

# 400 W Stirling Convertor for kW-Class Space Power System, Phase I Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



## ABSTRACT

SCCAQ Energy, LLC (SCCAQ), in collaboration with Temple University and Infinia Technology Corporation (ITC), is pleased to propose a Stirling Kilopower Innovative Prototype (SKIP) that is ideally suited for use with fission-based Space Nuclear Power Systems (SNPS) and/or Nuclear Electric Propulsion (NEP) systems. SKIP adapts the ongoing development of a 400-W free-piston Stirling (FPS) engine for terrestrial applications to meet NASA needs for SNPS. This proposal is specifically addressed to STTR Topic T3 (Space Power and Energy Storage), with an emphasis on Subtopic T3.01. The proposed effort will be supported by Temple University SEEE lab personnel and will heavily leverage engineering support from Infinia Technology Corporation (ITC). This proposal is based on adapting newly developed 400-W engine at ITC to current NASA needs for an extremely reliable, robust, and high performance space power engine for Kilopower fission thermal conversion, among other potential power system heat sources. The key change that is needed to develop a SKIP demonstration unit is to modify the heater head to be suitable for interface with a space reactor system as a heat source.

## ANTICIPATED BENEFITS

### To NASA funded missions:

Potential NASA Commercial Applications: The market for the SKIP-specific device will be initially focused on delivery of NASA space power systems.

### To the commercial space industry:

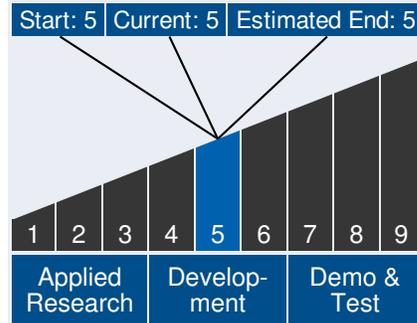
Potential Non-NASA Commercial Applications: The technology developed in the proposed SKIP system, however, has potential commercial applicability to the remote power and combined heat and power generator line that ITC/Qnergy is pursuing.



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## Technology Maturity



## Management Team

### Program Executives:

- Joseph Grant
- Laguduva Kubendran

### Program Manager:

- Carlos Torrez

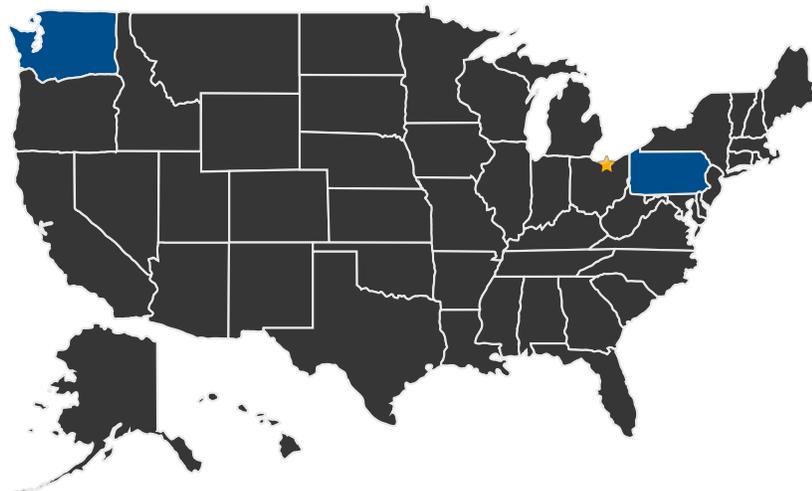
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## U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States  
With Work

★ **Lead Center:**  
Glenn Research Center

### Other Organizations Performing Work:

- SCCAQ Energy, LLC (Richland, WA)
- Temple University (Philadelphia, PA)

## PROJECT LIBRARY

### Presentations

- Briefing Chart
  - (<http://techport.nasa.gov:80/file/23589>)

## IMAGE GALLERY



400 W Stirling Convertor  
for kW-Class Space  
Power System, Phase I

### Management Team (cont.)

#### Principal Investigator:

- Songgang Qiu

### Technology Areas

#### Primary Technology Area:

- Space Power and Energy Storage (TA 3)
  - └ Power Generation (TA 3.1)
    - └ Fission (TA 3.1.5)

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## DETAILS FOR TECHNOLOGY 1

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### Technology Title

400 W Stirling Converter for kW-Class Space Power System, Phase I

### Potential Applications

The market for the SKIP-specific device will be initially focused on delivery of NASA space power systems.