HaWK (High Watts per Kilogram) Series of Solar Arrays

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HaWK Systems Details
- HaWK modular high performance solar array
  - Compatible with 3U and 6U form factors
- Deployable Solar Array Wing
  - Single array panel
- Power harness with customer specified connector (not shown, approximate location only)
- Snap-on sheet
- Single-axis drive mechanism
- Electronic melt wire release mechanism

Portfolio of Designs
- HaWK solar array architecture provides a building block approach allowing modularity and scalability
- Focus is on maintaining standard components for cost attractive power solutions
  - 36W BOL @ 70°C Peak Power
  - 72W BOL @ 70°C Peak Power
- Advanced proprietary embeddings at >700V and targeting >40kW peak power

HaWK Specifications
- Power Specs:
  - 36W BOL @ 70°C Peak Power
  - 130 W/kg BOL specific power
  - 90 Volts
  - Spectralab UT (28.3% at 28°C, AMO)
- Discrete integrated by-pass diode
- Structural Specs
  - 3rd mode > 2.5 Hz deployed
  - Deployment duration (t_d) from launch lock release to full deployment (t_f)
  - < 0.5 seconds
  - Solar array system mass ~ 270g
- Options
  - 36W 6U form factor
  - 10% (6cm) 6.5mm thick
- Motion is +/- 180 Degrees
- Sun tracking

Timeline of Technology Maturation
- HaWK technology largely supported by SBIR funding
- MMA Design solar array product portfolio continues to push the state of the art (SOA) in space power performance and future missions

HaWK Status
- Fully qualified for the ORS mission
- HaWK deployable solar arrays will be repurposed for the AFRL Biarri mission

HaWK Portfolio of Systems Details
- E-HaWK high power solar panel
  - Multi-panel design for high power missions
  - Deployable Solar Array Wing
  - 10 panels
- Solar Cells (UTI based) compatible with a variety of cell embodiments
- Patented rigid substrate
  - Single solar array panel (14 cm)
- Power harness with customer specified connector (not shown, approximate location only)
- Panel edge lock launch restraint mechanism
- Electronic melt wire release mechanism

HaWK Portfolio Systems Specifications
- Power Specs
  - 72 W BOL @ 70°C (3) panels per wing config.
  - 144 W BOL @ 70°C (6) panels per wing config.
  - 120 W/kg BOL @ 70°C Specific power
  - 30-50 kW/m²
  - Spectralab UT (28.3% at 28°C, AMO)
  - Discrete integrated by-pass diode
- Structural Specs
  - 1st mode > 3.5 Hz deployed
  - Deployment duration (t_d) from launch lock release to full deployment (t_f)
  - < 1.0 second
  - Solar array mass ~approx. 600 grams
  - Complete system with launch restraint

Conclusion
- High technology readiness level
- Flight heritage 2016
- HaWK portfolio of solar array platforms is establishing state of the art technology which will enable current and future high power mission.
- Providing best-in-class power solutions with demonstrated reliability, efficient packaging, modularity, and scalable power
- Offering component commonality and innovative mechanisms aimed at providing elegant solutions at a competitive price point
- Continuous development toward new HaWK configurations to provide power up to 40kW

E-HaWK Status
- Risk reduction random vibration testing complete; criteria enveloped industry standards
- Multiple 3D deployment tests completed successfully
- Thermal Cycle testing successfully performed between 80°C and -35°C, 8 cycles with 1 hours dwells