Overview of Small Spacecraft Technology Activities at the NASA Glenn Research Center

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Frederick W. Elliott | frederick.elliott@nasa.gov | 216-433-2322
NASA Glenn Research Center, 21000 Brookpark Road, Cleveland, OH 44135

COMMUNICATIONS

Candidate Mission Demonstrations

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<th>Candidate Mission</th>
<th>Description</th>
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<tr>
<td>Advanced Electric Bus (Albus)</td>
<td>Demonstration of inductive energy transfer, system integration, and cost effectiveness</td>
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<tr>
<td>Pathfinder Technology Development</td>
<td>High power density design for inductive power transfer and inductive resonant technologies</td>
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STMD Small Spacecraft Technology Program (STSP)

Tipping Point—Tethers Unlimited, Inc., HYDROS-0

RIT Development of a Non-Axial Space Power System

- Developing non-axial enhanced power systems components that allow for reduced weight while increasing capability in power systems for Cubats and other small satellites
- Carbon nanotube (CNT)-enhanced biocomposite batteries
- Improved power output rate at 240 kW/kg
- Decreased LID cycling of >100 cycles with no change in voltage
- Surface durability and wear rates of up to 100% improvement in power output rate
- CNT thermoelectric materials with improved efficiency of energy harvesting and cooling
- Demonstration of high-temperature tolerant solar arrays using space standards (July 2018)

Commercial Ka-Band User Terminal Antenna Examples

- Single system: transmit only for transmit and return capability
- Dual system: simultaneous transmit and receive capability
- Ka-Band Ka-Band antenna development for next generation Ka-Band satellite systems
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ASPs can maximize available orbital power by tailoring electric power transfer systems to the mission's power and energy needs, resulting in benefits for high-density solar power systems.

- ASPs can improve performance in 1-3 orbit cycles
- Increased amplifier efficiency
- Increased power density
- Increased power density
- Increased power density

RIT-2 and HYDROS AES Linear Coaxial

- Axial-to-axial power transfer in 1-3 orbit cycles
- Increased amplifier efficiency
- Increased power density
- Increased power density
- Increased power density