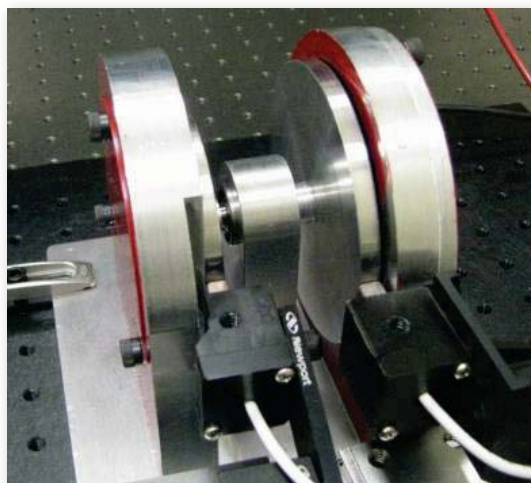


A DC Transformer Project

Center Innovation Fund: KSC CIF Program

Space Technology Mission Directorate (STMD)

National Aeronautics and
Space Administration

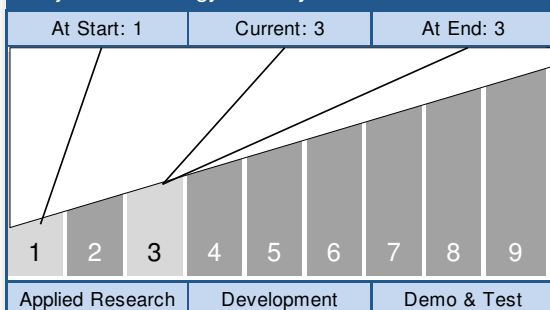


A DC Transformer

ABSTRACT

Demonstrate a DC transformer; a new electro-mechanical component with potentially high power applications.

Project Technology Maturity



Technology Area: Space Power & Energy Storage TA03 (Primary)
Launch Propulsion Systems TA01 (Secondary)

ANTICIPATED BENEFITS

To NASA funded missions:

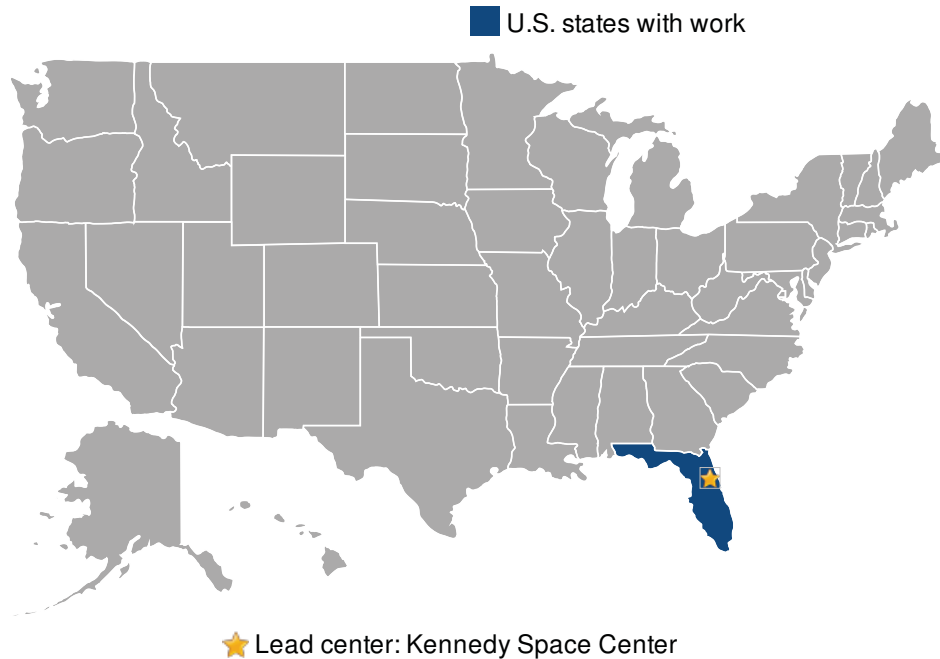
NASA's Return on Investment: This is a revolutionary advance. No dc transformer has ever been demonstrated, so this will not only yield a new device and new capability, but will highlight NASA's innovation capability and lead to new insights within electro-magnetism.

