



Space Solar Power Incremental Demonstrations and Research (SSPIDR)

NSS Space Solar Power Symposium

26 May 2022

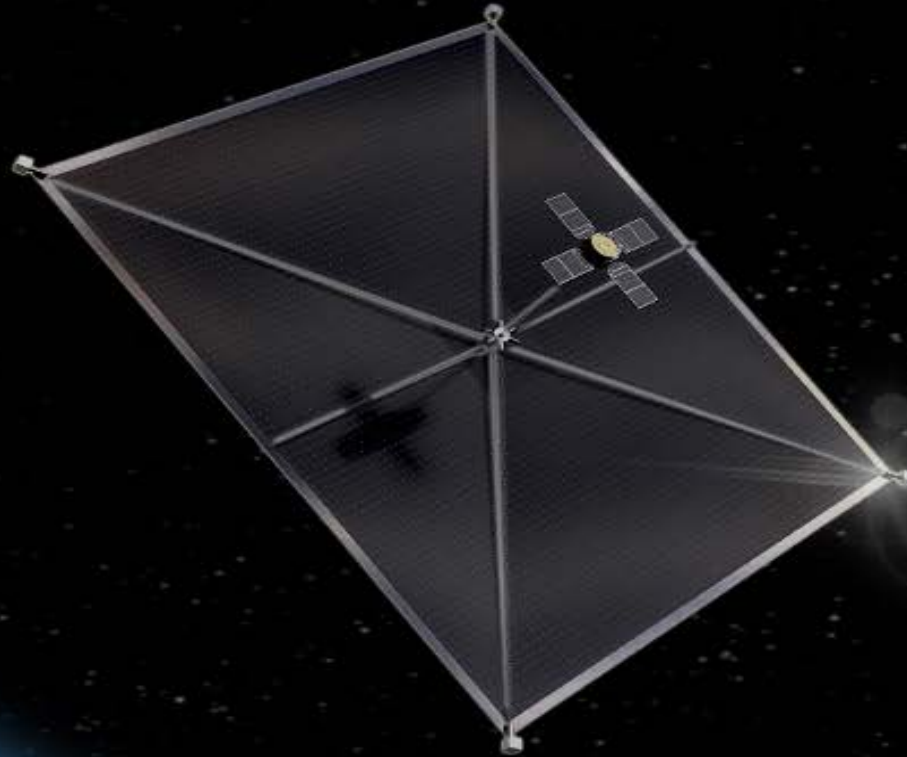
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"AFRL - Fast-tracking the science fiction of the past into the reality of the future"





