

## Project 70



# Reduction of nvPM Emissions from Aero-Engine Fuel Injectors

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## Objective:

- Characterize the formation and oxidation of non-volatile particulate matter (nvPM)
- Understand the effect of Jet A and SAF

## Project Benefits:

- Improve the understanding of nvPM formation/oxidation and develop numerical models to guide new fuel injector design.
- Provide experimental validation data to Proj. 71
- Complementary to engine tests to allow optical diagnostics
- Enable cleaner aircraft engines compliant with the ICAO CAEP/11 nvPM LTO standard

## Research Approach:

- Experiments on high pressure combustor with three liquid fuel injectors
- Variety of optical diagnostics (OH PLIF, LII) and sampling at practical engine conditions
- Numerical simulations to understand underlying nvPM formation mechanisms

## Major Accomplishments (to date):

- A unique high pressure combustor with three fuel injectors commissioned
- Numerical simulations were conducted to be compared with experiments
- LII, OH PLIF and sampling measurements were conducted to investigate the nvPM formation mechanism under different conditions

## Future Work / Schedule:

- Systematic experimental measurements on Jet A, SAF and their blends
- Comparison between modeling and experiments
- Extractive sampling measurement on nascent soot, NO<sub>x</sub>, SO<sub>x</sub>, and CO