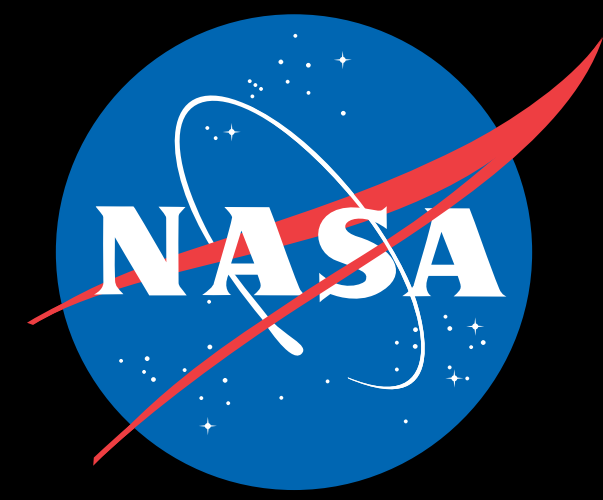




Space Technology Mission Directorate Game Changing Development Program

Propellant Fueled Solid Oxide Fuel Cell (PropFC)

Project Overview

Advancing Solid Oxide Fuel Cell (SOFC) stack to generate electrical power directly from residual CH₄/LOX propellants by maturing stack design & conducting system-level study.

Technical Approach

Utilizing computational design, process simulation & qualification testing (e.g., life, thermal cycle, vibration/shock) to develop a robust, modular SOFC stack.

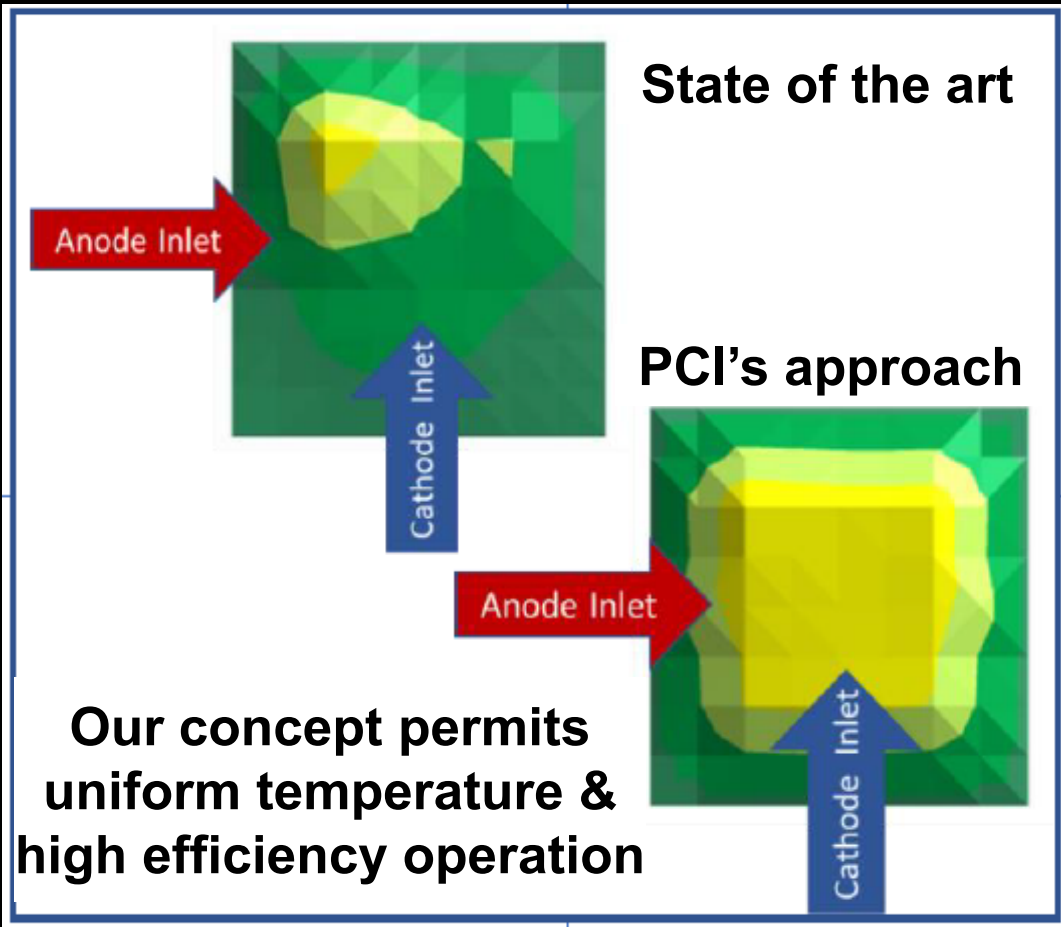
Completed 2000 hrs of SOFC power generation with CH₄ & H₂ including 100 operational & thermal cycles.

