



UNDERSTANDING MACHINE LEARNING MODELS  
XAI WORKSHOP  
PIOTR MAZUR, SENIOR ML ENGINEER & TEAM LEAD

**Prepare your environment**



**<http://piomazur.pl/xai-zip>**

# Agenda

About Airspace Intelligence

Why do we need XAI?

Coding

- Feature Importance

- Partial Dependence Plots

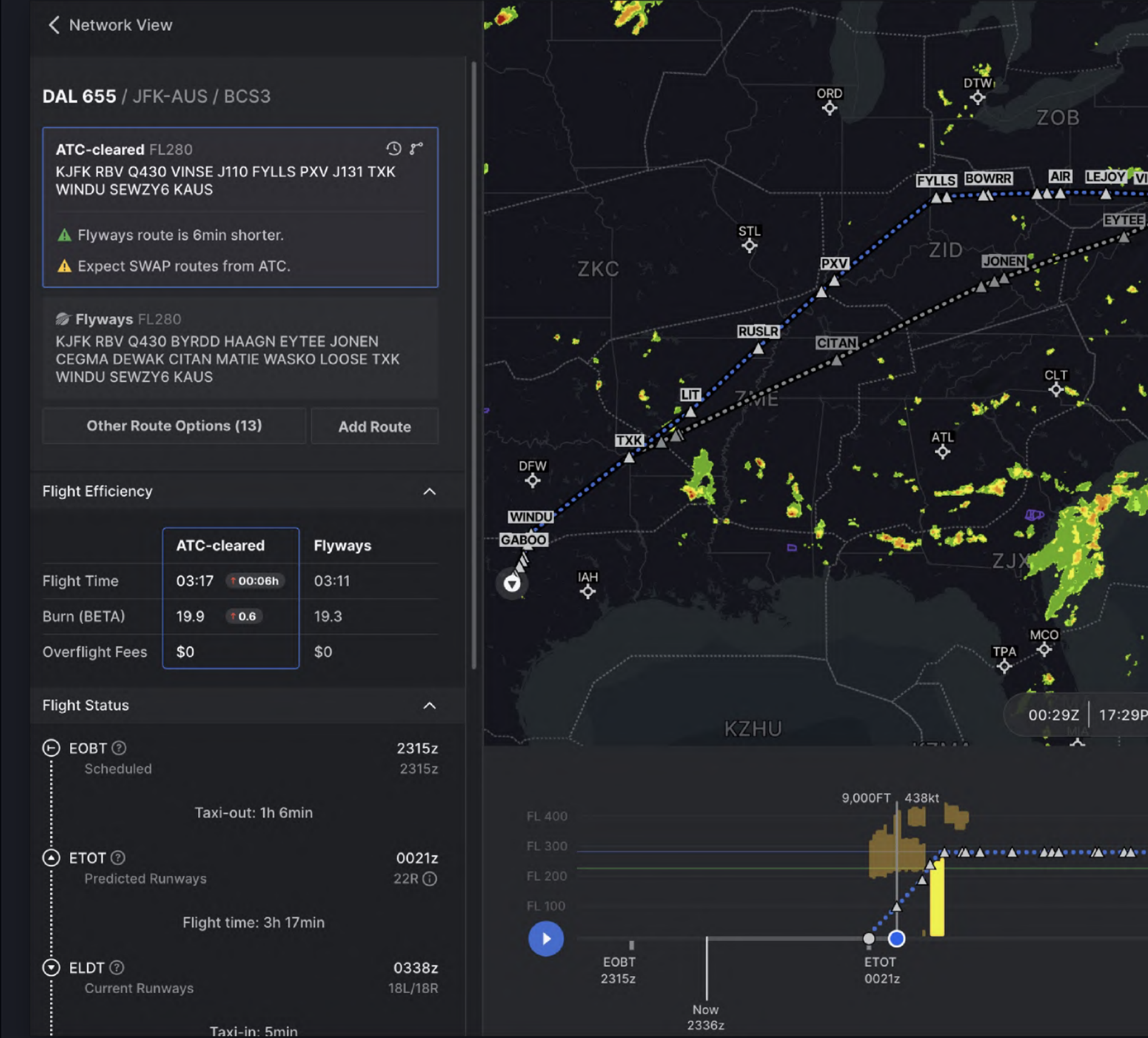
- SHAP Values

What to do when explaining black-box is not enough?

FLYWAYS AI™ PLATFORM

# The operating system for airline network operations.

Flyways is an AI-enabled platform designed to accelerate & improve operational decision making capabilities in the world’s most complex and dynamic airspace.





# Airspace Intelligence

TEAM & OFFICE





# Why do we need XAI?

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Model debugging



Model made bad prediction,  
how do you tell what caused  
it?

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## Accelerating feature engineering & data collection



How to tell which features  
are important and which  
are not? What kind of data  
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## Informing human decision-makers



Humans that are making  
decisions based on ML  
models need to understand  
the why.

FLYWAYS AI™ PLATFORM

# Informing human decision-makers

⚠ Flyways route saves 10min.

⚠ Flyways route saves 4,738lbs of fuel.

⚠ Recommend SUUNR arrival due to high demand on MPORT.  
Demand count: 7, procedure capacity: 6.

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## Building trust



From the engineers to users,  
everyone should trust the  
models.



# Coding

- 👉 Feature Importance
- Partial Dependence Plots
- SHAP Values





# Coding

✅ Feature Importance

👉 Partial Dependence Plots  
SHAP Values





# Coding

✓ Feature Importance

✓ Partial Dependence Plots

👉 SHAP Values





# Interpretable models



# Interpretable models

👉 Linear Regression





# Interpretable models

✅ Linear Regression

👉 Decision Tree





# Interpretable models

✓ Linear Regression

✓ Decision Tree

👉 GAM - Generalized Additive Model



# Interpretable models

✓ Linear Regression

✓ Decision Tree

✓ GAM - Generalized Additive Model

☞ EBM - Explainable Boosting Machine





# Sources

- <https://www.kaggle.com/learn/machine-learning-explainability>
- <https://xai-aniti.github.io/ethik/tutorials/partial-dependence-plot.html>
- <https://shap.readthedocs.io/en/latest/>
- <https://christophm.github.io/interpretable-ml-book/index.html>
- <https://interpret.ml/docs/ebm.html>

