



Space Power Workshop

Rapid and agile power systems: Developing new norms for an evolving and contested space environment

April 23–25, 2024

Torrance Marriott Redondo Beach, Torrance, CA

Day 1, Tuesday, April 23:

Note: all times are Pacific Daylight Time (UTC-7)

8:00 Keynote Speaker:

Mark Honda, Chief Engineer, Space Systems Command
Space Systems Integration Office, U.S. Space Force

8:40 Plenary Session Speakers:

A Need for Speed: Tips for Fielding Responsive Space Systems

Ari Sandberg, Technical Staff in the Tactical Space Systems group
MIT Lincoln Laboratory

10:00 Break

10:15 Mission and Program Experience:

Europa Clipper Power Subsystem Implementation and Lessons Learned

Brandon Burns, Jet Propulsion Laboratory, California Institute of Technology

Analysis of Glint During the Artemis I Mission

Alexander Jurcago, John Carroll University

Carrying It Forward - Iridium NEXT Lithium-Ion Batteries

Mark Toft, Iridium Satellite, LLC.

iROSA Computational Model Development and Integration for the International Space Station

Steven Korn, NASA Glenn Research Center

Ovzon-3: First commercial application of ROSA, on a Maxar GEO spacecraft

Harry Yates, Maxar Space Systems

12:00 Lunch

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1:15 Energy Storage I – Space Battery Level Topics:

VL10ES Cell and Battery Qualification update

Yannick Borthomieu, Saft

Recent Results from Li/CFx Battery Cell Development for Robotic Space Missions

Erik Brandon, Jet Propulsion Laboratory, California Institute of Technology

Effects of Pressure Distribution within Battery Cells

Jarred Olson, The Aerospace Corporation

Self-Discharge Measurements of Cells in Cycling Li-Ion Batteries

Albert Zimmerman, The Aerospace Corporation

Investigation of COTS Li Ion Cell Performance at Low Temperature

Ryan Pritchard, EnerSys Advanced Systems ABSL

3:00 Break

3:15 Energy Generation I – Space Solar Cell Technologies:

Addressing Space Power Demands with XTE Plus Family of 3J Technologies and Sitewide Manufacturing Advancements

Philip Chiu, Spectrolab, Inc.

Qualification, Production, and Mission Updates of SolAeros Inverted Metamorphic and Upright Multijunction Solar Cells

Daniel Derkacs, SolAero Technologies Corp by Rocket Lab

AZUR SPACE - Enabling Solar Cell Technologies for Today's and Future Space Markets

Torsten Torunski, AZUR SPACE Solar Power GmbH

Effective Annealing of 1 MeV Electron and 3 MeV Proton Damage in Silicon Solar Cells at 65C and Maximum Power Point Conditions

Diana Aponte, Solestial, Inc.



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Epitaxy-Free, Thin-Film GaAs Solar Cells with Voc Greater than 900 mV

Phillip Jahelka, California Institute of Technology

5:00 Poster Session and Networking Social

Normal incidence and angle single event effects (SEE) results of a radiation hardened 100V GaN power HEMT

Oscar Mansilla, IR HiRel, an Infineon Technologies Company

Development of Cost-efficient and Ultra-light CIGS Solar Cell for Space Applications

Hiroshi Tomita, Idemitsu Kosan Co., Ltd.

Airbus Space Batteries Products

Kévin Allenbach, Airbus

Dynovas' Motorless Deployable Array Technologies

Brynn Hall, Dynovas, Inc.

Development of Engineered Ge Substrate for Space Solar Cells: Project status and outlook

Kristof Dessen, Umicore

Design of Precharge Circuit with Latched Current Limiter for Power Control and Distribution Unit in Low Earth Orbit Satellite

Youngsu Youn, Korea Aerospace Research Institute

Lithium Sulfur Energy Storage Development for Space Applications

Taylor Xu, Navitas Systems LLC

Main Electronics for Global Access (MEGA) power units: modular and integrated electronics for LEO constellations needs

Marcos Núñez Rodríguez, Airbus Crisa

Solar Cell IV Measurement... to the Moon

Scott Ireton, Angstrom Designs



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Solar Simulation challenges of NASA's Huge Artemis Power and Propulsion Element Solar Arrays
Casey Hare, Angstrom Designs

7:30 Conclusion of Day 1

Day 2, Wednesday, April 24:

Note: all times are Pacific Daylight Time (UTC-7)

8:00 Power Systems Architecture:

Generic High Power System for manned missions to the Moon and beyond
Marcos Núñez Rodriguez, Airbus Crisa

The Lunar Surface Innovation Consortium: Collaboratively Developing Lunar Surface Power Systems
Julie Peck, Johns Hopkins University Applied Physics Laboratory

The Necessity of Developing Lighter, Smaller and More Efficient Power Modules for SmallSats // Enhance mission reliability and address the unique challenges posed by the space environment
Jason Stange, Packet Digital

Renesas Power Solutions to Address Multi-Mission Requirements
Abigail Eberts, Renesas Electronics

10:00 Break

10:15 Energy Generation II – Modules and Arrays Designs:

Results on Solar Array Technology Qualification for LEO SmallSat Missions using semi-automated processes
Ismael Sanchez, DHV Technology

Flexible and lightweight solar power modules for LEO satellites and next-generation arrays
Chris Youtsey, MicroLink Devices, Inc.

