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Tom Cawley, Lab Director
The Pennsylvania State University
Applied Research Laboratory
North Atherton Street
State College, PA 16801

Biofuel Comparison in Compact Turbojet Engine

Task 1. Adaptation of thrust cell to existing engine and test stand ---

The existing test stand and engine will be modified to accept the existing 200-lb thrust cell. Thrust, RPM and exhaust temperature signals will be conditioned for/adapted to existing data acquisition equipment. The ability to document of the engine/fuel testing with a digital data set will result. Fuel flow rates will not be intrinsic to the digital data set. A facsimile of the fuel flow rate signal may be added to the digital data set in post-processing.

Task 2. Rework of fluidized bed fuel feed system ---

The existing fuel feed system will be reworked to enhance control of solid biofuels with varying properties (density, particle hardness, moisture content). Valve, instrumentation and gas distributer selection as well as equipment arrangement will be included in the rework.

Task 3. Re-Baseline of TurbineBioFuel (Algae Derived) ---

A baseline marginal thrust specific fuel consumption for the SG-18 operating on Jet A will be measured. This parameter represents the increase in power associated with an increase in fuel flow. This measurement will be performed with the engine idling on Jet A and “throttled-up” with TurbineBioFuel that is currently on-hand at ARL. A similar measurement will be performed while operating exclusively on Jet A. The increase in power during the throttle excursion will be normalized by the product of fuel flow and heat of combustion to produce a rudimentary combustion efficiency parameter.

Task 4. Baseline of TurbineBioFuel (Yeast Derived) ---

This marginal thrust specific fuel consumption measurement will be measured with the engine idling on Jet A and “throttled-up” with yeast derived TurbineBioFuel yet to be delivered to ARL. The increase in power during the throttle excursion will be normalized by the product of fuel flow and heat of combustion to produce a rudimentary combustion efficiency parameter. The biofuels will be compared to the Jet A on the basis of these basic performance parameters. A manuscript will be prepared to submission for publication in a yet-to-be-specified technical journal.

Formal Scope of Work and greater detail will be forwarded with the contract. PSU business office will forward the contract for your review shortly.