

IAF SPACE POWER SYMPOSIUM (C3)
Solar Power Satellite (1)

Author: Mr. Dale Wyllie
UK Space Agency, United Kingdom

Dr. Mamatha Maheshwarappa
UK Space Agency, United Kingdom

Mrs. Jennifer Barry
UK Space Agency, United Kingdom

Dr. Noramalina Mansor
Department for Energy Security & Net Zero (United Kingdom), United Kingdom

AN OVERVIEW OF THE UK ACTIVITIES ON SPACE-BASED SOLAR POWER

Abstract

The UK Government's Department of Energy Security and Net Zero & the UK Space Agency have jointly funded activities to advance Space-Based Solar Power (SBSP) technologies and architectures through the Net Zero Innovation Portfolio (NZIP). The joint investment represents an opportunity to explore the technological and commercial case for SBSP, as well as consider the opportunities and challenges of this potential future source of energy against other more established options. The SBSP Innovation Competition is looking to advance technologies developed in the UK under four themes: Wireless Power Transmission, High Concentration Solar Photovoltaics, Systems Energy Engineering focused on design, integration, and management of SBSP into existing energy systems, and Space Mission Architecture Feasibility Studies.

1. Wireless Power Transmission

- Includes the development of a vector phased array transmitter and reflector array rectenna, as well as an open-source toolset to simulate antenna array design.

2. High Concentration Solar Photovoltaics

- Includes two separate projects focusing on the development of advanced solar cells and concentrator photovoltaic devices.

3. Systems Energy Engineering

- While initial studies of SBSP have been positive, it is important to further understand their role, implications, and integration within the UK's energy system. This study therefore assesses the technoeconomic feasibility of SBSP from a whole-energy system perspective.

4. Space Mission Architecture Feasibility Study

- To advance the maturity of the overall SBSP architecture through leading concepts within the UK. The objective of this study was to investigate the mission architecture feasibility including the system performance, risks, and life costs to a greater degree of confidence than studies performed previously.

This paper will highlight the context of SBSP and the potential UK role in the global Energy from Space sector, current progress of the SBSP Innovation Competition (in particular the Mission Architecture Feasibility study) and conclusions on feasibility so far from the work, as well as current funding programmes from the Department for Energy Security and Net Zero & the UK Space Agency that will help to enable SBSP in the future.