

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

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ESA'S SYSTEM STUDY ACTIVITIES ON COMMERCIAL-SCALE SPACE-BASED SOLAR POWER

Abstract

The European Space Agency (ESA) has initiated a Pre-Phase A study aimed at evaluating the feasibility of commercial-scale space-based solar power (SBSP) systems for terrestrial energy needs. This study is the first of ESA's Solaris initiative, which was approved by Member States at the 2022 Ministerial Council. The overall goal of this research and development initiative is to assess the potential for SBSP to provide clean and secure sources of energy for Europe. ESA has not performed a systems-level investigation of SBSP for almost two decades. New paradigms in the space industry, such as the advent of re-usable launch vehicles and the large, commercial-scale production of space hardware, coupled with the world's energy needs warrant a re-examination of the potential utility of SBSP. This new Pre-Phase A study is assessing candidate commercial use-cases for SBSP energy provision and the selection of reference system architecture(s). Architecture selection is made by considerations of the technical feasibility, commercial viability, environmental impact, and industrial capability. The results of this study will be used by ESA to identify enabling technology development activities and inform future systems and socioeconomic study activities in the Solaris initiative. This paper provides an overview of this new Pre-Phase A study and its objectives, scope, work logic and timeline. Progress and intermediate results are presented, along with discussions around the candidate commercial use-cases of SBSP and the main design trades and architectural decisions towards their realization.