

SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FAR FUTURE (D4)  
 Contribution of Space Activities to Solving Global Societal Challenges (4)

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SOLAR-BASED POWER STATION – NEW CONCEPTION

**Abstract**

Energy potential of solar radiation is capable to satisfy all people demands. The radical solution of problem connected with receiving of solar energy is the deployment of solar energy units in space on the Earth orbit and the transmitting energy to the Earth surface via directed laser or microwave radiation. Our suggested concept of Solar-Based Power Station construction based on the following principles: • Creation of autonomous photo radiation module, which convert received solar radiation in laser radiation, and from which the convertible big-size construction is forming on the satellite. • Construction of solar energy photoconverter system and antenna, which radiate the accumulated laser beams from autonomous information-connected satellite controlled by pilot signal from Earth. • Location of ground-based photo receiving system on high-altitude captive balloons. The key moment of solar-based power station development is implementing of real space-ground demonstration test. The structure of such hybrid solar-based power station will be consists from the following components: • Captive balloon (the high is 4-6 km) with big area (1000 2) of photo receiving cells construction, placed on the top part of disk-shaped balloon. • -, ( 1 ); • satellite of demonstration space power station with laser channel of energy transmission • Energy station and satellite control center. The selection of laser types for this power station is determined by the following requirements: • The length of laser radiation wave should be close to aerosol absorption band, that will lead it to absorption during the passage of laser beam - below the level of captive balloon. • Achievement of high efficiency (more than 30 • Possibility of high capacity achievement of individual samples (more than 20 kilowatt). • High-quality of laser radiation beam (close to diffraction level). • Possibility of summation without loss of beam quality. • Minimum mass-dimensional specifications and absence of mobile systems

The fiber lasers are satisfying such requirements. The variants of configuration of demonstration space power station have been considered during the using of LV Souz fairing for receiving of the maximum area of photoradiating panels. The realization of such hybrid solar balloon-space power station is possible by the available hardware and it will allow to make one more step to industrial solar-based power station development.