

## Agenda Item 8 – NSS on SSP – John C Mankins - 25Aug21.mp4 Transcript for audio verification

Hello my name is John Mankins and I here with you today as a member of the National Space Society Board of Directors to share with you a topic of great importance and urgency to the world community.

In particular I would like to make the case that it is time to develop commercial space solar power for civil market applications around the world and bring this new energy option to bare on the climate crisis that we now face.

It is evident that there is an urgent need for new energy solutions. Although many people enjoy a high quality of life they do so through the investment of tremendous amounts of energy, and much of that energy is derived from carbon-based sources. These sources must be replaced in the coming decades by other energy options if we are going to drastically reduce the greenhouse gas emissions which are now going into our atmosphere. At the same time many billions have no high quality of life and for them the future is one of either bleak poverty or the need for massive new energy sources and although we have much that we can glean, much that we can accomplish using existing renewable energy options never the less these are intermittent in character. Solar energy produces power when the Sun shines, wind energy produces power when the wind blows, hydro electric when the dams are full of water . . . difficult in droughts.

In order to have a clear path with 24 x 7, carbon net zero energy, we need new solutions in addition to the existing sustainable energy options What is that? What are those solutions? Well, we believe that one of them is Space Solar Power.

Space Solar Power is a very simple idea. The Sun shines 24 x 7 in space. If you place large platforms in space, you can harvest the solar energy there and deliver it by wireless microwave energy transfer to the ground at relatively low intensity, with high precision, and with reliable economics, to ground stations where it can then be converted back into electricity, translated to the local grid and delivered to homes and businesses where and when it is needed.

This concept has been around for decades. However, it was only recently that the major hurdles that have prevented Space Solar Power, which is technically feasible, from becoming a financial . . . financially viable energy option. In particular, there are two major hurdles that have recently been overcome. First “lowering the cost of launch” of launch, new renewal launch systems have demonstrated that the cost of access can be reduced by 90% or more.

Moreover, recently emerging Mega constellations are extraordinarily important because they demonstrate that the mass production of low-cost space hardware is possible with cost reductions on the order of 99% or more. Between these two, more than a than a 90% reduction in the cost of space launch, more than a 99% reduction in the cost of space hardware very large space system platforms become possible.

However, only if you under take them in the right way. The specific kind of Space Solar Power system which is being advocated today, which we believe that leads to a viable path, is very highly modular. One that addresses very low-cost launch by enabling mass production of the space system elements that make up the platform. One such case is the SPS Alpha, Solar Power Satellite by means of Arbitrarily

Large Phased Array in which modular system elements which with simple interconnections can be mass assembled in orbit by robotic systems which have now emerged in recent years and that these platforms solar power generation, RF power transmission, can send the energy to Earth when and where it is needed. However, getting there quickly requires a focused investment and one that addresses both the technical challenges and the programmatic ones.

Fortunately, there is a clear roadmap forward for commercial civil space solar power. In the next few years, we need to establish the technical foundations for large scale modular solar powered RF satellites. We need to develop the capabilities including the policy and regulatory matters, and demonstrate by the mid-to-late 2020s that these systems can be taken to space. And we need by the later years in this decade to demonstrate Space Solar Power systems in Earth orbit for Earth, and also for its applications in space such as Earth's Moon.

This can be done for billions not trillions. We believe that Space Solar Power can be developed in this decade, that is a vitally needed option for net-zero carbon energy and that we can do it together.

Thank you for your attention.

