A new concept of space solar power satellite

What is space solar power satellite (SSPs)?

1. Introduction Space solar power satellite (SSPS) is a tremendous energy systemthat collects and converts solar power to electric power in space,and then transmits the electric power to earth wirelessly .

What is a solar power satellite?

The concept of the solar power satellite (SPS) was invented in the late 1960s by Dr. Peter Glaser. The SPS concept is an elegant solution to the challenge of providing large-scale energy for humanity. A series of enormous platforms would be positioned in space in high Earth orbit to continuously collect and convert solar energy into electricity.

What is space-based solar power?

Space-Based Solar Power,SBSP,is based on existing technological principles and known physics,with no new breakthroughs required. Today's telecom satellites transmitting TV signals and communication links from orbit are basically power-beaming satellites - except at a far smaller scale of size and power.

How much solar power would a satellite generate?

A single solar power satellite of the planned scale would generate around 2 gigawattsof power,equivalent to a conventional nuclear power station,able to power more than one million homes. It would take more than six million solar panels on Earth's surface to generate the same amount.

How big is a solar power satellite?

A single solar power satellite at geostationary orbit might extend more than a kilometre across,with the receiver station on the ground needing a footprint more than ten times larger.

Who invented the tethered solar power satellite?

An artist conception of the tethered solar power satellite (Tethered-SPS) is shown in Fig. 1. This concept was first developed by a study team organized byInstitute for Unmanned Space Experiment Free Flyer (USEF)in 2001 and 2002 .

-2012, NASA investigated a new concept of space solar power: SPS-ALPHA. John C. Mankins, "SPS-ALPHA: The First Practical Solar Power Satellite via Arbitrarily Large Phased Array," 2012 European research on the SSPS ...

China"s dominant satellite builder, China Academy of Space Technology, is preparing to demonstrate high-voltage transfer and wireless-power transmission from a ...

The concept of the Solar Power Satellite (SPS) is very simple. It is a gigantic satellite designed as an electric power plant orbiting the earth which uses wireless power transmission of space based solar power.

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Space-based solar power essentially consists of three functional units: A.

The principal objective of this "fresh look" study was to determine whether a solar power satellite (SPS) and associated systems could be defined that could deliver energy into terrestrial electrical power grids at prices equal to or below ground alternatives in a variety of markets, do so without major environmental drawbacks, and which ...

The fundamentals of Space Solar Power (SSP) are well understood and could lead to a world of energy abundance; the deliverable energy from just a 10 km geostationary (GEO) band exceeds 570 TW-years - enough to supply ten billion people at six-times current US per-capita levels. Despite this, SSP has languished for fifty years.

The objective of this paper is to propose a new Free-Drift Solar Power Satellite concept that reduce mass and fuel consumption. Firstly, Sun-frozen orbit in geosynchronous Laplace plane and quasi-Sun-pointing attitude are designed to significantly save orbital and attitude control fuel. ... Attitude control of space solar power satellite with ...

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concepts and terrestrial markets that might be involved in future space solar power (SSP) systems. The principal objective of this "Fresh look" study was to determine whether a ...

The SSPS will provide significant power to Earth. There are more than 27 variants of SSPS conceptual designs proposed by researchers; i.e., SSPS 1973, National Aeronautical and Space Administration (NASA) 1979, SSP2000, Sunshine Project of New Energy and Industrial Technology Development Organization (NEDO), L-SSPS from Japan Aerospace ...

Space solar power satellite (SSPS) is a tremendous energy system that collects and converts solar power to electric power in space, and then transmits the electric power to earth wirelessly. In this paper, a novel SSPS concept based on e-near-zero (ENZ) metamaterial is proposed. A spherical condenser made of ENZ metamaterial is developed, by using the refractive property ...

conduct studies on Solar power satellites 30% of the thermal energy being used to produce 1. Introduction In 1968, Peter Glaser, then of Arthur D. Little, proposed the concept of a Space Solar Power Satellite as a means to solve the ...

A new concept of solar power satellite: Tethered-SPS. Acta Astronautica, 60 (3) (2007), pp. 153-165. View PDF View article View in Scopus Google Scholar. ... Thermal design, analysis and comparison on three

concepts of space solar power satellite. Acta Astronautica, 137 (2017), pp. 382-402. View PDF View article View in Scopus Google Scholar.

This paper describes a new Solar Power Satellite (SPS) concept, based on the principle of wavelength-scale modular integration of all major functions, from sola

It can provide a new energy development way to use solar energy, which will greatly improve the capacity of space technology and become a strategic choice to deal with global climate change. ... The MR-SPS concept won the first prize in the 2015 International Space Solar Satellite Design Competition. ... This special issue covers the researches ...

Tethered solar power satellite (Tethered-SPS) consisting of a large panel with a capability of power generation/transmission and a bus system which are connected by multi ...

However, solar energy on the ground is greatly affected by the earth"s shadow (at night), weather, seasons, and atmospheric attenuation (Li et al., 2019b, Sudhakar, 2020, Sato et al., 2017). In order to effectively utilize solar energy in large scale, Glaser (1968) first proposed the concept of solar power satellite (SPS).

Space solar power satellite (SSPS) is a prodigious energy system that collects and converts solar power to electric power in space, and then transmits the electric power to Earth wirelessly.

A variety of SPS conceptual designs have been put forward. The first systematic SPS concept is the 1979 SPS Reference System, which consists of an ultra-large solar array, a transmitting antenna, and a high-power conductive rotary joint (DOE/NASA, 1979).The concept of Abacus/Reflector SPS was proposed in 2000 (Carrington et al., 2000).An Earth-oriented mirror ...

N2 - Tethered solar power satellite (Tethered-SPS) consisting of a large panel with a capability of power generation/transmission and a bus system which are connected by multi-wires is proposed as an innovative solar power satellite (SPS). The power generation/transmission panel is composed of a huge number of perfectly equivalent power modules.

The space solar power station (SSPS) capable of providing earth with primary power has been researched for 50 years. The SSPS is a tremendous design involving optics, mechanics, electromagnetism, thermology, control, and other disciplines. ... A new concept of solar power satellite: tethered-SPS. Acta Astronaut., 60 (2006), pp. 153-165. View in ...

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