SSPIDR

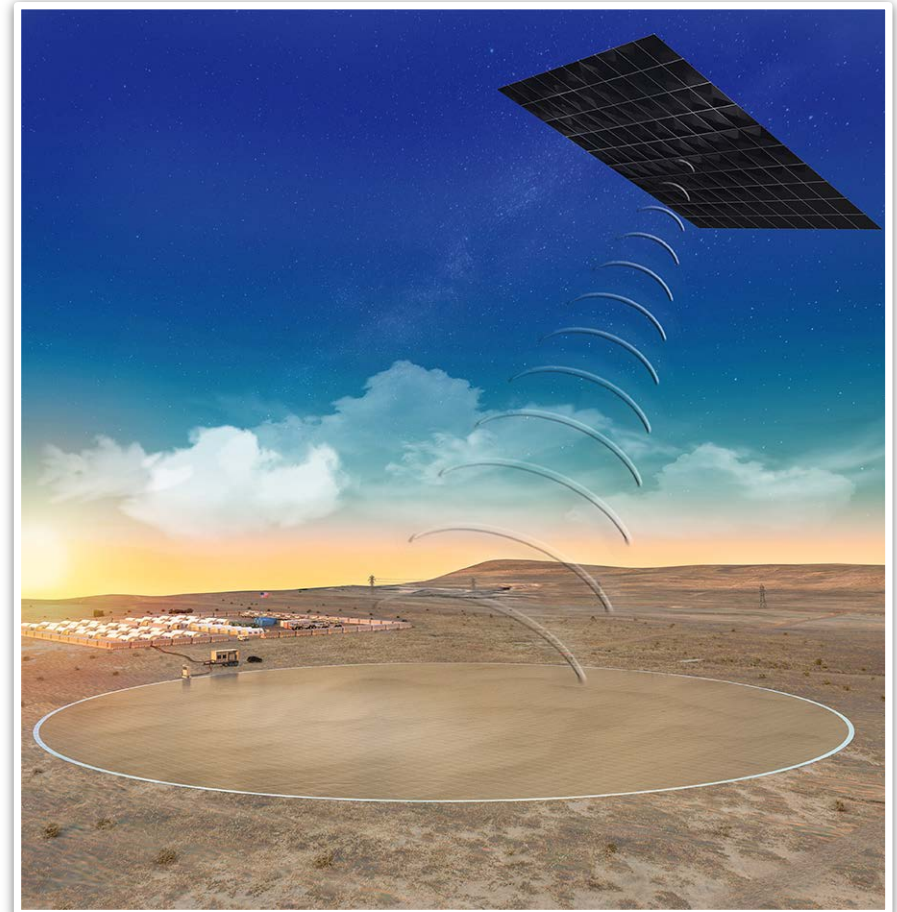


Space Solar Power

The idea of power beamed from space is not new but has not been historically feasible. However, recent technology developments have put this concept within the realm of the possible, such as:

- Mass-efficient deployable structures concepts
- Increased efficiency of modern electronics
- Reduced mass, high efficiency solar cells
- Promising low-cost manufacturing approaches in work
- Lower cost per kg to get to orbit
- **Solar to RF Sandwich Module** – a potentially game changing technology

Despite many concepts of grand scale, nothing of significance has been built, but many different entities are working to prove the feasibility of this concept including Naval Research Laboratory (NRL) launched their version of the sandwich module, the Photovoltaic RF Antenna Module (PRAM).



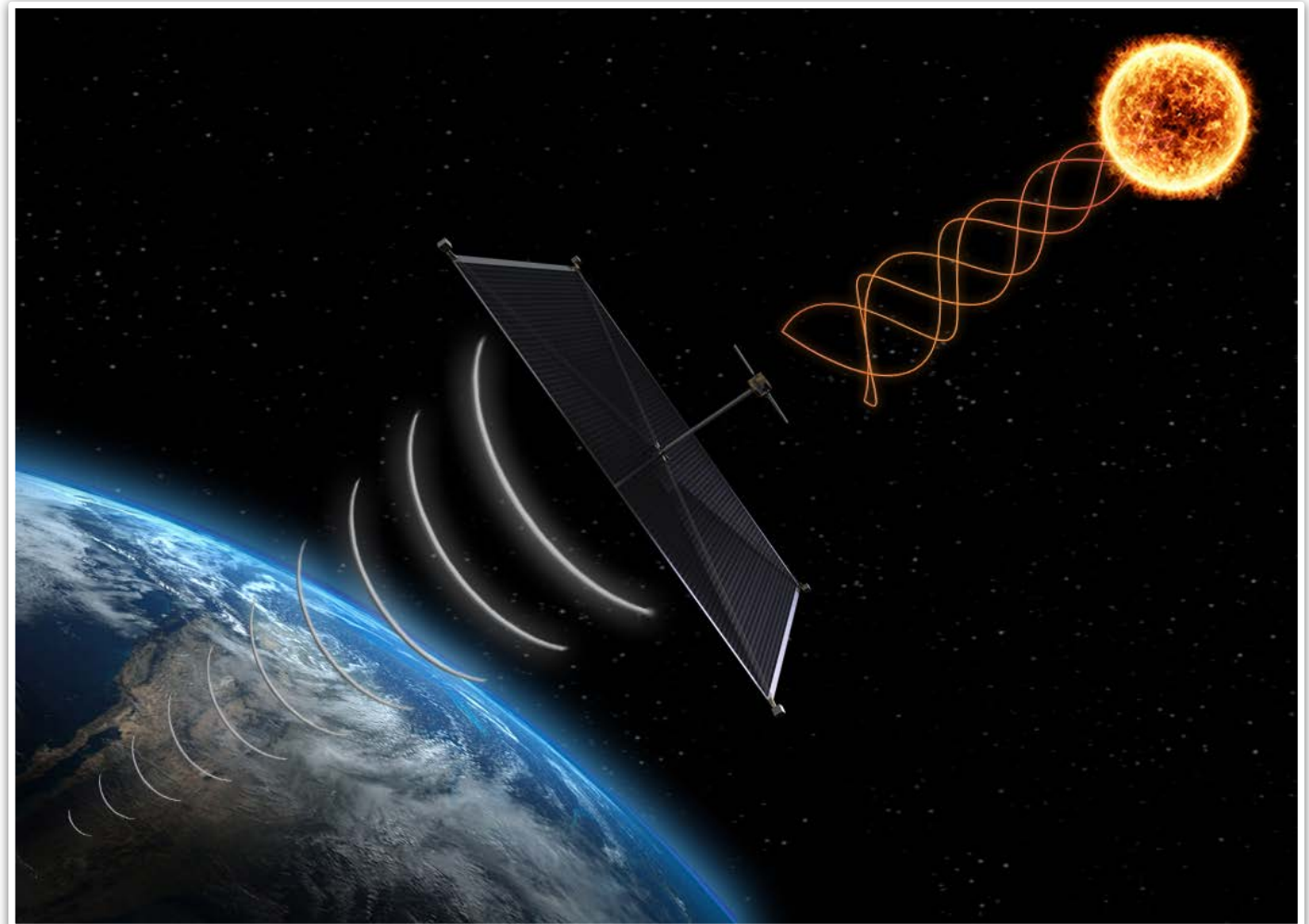
Space Solar Power Initiative (SSPI)

