

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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EDUCATIONAL STRATEGIES FOR PROMOTION OF SOLAR POWER SATELLITE TECHNOLOGY

Abstract

In the current global energy crisis, characterised by the depletion of fossil fuel resources and an ever-increasing demand for energy, the exploration of sustainable alternative solutions is imperative. Solar Power Satellites (SPS) emerge as a promising technology within this context, capable of revolutionising the global energy landscape through the harnessing of inexhaustible solar energy in space and its transmission to Earth via microwaves. This innovative approach offers a clean, renewable, and abundant energy source, potentially alleviating the world's energy scarcity.

For students to discover and immerse themselves in this technology, this work, conducted by an interdisciplinary team consisting of four high school seniors, a teacher, an aerospace engineer and an engineering degree student, aims to build an educational model focused on the Wireless Power Transfer (WPT) and SPS principles. The dual objective is to demonstrate the technical and educational feasibility of learning this advanced technology and to assess its potential impact on the energy transition.

An innovative experimental model has been developed to simulate the operation of SPS and to conduct small-scale experiments. This experiment consists of transmitting wirelessly solar energy acquired from photovoltaic cells using an array of antennas to sustain power for the rotation of a small-scale solar orbital station model and features the key technology of SPS. This practical approach is designed to facilitate understanding of the underlying principles of SPS and their potential to provide a clean, renewable, and abundant energy source. The educational experience, designed to engage and educate the younger generations, is part of a broader perspective of embracing new space technologies and raising awareness of contemporary energy challenges.

This study will not only highlight the viability of SPS as a sustainable energy solution but also aim to inspire the scientific community to further invest in the research and development of this technology on a larger scale. Through this initiative, the ambition is to contribute to better awareness of space for the benefit of terrestrial populations, while promoting a transition towards a greener and more sustainable energy economy.