Contributing Partners and/or Infusion Plans

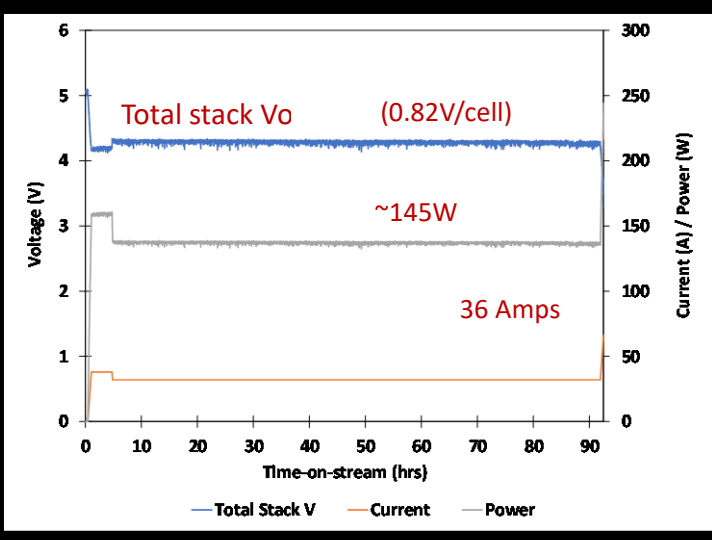
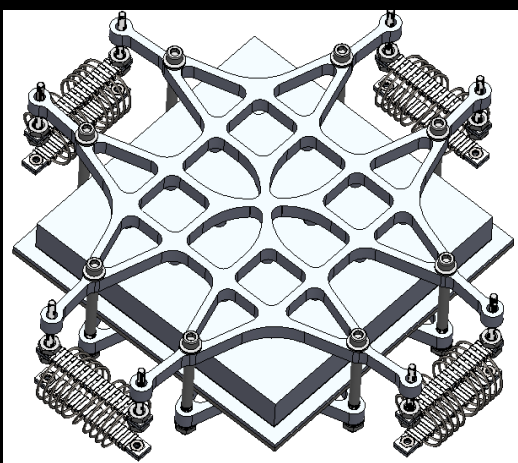
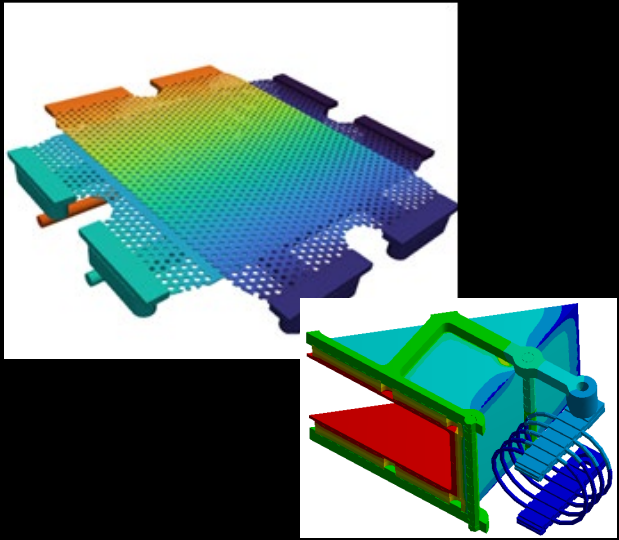
NASA JSC; NASA GRC;
Lunar/Mars surface missions
(e.g., rovers, landers, habitats)

Additional Information

Concept: Thermal measurements show improved temperature distribution & uniformity



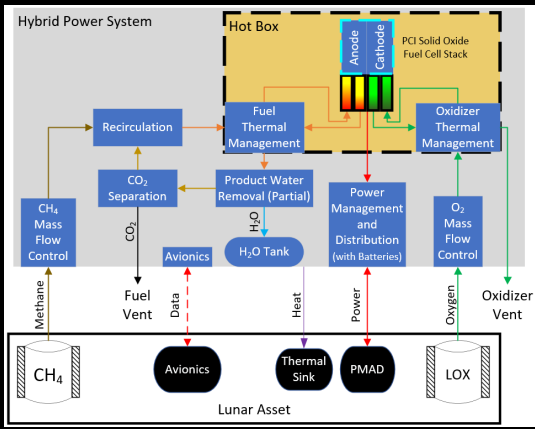
PCI Tasks: SOFC Stack Design, Development & Performance Test (Cycles, Durability)



JSC Tasks:
Stack Verification & Environmental Test



GRC Tasks: Develop Functional System Diagram



Summary of PropFC Activities	
Design & Build Fuel Cell Stack (PCI)	• 250-Watt SOFC stack • Design for H ₂ & CH ₄ reactants
System-level Trade Study (GRC)	• Develop system-level design • Identify system-level tech. gaps
Performance Test (PCI)	Operational envelope
Environmental Test (JSC)	Shock & vibration with performance verification

Schedule:



POC's: Todd Peterson (COR – GRC), Christian Junaedi (PCI), Ian Jakupca (GRC), Kam Mwara (JSC)

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