

High Performance Configurable Electrical Power System for LEO Missions, Phase I Project

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



ABSTRACT

Leveraging Tyvak personnel's extensive experience in end-to-end technology development cycles, we propose to design, fabricate and qualify an EPS system targeting 50 to 100W orbit average power. Fitting within a 6U or smaller envelope, this fault-tolerant electrical power system will integrate mission-configurable deployable solar arrays; ultra-efficient, low-noise peak power energy transfer circuitry; high capacity, high cycle and high power capable energy storage; and high-efficiency power regulation & distribution circuitry. The Phase-I Option of this effort will involve the design and analysis of these systems adhering to a development philosophy of modularity, scalability and testability.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: Completion of the proposed phase-II effort will produce a flight qualified high-power electrical power system (EPS). This EPS will advance small satellite power capabilities, enabling continuous measurement payloads and the associated high-rate data downlink overhead. By miniaturizing power capabilities currently only achievable in large spacecraft form factors, full-capability programs may enjoy the low-cost, quick turn benefits currently afforded to NASA InVEST technology demonstration missions. The proposed flexible architecture will be adaptable to a variety of Earth sensing missions, conducive to fulfilling a number of NASA's published strategic goals and science plans, especially those concerned with environment change measurement. Cost and budgeting uncertainty will be minimized throughout these programs through the proposed architecture of standardized component modules and reconfigurable solar arrays.

To the commercial space industry:

Potential Non-NASA Commercial Applications: The proposed flexible architecture will be adaptable to a variety of commercial

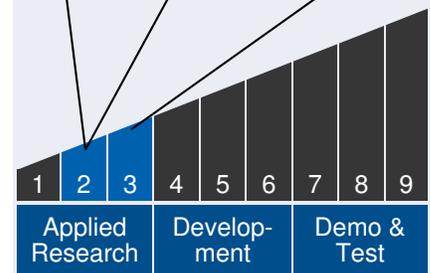


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Technology Maturity

Start: 2 | Current: 2 | Estimated End: 3



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Continued on following page.

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Earth sensing missions, especially those concerned with comm., weather and multi-spectral imaging ventures. Cost and budgeting uncertainty will be minimized throughout these programs through the proposed architecture of standardized component modules and reconfigurable solar arrays.

Management Team *(cont.)*

Principal Investigator:

- John Abel

Technology Areas

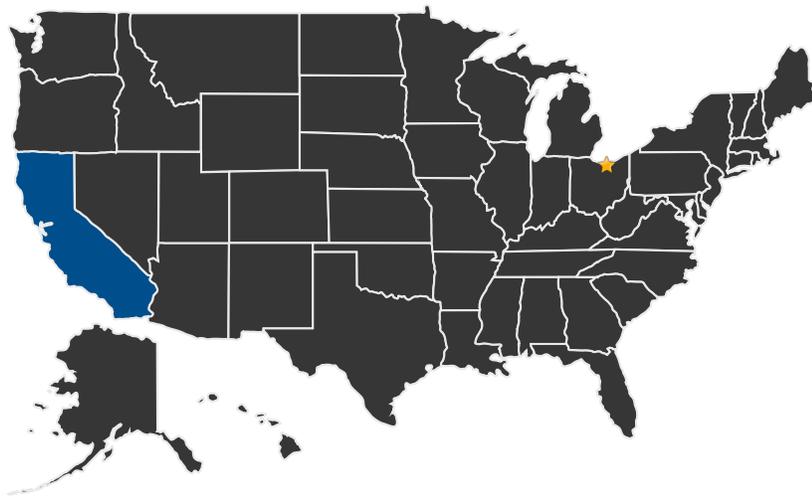
Primary Technology Area:

Space Power and Energy Storage (TA 3)

└ Power Management and Distribution (TA 3.3)

└ Conversion and Regulation (TA 3.3.5)

U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States
With Work

★ Lead Center:
Glenn Research Center

Other Organizations Performing Work:

- Tyvak Nano-Satellite System Inc (Irvine, CA)

PROJECT LIBRARY

Presentations

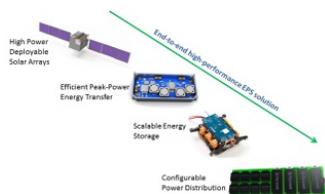
- Briefing Chart
 - (<http://techport.nasa.gov:80/file/23353>)

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IMAGE GALLERY



*High Performance Configurable
Electrical Power System for LEO
Missions, Phase I*

DETAILS FOR TECHNOLOGY 1

Technology Title

High Performance Configurable Electrical Power System for LEO Missions, Phase I

Potential Applications

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