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SAVER: Evolution and performance of Maxar GEO solar arrays

Harry Yates, Maxar Space Systems

Power Generation Impacts of Spacecraft Albedo During the Artemis I Mission

Spencer Furin, NASA Glenn Research Center

Active, All-Cell Reconfigurable Strings for Long, High Efficiency Missions

Jay Gordon, Northrop Grumman Corporation

12:00 Lunch

1:15 Advanced Concepts:

Creating a Lunar Surface Power Grid

Jeffrey Csank, NASA Glenn Research Center

The Fission Surface Power Project

Andrew Presby, NASA Glenn Research Center

The Orbitron - A Compact Fusion Power Source for Space

Park Cover Jr., Avalanche Energy

Robust & Resilient Electronics Adaptive Development (RREAD)

David Caldwell, The Aerospace Corporation

Fortifying the Future: A Secure US Germanium Supply Chain for Space Solar Cells

The Chinese germanium embargo and N. American Sourcing

Jason Merrell, 5N Plus Semiconductors

3:00 Break

3:15 Workshops (Concurrent Sessions):

- Energy Generation
- Energy Storage
- PMAD



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5:00 Conclusion of Day 2

Day 3, Thursday, April 25:

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8:00 Energy Storage III – Advanced Energy Storage Topics:

LEO Cycling Performance of Lithium-Ion Batteries with Carbon Nanomaterials

Elena Haddon, Carbon Solutions, Inc.

High Performance Li-ion Enabled by Vanadium Oxide Anode: Max Power, Extended Life and Low Temp Charge Capability

Haodong Liu, Tyfast Energy Corp.

Lyten's High Energy Li-S Batteries for Aerospace Applications

Ratnakumar Bugga, Lyten, Inc.

Liquefied Gas Electrolytes for Next-Generation Batteries for Extreme Cold Temperature Operations

Ryo Tamaki, South 8

Silicon enabled energy storage with extreme energy and power density

Ionel Stefan, Amprius Technologies, Inc.

10:00 Break

10:15 Energy Generation III – Reliability and Characterization:

Thermal runaway in space solar cells

Tetsuya Nakamura, Japan Aerospace Exploration Agency

Electroluminescence Imaging: A Quantitative Characterization Technique to Measure Dust Occlusion on Solar Cells

Meghan Bush, NASA Glenn Research Center

Dosimetry Methods in Beam Fluence Determination for Solar Cell Radiation Ground Testing

Scott Messenger, Northrop Grumman Corporation

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Results of the Alba mission

Michael Kelzenberg, California Institute of Technology

Survey of Electrical Power Subsystem On-Orbit Anomalies Since 1970 with a Focus on Solar Arrays

Yao Lao, The Aerospace Corporation

Solar Cell IV Measurement... to the Moon*

Scott Ireton, Angstrom Designs

1:15 Energy Storage II – Cell Level Developments for Energy Storage:

Development of Specialized Li-ion Batteries for a Venus Aerobot Mission

Will West, Jet Propulsion Laboratory

Development of the lithium-ion cells for lunar exploration programs

Hiroki Fuse, GS Yuasa Technology Ltd.

GS Yuasa's Generation 4 Li-ion Space Cell Update

Thomas Pusateri, GS Yuasa Lithium Power

Domestic Lithium-ion Cell Production and Performance Characteristics

Joe Troutman, Forge Nano

Studies on Zero-voltage Stability on ALE 4Ah 18650 cylindrical cells for NASA applications

William Hadala, American Lithium Energy Corporation

3:00 *Break*

3:15 PMAD – Power System Design and Analytical Techniques:

Innovative COTS Based PCU and Reversible Power Converter Module Solution for Telecommunications Market

Marcos Núñez Rodríguez, Airbus Crisa

ESA PLATO Mission Power Conditioning and Distribution Unit

Hans Jensen, Terma A/S



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Passive Survival of the Lunar Night with Cryogenically-Operable Electronics

Nicholas Uguccini, NASA Glenn Research Center

Environmental impact on BMS design and Architecture

Richard Coffin, EaglePicher Technologies

Novel Protection of Half-Bridges in Space Environments

Alex Billings, Apogee Semiconductor

5:00 Conclusion of Day 3

**Backup Presenters*

Presentations will be included in the SPW Proceedings