Project 33
Alternative Jet Fuel Test Database Library

Motivation and Objectives

With a rapidly diversifying landscape of alternative fuels and increased momentum in national integration efforts, the need for close monitoring and analysis of the state-of-the-art in synthetic fuels becomes critical. Proceeding with synthetic and alternative fuel adoption under high levels of certainty and control requires two objectives:

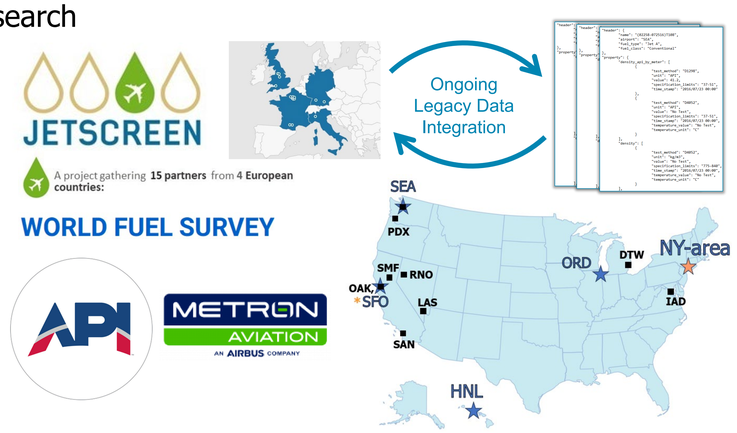
1. Accurate and regional specific tracking and monitoring of jet fuel composition, property, blending and usage trends

2. Improved methodologies for rapidly assessing both chemical-property and engine operability indicators for new fuels undergoing the qualification process

Research Partners

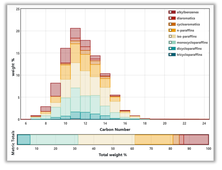
Summary

Maintain and expand jet fuel data archive to establish a foundation for synthetic and alternative jet fuel research

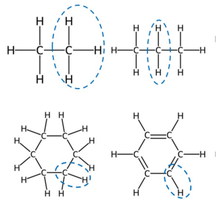


Leverage data to accelerate model development and evaluate novel jet fuel

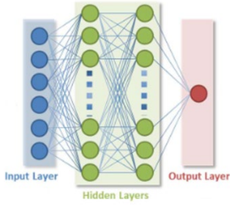
Fuel composition and property data

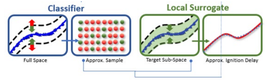


Fuel Surrogate Modelling with functional groups: Robust approach for novel fuels



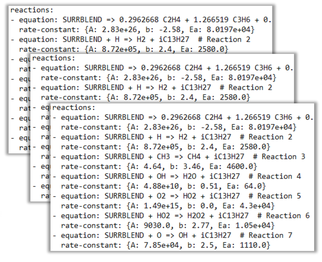
Data Driven Neural Network





Accuracy on par with detailed kinetic simulations with greatly reduced computational time

Rapidly generated kinetic mechanisms for full engine simulations



Lead investigator: Tonghun Lee, UIUC
Project manager: Ana Gabrielian, FAA

October 15, 2025

Results and Discussion

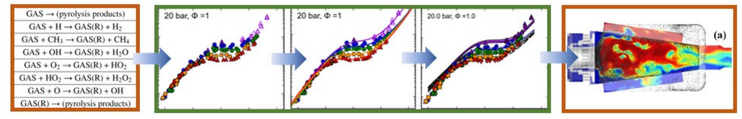
A Comprehensive SAF Database

- Assemble data into a centralized database for synthetic aviation fuels and enhance website usability and analysis functionalities.
- Connect database to international network: ALIGHT and NewJET
- Forge a new data pipeline with domestic US airports: fuel test data reports

NewJET: a virtual center of excellence linking the chemical properties of a fuel to improved performance properties

ALIGHT

- Incorporate a variety of testing data beyond composition-property test reports
- Apply advanced analysis technique: Machine-Learning based strategies to rapidly generate models and understand uncertainty



Conclusions and Next Steps

Domestic and International Data Sharing:

- Expand scope of airport data collection
  - NY Port Authority
  - HNL
- Implement data pipeline using data format conversion script and create a defined process for new data uploads

Chemical Kinetics Development:

- Rapid chemical kinetic mechanism generation for any fuel
- Uncertainty Quantification and Reduction

This research was funded by the U.S. Federal Aviation Administration Office of Environment and Energy through ASCENT, the FAA Center of Excellence for Alternative Jet Fuels and the Environment, project 33 through FAA Award Number 13-C-AJFE-UI-038 under the supervision of Ana Gabrielian. Any opinions, findings, conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the FAA.