

Propellant Fueled Solid Oxide Fuel Cell (PropFC) – TP

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Project Overview

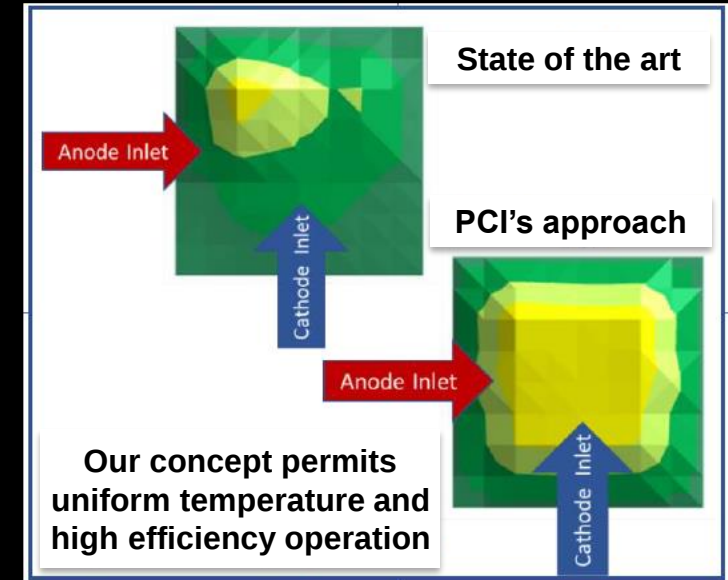
Precision Combustion, Inc. (PCI), in conjunction with NASA support, will design, develop, and demonstrate a TRL-6, air independent, solid oxide fuel cell (SOFC) stack for generating power directly from CH_4/LOX propellants as well as scavenged resources (e.g., in-situ resource utilization) for lunar surface applications in support of Tipping Point Topic 2: Enabling sustainable surface power for lunar missions.

Technical Approach

The project is developing a robust, modular SOFC stack for generating power directly from propellants and scavenged resources through computational design, process simulation, and qualification testing (e.g., life, thermal cycle, vacuum, and vibration tolerance).

Results/Summary

The contract was awarded in August 2021 with a period of performance of 24 months. Since the beginning of the project, PCI has reviewed resources, assignments, & schedule/availability. The kick-off meeting was held on September 2 (presuming this happens by the time we show this poster).



- Advanced SOFC stack design that permits power generation with CH_4/LOX propellants.
- Synergistic operation to allow for increased lifetime & efficiency
- SOFC stack will be designed for air independent operation.

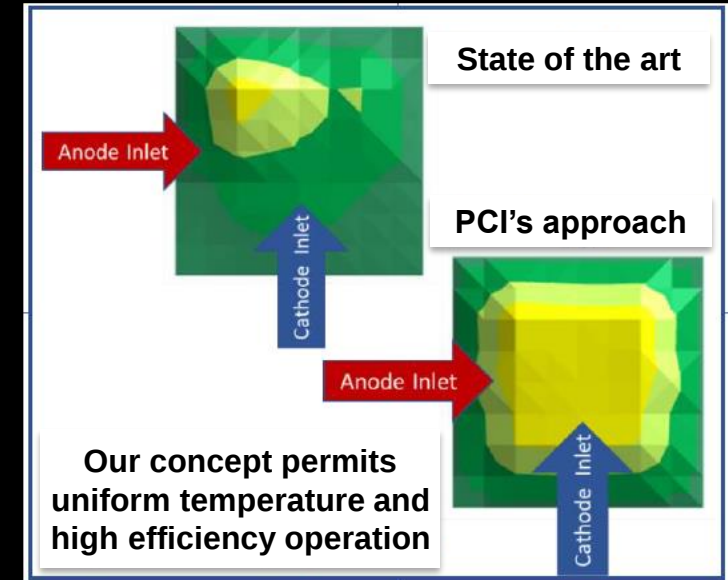
Contributing Partners

NASA GRC is providing technical development support and JSC is providing technical development support and demonstration.

Infusion and Transition Plan

The proposed solution is a novel SOFC, designed for lunar surface power generation (directly from CH_4/LOX propellants or scavenged resources).

Targeted space applications include future power generation systems and ISRU concepts for lunar or Martian surface landers, rovers, and bases. NASA STMD is the transition partner/customer before technology infusion to multiple commercial opportunities in conjunction with NASA's Thrusts of Go, Land, Live, and Explore.



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