INTERNATIONAL SPACE SOLAR POWER STUDENT COMPETITION

DATE: 14 February 2017
SUBJECT: The International Space Solar Power Student Project Competition

Dear Colleague(s),

The need to advance the goals of STEM (science, technology, engineering & mathematics) education is especially important in encouraging the emergence of future generations of researchers, technologists and innovators in the space sector in general, and in particular in the special fields of expertise required for the successful exploration, development and eventual settlement of space. The critical topic of *Space Solar Power* (SSP) – harvesting solar energy in space affordably and delivering it to markets in space and on Earth – has been studied as a vision for Humanity's future for almost 50 years. And yet there are almost no courses (and no degrees of which we are aware) offered on this topic at either the undergraduate or the graduate levels in accredited colleges or universities.

If *Space Solar Power* – which is critical to space development and settlement – is to become a reality, this must change.

In a new cooperative effort, SPACE Canada[i], the International Astronautical Federation (IAF) Power Committee, the Global Space Solar Power Working Group (GSSP-WG) of the International Academy of Astronautics (IAA), the National Space Society (NSS) International Space Development Conference (ISDC) SSP Track, and the IAF Space Generation Advisory Council (SGAC; to be invited) are organizing an annual faculty-advised, student-conducted international research and engineering research/paper competition on the topic of Space Solar Power.[ii] Upon request, additional details concerning the competition will be provided; the key points are as follows:

1. This will be an annual competition; the first year will be this year, 2017.[iii]
2. The purpose of the competition is to engender new, meaningful and credible student research projects in the broad field of *Space Solar Power*, and to support the

---

[i] SPACE Canada is a non-profit, non-governmental organization based in Canada; the purpose of the organization is to promote international dialogue on and understanding of the topic of Space Solar Power.

[ii] It is anticipated that with time some organizations may be added as participants in implementing the annual competition, while others may choose not to be involved; as the foundation of the competition, SPACE Canada is the principal sponsor of the effort, and the prizes. Cooperation has been established among SPACE Canada, the IAF Power Committee, the IAF Power Committee and the ISDC SSP Track organizers. Participation by the IAF SGAC is anticipated, but must still be confirmed.

[iii] This competition builds upon and integrates two previous independent events: an annual SSP visualization competition held in conjunction with the NSS ISDC conference, and a yearly SSP student paper competition resulting in a paper and presentation at the annual International Astronautical Congress (IAC), organized by the IAF Power Committee and the IAF SGAC.

presentation of the best of the various projects in an international forum including explicit recognition of the best research with a formal prize.

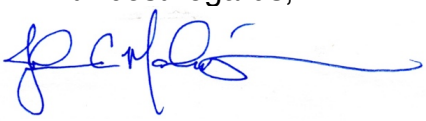
3. The International Space Solar Power Student Competition Prize will have four parts: (a) travel and registration support for selected semi-finalist teams to attend the annual ISDC (see below); (b) a formal certificate of recognition for selected semi-finalist teams (as a team, and for each team member, including the faculty advisor); (c) travel and registration support for one or two selected finalist team(s) to attend the annual IAC SSP Symposium (see below); (d) a formal certificate and a plaque for the selected winning team(s) (the plaque for the team, and a certificate for each participant, including the faculty advisor).
4. The competition is open to participation by faculty-coached, student-implemented project team, including a faculty advisor, not fewer than two undergraduate students and potentially one or more graduate students from any accredited international college or university. A given project team may involve more than a single university in an integrated team; however, each team from any participating college or university must include not less than two undergraduate students and one faculty advisor.
5. The competition will involve three stages: (1) registration and proposal / abstract submission; (2) preliminary presentation of interim results at the Space Solar Power Track of the annual NSS ISDC (in late May each year); and (3) final presentation (with a formal technical paper) of the one or two best projects at the IAF Power Committee Solar Power Satellite (SPS) Symposium at the annual International Astronautical Congress (IAC) (in late September each year).
6. Semi-finalists in the annual competition will be chosen by an independent review process based on submitted abstracts and draft presentation materials; these will be provided with a fixed level of financial support for their attendance and presentation of interim results at the annual ISDC SSP Track. (Participation in the ISDC must comprise not less than one student team member and one faculty advisor; however otherwise the decision as to who should participate and how the funds should be distributed among team members to meet travel and registration costs will be flexible.)
7. Finalists in the annual competition will be chosen by an independent review process based on the presentations made at the annual ISDC SSP Track, and updated draft research presentation results. In the event that no project teams are adjudged to have achieved a sufficiently high level of technical accomplishment in a given year, no award will be made during that year.
8. The chosen winner(s) will be provided with a fixed level of financial support for their attendance and presentation of interim results at the annual IAC SPS Symposium. A formal paper is required, and must be submitted to the IAC according to the rules of the conference. (Participation in the IAC must comprise not less than one student team member and one faculty advisor; however otherwise the decision as to who

should participate and how the funds should be distributed among team members to meet travel and registration costs will be flexible.)

9. In order to be eligible, members of each competing team (as described elsewhere) must be available and able to attend and present at the ISDC (semi-finalist) and the IAC (finalist).
10. The competition will encompass multiple disciplines, but will be focused each year around a particular Solar Power Satellite concept. During 2017-2018, the focus will be on highly-modular microwave wireless power transmission (WPT) Solar Power Satellite concepts as embodied in the "SPS-ALPHA" concept (Solar Power Satellite by means of Arbitrarily Large Phased Array) and related SPS architectural concepts. Details are available upon request.
11. The acceptable disciplines/fields for research projects include (a) architecture level studies; (b) end-to-end energy concepts & technology (including wireless power transmission (WPT), solar power generation, etc.); (c) structural systems, controls and dynamics technology; (d) space transportation technology and engineering for SPS (including Earth-to-orbit or in-space transportation and/or propulsion); (e) space resources utilization for SPS; (f) ground systems and integration; (g) near-term SPS system and technology demonstration concepts; and (h) space policy, legal and regulatory considerations across all of the above (including international cooperation, spectrum management, space debris, etc., etc.).
12. **The first deadline for participation in the 2017 competition is the development and submission of an abstract for a proposed student research project by not later than March 29, 2017.**

We look forward to the active participation by students and faculty from accredited colleges and universities globally in this new competition. If you would like to indicate interest in participating, and to obtain additional information, please contact us at the email address below.

With best regards,



John C. Mankins
Lead, International Space Solar Power Student Competition
Member of the Board, SPACE Canada
Secretary, IAF Power Committee
Co-Chair, ISDC Space Solar Power Track

For additional information, please contact us at:
sspstudentcompetition@gmail.com