WiSEE 2016: Workshop on Space Solar Power (SSP)

Chairs: Seyed (Reza) Zekavat (Michigan Tech), Darel Preble (Space Solar Power Institute)

This workshop will provide a forum for researchers and developers working on space solar power (SSP) topics to highlight progress and needs, to discuss these different technologies, and take necessary action toward the implementation of solar power satellites or sunsats. Workshop information will be posted on the workshop website.

Motivation: Earth's fossil fuel reserves are limited and we need suitable low carbon substitutes, sometimes called renewable energy. Examples of these energy sources include solar, bio-fuel, and wind. Non-intermittent SSP has been proposed to correct this major problem with windmills and terrestrial solar collectors.

SSP would collect solar energy in space and transmit it wirelessly to the earth. Development of this concept will further promote advances in technologies for ultra high power and frequency communication and microwave circuits, light and smart space-based structures, reliable low-cost space access techniques, photovoltaics and cis-lunar space resource development, among others.

Beyond the many previous SSP Workshops in this series, such as the December 2015 IEEE WiSEE 2015, there has been a "recent surge in interest in SSP at high levels of the U.S. government", including at the Pentagon, White House Office of Science and Technology Policy, Department of State, and elsewhere, in large part because of the outcome of the recent Defense, Diplomacy, and Development (D3) Innovation Challenge. In response to Defense Secretary Ash Carter's request for ideas, the winning proposal from over 500 submissions, a space solar power concept was selected as one of six finalists and ultimately received a majority, four, of the seven possible final awards. More information is available at the link http://www.nrl.navy.mil/media/news-releases/2016/NRL-Space-Based-Solar-Power-Concept-Wins-Secretary-of-Defense-Innovative-Challenge. A US public/private committee is being assembled under this initiative and aegis, since any meaningful forward action would involve them. Committed international SSP advocates among other countries, industries and government agencies should attend. This workshop would serve in part to address this recommendation by providing a forum for relevant EU area stakeholders.

Workshop Highlights: Presentations and keynotes selected from researchers, program managers, industry representatives, and academics will be given, interspersed with working group discussions. The working group discussions will be summarized and action items will be disseminated prior to the end of workshop. In the first year, the workshop aims to compare different space-based power technologies and maintains discussion around these technologies. In addition it discusses how it might complement or enhance the efforts of existing national and international Space Development agencies and organizations. A workshop goal is to increase the visibility of SSP and publicize this important renewable energy source within schools and younger generations. The workshop highly encourages attendance of students. Talks will be invited to highlight:

1. The potential of SSP as an energy source;
2. Communication requirements and Interference studies for SSP;
3. An assessment of the most relevant technologies and implementations for SSP;
4. The most critical needs for development of solar power satellites or sunsats; and,
5. Opportunities for cooperation and competition to promote development of SSP technologies.

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Call for Papers and Presentations

Supported by National Science Foundation, Michigan Tech, and Space Solar Power Institute

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This workshop offers a forum for researchers and developers to facilitate and highlight SSP technologies, to determine and advance the state of the art, to discuss supporting and related technical issues, and take necessary actions. Papers, presentations and keynotes selected from researchers, program managers, industry representatives, and academics are accepted. Accepted papers will be published at IEEE Xplore and presented at the workshop. The workshop accepts talks only, and papers + talks. Papers should be submitted online and follow WiSEE2016 format and submission approach.

Topics for talks include (but not limited to):

1. Communication requirements (frequency allocation, interference & bandwidth) with sensors and robotics structures for SSP;
2. Wireless Power Transfer (WPT) / Microwave Power Transfer (MPT) Technologies;
3. Technological and policy needs for stimulating development of WPT/MPT;
4. Educating Next Generations on Wireless Power Transfer;
5. SSP Photovoltaics power planning, superconducting power management design, construction, maintenance and operational techniques
6. SSP Energy-Economics overview; Fossil Energy Resources and Green Energy alternatives;
7. Energy, Space, Environmental and Economic policy makers;
8. SSP Design and Development Challenges;
9. National & International SSP projects (technologies, industries, companies, coordinated Research, SSP Power Beaming Competitions and challenges);
10. SSP Environmental Impact and planetary Sustainability issues (rising CO2, climate change)
11. Wireless Channel (impact of power; frequency, bandwidth);
12. Massive Phased Arrays/MIMO for Wireless Power Transfer;
13. Beam-forming strategies for power beaming;
14. Antenna and Solar Cell integration Technologies;
15. Power Harvesting Unit (e.g., Rectenna) Design;
16. Transmission Schemes: modulation, multiple access, frequency;
17. Wireless Power Distribution (space-to-space, space-to-ground, ground-to-ground, ground-to-space);
18. Ground and space segment design, operation and control;
19. Space-based smart grids;
20. Multi-layer power transfer (Air-to-Water, Air-to-body, etc.);
21. Orbital Security and Space Debris;

To submit a paper, please see EDAS and WiSEE2016.

Key Dates:

Paper/poster submission:	July 20, 2016
Acceptance notification:	August 1, 2016
Final camera ready paper:	August 15, 2016