A congressional special interest project.

The Goal

To rapidly infuse space technological innovations in collecting solar energy and provide uninterrupted, assured, and logistically agile power to expeditionary forces.

Programmatic responsibility given to AFRL to develop a solution and meet the SSPI goal.



AFRL's Approach

SSPIDR is a series of Integrated Demos and Technology Development/Maturation Efforts focused on addressing space-based power collection and transmission capabilities for Headquarters Air Force (HAF)

Approach: Rapid Demonstration-Driven Projects to Burn Down Highest Risks

- Identified Critical Technology Elements (CTEs)
- Pursue Parallel Tech Development Paths
- Integrated Prototype Demos that Show Functional Capability

AFRL has two major thrusts/objectives:

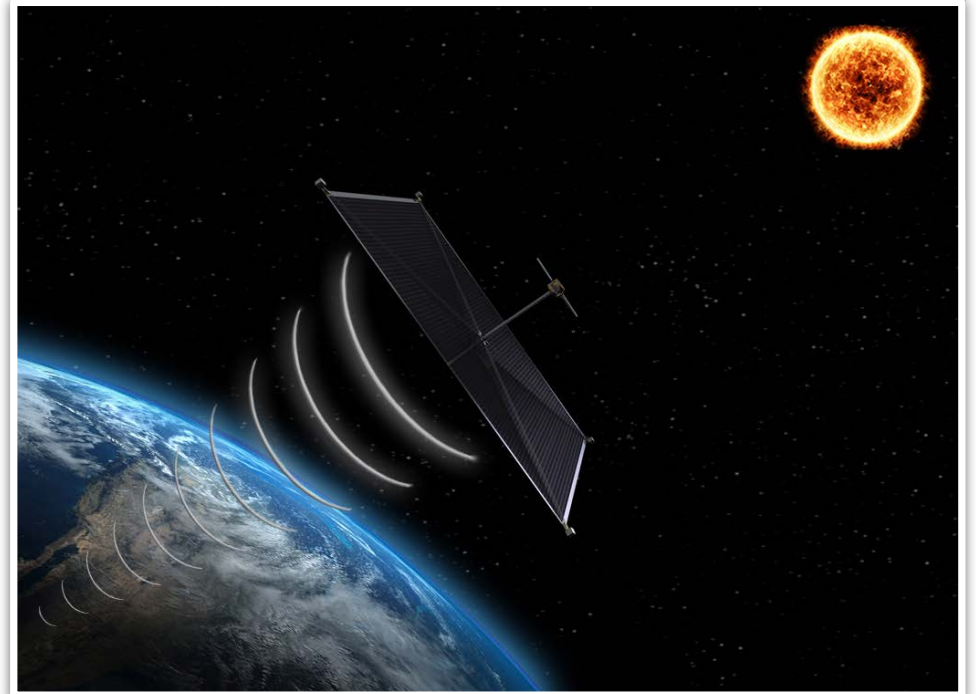
1. Integrated Demonstrations: High-Risk/High-Payoff Components

- *Solar-to-RF Tile/Panel/Array Components*
- *Large Deployable Structures/Metrology*

2. Research: CTE Technology Development:

- *Energy Generation*
- *Structures*
- *RF Beaming*
- *Thermal*
- *Metrology*

Determine the feasibility and demonstrate a space-based power collection and transmission capability.





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