To NASA unfunded & planned missions:

Dc to dc converters exists, but these are low power devices consisting of ...

Read more on the last page.





DETAILED DESCRIPTION

Three different concepts were tested with the intent of demonstrating a true dc transformer, i.e. an electrical device into which a given dc voltage and current can be applied and which will generate a different voltage and current, effectively changing the impedance of a power supply.

MANAGEMENT

Program Executive:
John Falker

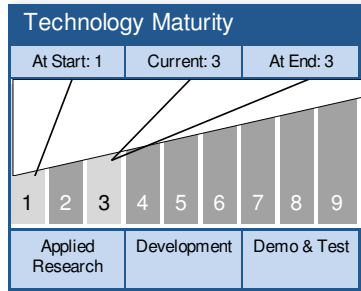
Program Manager:
Nancy Zeitlin

Project Manager:
Nancy Zeitlin

Principal Investigator:
Robert Youngquist

TECHNOLOGY DETAILS

A DC Transformer



TECHNOLOGY DESCRIPTION

Three different concepts were tested with the intent of demonstrating a true dc transformer, i.e. an electrical device into which a given dc voltage and current can be applied and which will generate a different voltage and current, effectively changing the impedance of a power supply.

This technology is categorized as a hardware component or part for other applications

- Technology Area

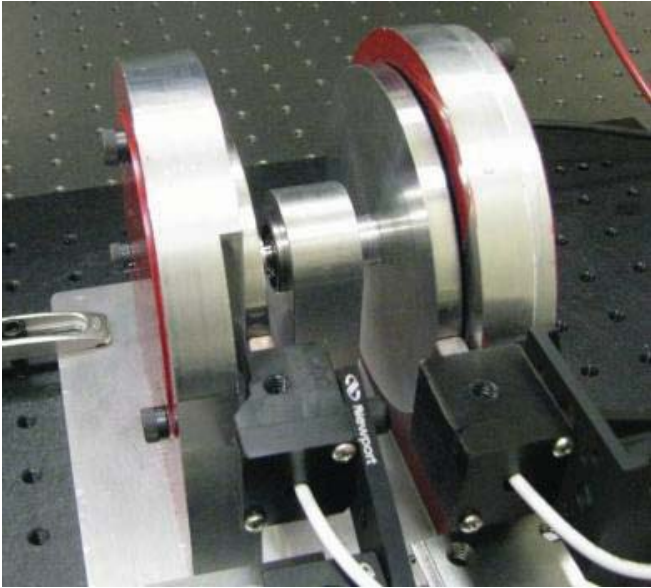
- TA03 Space Power & Energy Storage (Primary)
- TA01 Launch Propulsion Systems (Secondary)
- TA13 Ground & Launch Systems Processing (Additional)

CAPABILITIES PROVIDED

After 200 years of development it is rare for any fundamental advance to occur in the field of electro-magnetism, yet analysis has shown that the construction of a dc transformer should be possible. No one has ever demonstrated a dc transformer, so this would be significant accomplishment. Also, power companies need better methods of shifting the impedance of dc power systems.

This device may become a commercially available entity, not unlike ac transformers are now. This advance will affect a wide variety of fields, especially in green technologies where dc power is routinely generated, stored, and utilized.

IMAGE GALLERY



A small scale device was constructed to demonstrate the d-dc transformer concept

TECHPORT PROJECT LIBRARY REFERENCES

CONFERENCE PAPERS

A DC Transformer; IEEE Transactions on Power Electronics manuscript:
(Vol. 29, Issue 1, January 2014, pp. 42-44)



ANTICIPATED BENEFITS

To NASA unfunded & planned missions: (CONT'D)

semiconductor switches. The proposed work develops a true dc transformer that can be scaled up to very high power levels.

To the commercial space industry:

This device may become a commercially available entity, not unlike ac transformers are now. A manuscript was published in the January 2014 issue of IEEE Transactions on Power Electronics, titled "A DC Transformer" (VOL. 29, NO. 1); the letter presents an electromechanical component that transforms dc power, allowing dc voltages or currents to be stepped up or down.

