

MVA Architecture Working Group Activities (AWG) December 2025

- **MVA AWG 2025:**
 - **Outreach**
 - IAC 2025 Sydney (3 MVA-related papers and presentations were given C3 Power Symposium, D3 Systems Engineering Symposium, and A5 Human Exploration), Joint MVA AWG/IAF Space Habitats Committee Meeting, was held on Wednesday, October 1 (9:00 am – 10:30 am Sydney Time).
 - **Synthetic Moon Participation**
 - Infusing MVA curated models of required lunar elements/systems into shared lunar modeling and simulation environments – On hold, awaiting NASA disambiguation complicated by the U.S. Government shutdown. Continuing to coordinate with interested commercial, university, and non-profit entities.
 - **Fundable Commercial, Non-profit, and Public/Private Partnerships** for Technology Development, Demonstration, and Deployment mission opportunities that reduce cost, schedule, and technical risk.
 - **Nexus/Clearinghouse for codifying what we know we know, and what we know that we do not know** about sustainable space infrastructure, and making that broadly available to interested actors and the general public.
 - **Sustainable Lunar Settlement Design Charrette & Requirements Taxonomy**
 - **Cooperative, collaborative, and competitive exploration and codification of how science, systems engineering, and architectural design drive the requirements for Offworld Anthropological Space Infrastructure Settlement (OASIS)**
 - The goal is to bias initiatives across the community to achieve better outcomes
 - Collaborative program notes received from various AWG members/participants (Gary, John Mankins, James Wertz, Melodie Yashar, Aziz Alareedh)
 - IAF Space Habitats Committee and the Systems Engineering Symposium D3.2A/2B have agreed to sponsor a special collaborative workshop proposal for IAC 2026, Antalya, Turkey, October 5-9, 2026, on the exploration and codification of driving requirements for sustainable lunar element design
 - **New Areas of Progress Since May 2025**
 - **IAA/IAF/NSS Space Solar Power Report out for Peer Review**
 - **Utilizing EMS and Kinetic Fabrics in Variable Gravity Adaptive and Rehabilitative Medicine Applications, Orientation and Training Study** is spinning up.
 - Engagement on the development of **Sustainable Systems Integration Standards (SSIS)**
 - **Sustainable Infrastructure Accommodation Requirements** for Humans, Robotics, and Advanced Autonomy (Driven by science, systems engineering, and architectural design)
 - **Sustainable Infrastructure Interface Standards** for Humans, Robotics, and Advanced Autonomy
 - Focused on ongoing **Coordination, Cooperation, Collaboration, and Competition** as implementable threads on all levels.
 - **Website update addressing 2025 accomplishments and planned 2026 activities will be provided after coordination with MVA senior leadership. <Work in Progress>**

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(1) The MVA Mission-related papers presented by the MVA AWG Chair at IAC 2025 Sydney included . . .

- Sustainable Lunar Settlement Design: How System Engineering Requirements Drive Sustainable Lunar Habitat Design, Gary Pearce Barnhard and Abdulaziz Alareedh IAC-25,D3,2A,8,x99637 -- Paper and Presentation
 - https://drive.google.com/file/d/1pBfVXmGkU5pfae5fGo1JmFGeoMy-8RCq/view?usp=drive_link (Paper)
 - https://drive.google.com/file/d/1Dw-20Fokz24fhOFunXL7WUr5V9dO87Pz/view?usp=drive_link (Presentation)
- SPACE Squared: An End-to-end integrated microgrid controller for dynamic shared control of dispatchable mission-critical power and ancillary services Gary Pearce Barnhard IAC-25-C3,3,6,x99606 -- Paper and Presentation
 - https://drive.google.com/file/d/1rPEENqRR8JMNjfhbJSR_fFq3uWVGJxLZ/view?usp=drive_link (Paper)
 - https://drive.google.com/file/d/1gvYd5uW8Yvn5LmRkq8or4DnZKygx7IKv/view?usp=drive_link (Presentation)

(2) Please check out the following for this coming meeting . . .

- The Commercial Lunar Economy Field Guide, A Vision for Industry on the Moon in the Next Decade was recently released . .
- https://www.airuniversity.af.edu/Portals/10/AUPress/Books/B_186_Nayak_Lunar_Economy_Field_Guide.pdf

(3) ISS Special Purpose Acquisition Corporation (SPAC) Proposal Development

- Independent commercial test of the requirement to deorbit all elements of the ISS to Point NEMO in the early 2030s.
- Development of a proposal to buy or lease, in whole or in part, the International Space Station as a Technology Development, Demonstration, and Deployment Facility in support of the coming Commercial Infrastructure Diaspora and Cislunar infrastructure development in earnest.
- IAC-2022 Paris Presentation and Paper on ISS as a Technology Development, Demonstration, and Deployment mission facility (attached)
- IAC-2024 Boeing Paper ISS Extension (Attached)