

Alternative Jet Fuel Test Database Library

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Objective:

This objective is to **establish a comprehensive and foundational database of current and emerging alternative jet fuels by integrating relevant pre-existing jet fuel data into a common archive** that can support scientific research, enhance operational safety, and provide guidelines for the design and certification of new jet fuels. We also plan to establish the foundation for a transnational network to track both SAF development and integration in the global arena.

Project Benefits:

Domestic benefits include integration of SAF data into a centralized database which can support future research and fuel certification. The internationally connected database structure will also increase our understanding of the global fuel infrastructure and variability, **increase sustainability by supporting the certification and integration of new SAFs, and safeguard US airlines** by monitoring the fuel consumed across the complex global aviation landscape as new fuels are integrated into the system.

Research Approach:

Develop a Comprehensive SAF Database on Properties & Testing

- Compile data into a centralized database for SAF
- Select data storage format: non-relational JSON & CSV
- Apply advanced analysis technique: Machine learning based
- Connect database to international network: JETSCREEN & beyond
- Inclusion of current jet fuel data in use

With integration of new fuels into our global aviation infrastructure, establishment of this database can help to (1) monitor current jet fuel development and deployment, and (2) shorten the sustainable jet fuel certification process by supplying key data and analysis that can reduce redundant tests. In the future, this database can potentially be the basis for a transnational network that can be used to monitor worldwide fuel usage in real time and provide critical information that can ensure enhanced sustainability and airline safety in a complex global arena.

Major Accomplishments (to date):

Accomplishments in Current Year

- Functional updates to database (display, export, import, etc.)
- Selection of data sync with JETSCREEN as well as privacy protocols
- Machine learning: detection of novelty fuels, missing data imputation, uncertainty analysis, improved modeling robustness
- Machine learning based chemical kinetics mechanism for SAF
- COVID Impact: airport data integration delayed

Future Work / Schedule:

- Continued collection of data for integration into the database
- Improvements to the online analysis tools (visualization, statistical analysis)
- Integrate GCxGC data into database website
- Extension of database with A-Light and NEWJET programs (Europe)
- Continued development of analysis using machine learning: prediction, confidence analysis, and chemical kinetics development
- Reinitiate Integration of real time airport data (fuel properties)