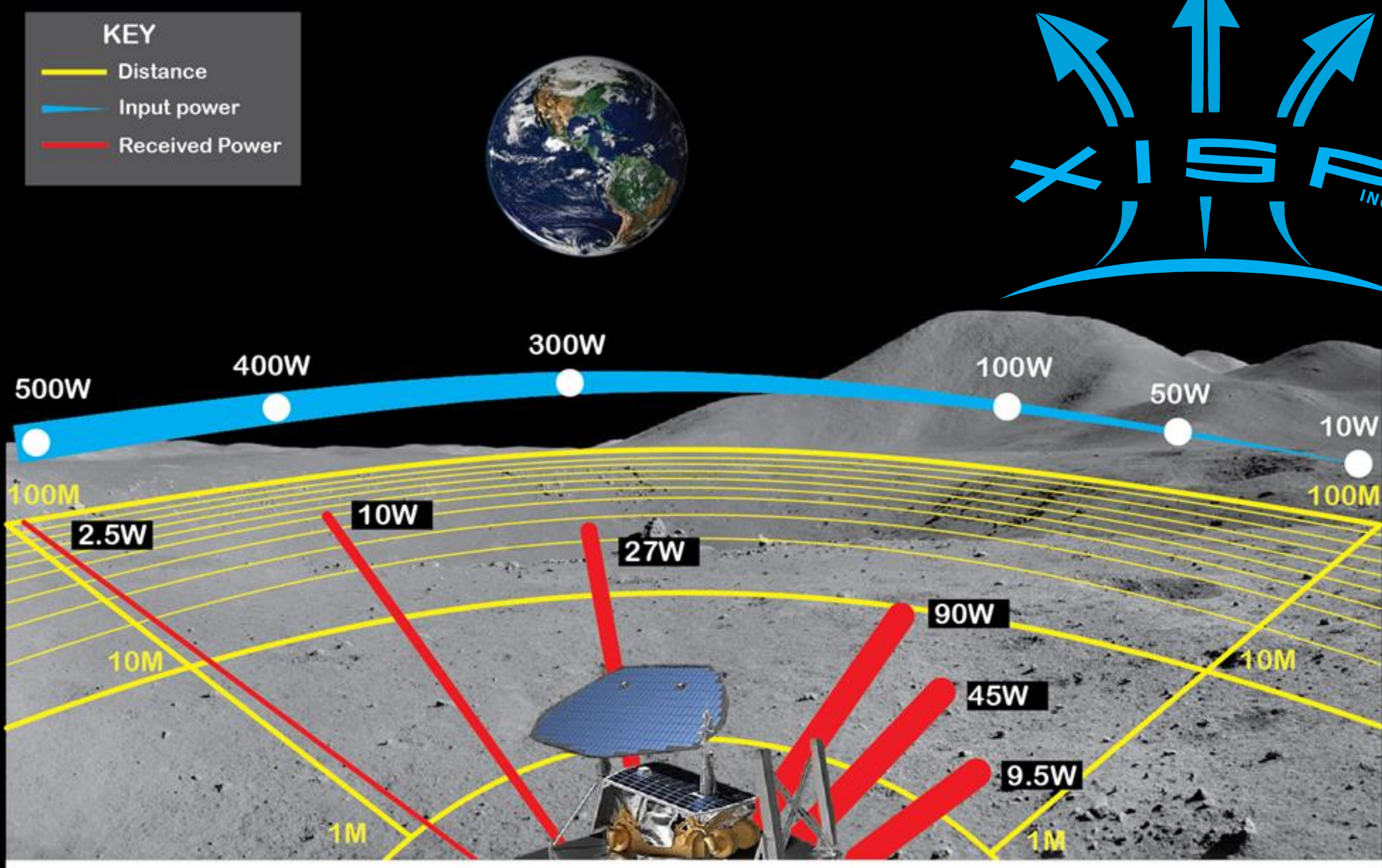
Surface-to-Surface Power Beaming



XISP-Inc Proposed LSITP Power & Ancillary Services Beaming Payload

Power & Ancillary Services Beaming Technology Development, Demonstration, and Deployment (TD^3) Mission

Initial Payload Specifications

Mass: Less than 15 kg on lander

Volume: 6U without deployment options

Input Power Range: 10 to 1000 W

Received power is a function of input power, achievable power density, and distance.

Ancillary services are frequency agnostic, with a Ka band nominal baseline.

Adaptable Lander & Customer Interfaces

Does your Payload Need Power & Ancillary Services To Operate and Survive the Night?

Are power, mass, volume, data, navigation, cadence, and/or related system complexity issues impacting your science yield?

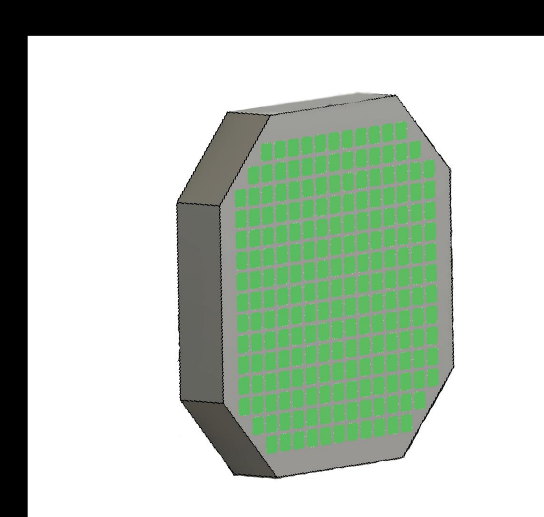
Does your ISRU application need sustainable energy generation, storage, and distribution infrastructure?

Contact Gary.Barnhard@xisp-inc.com

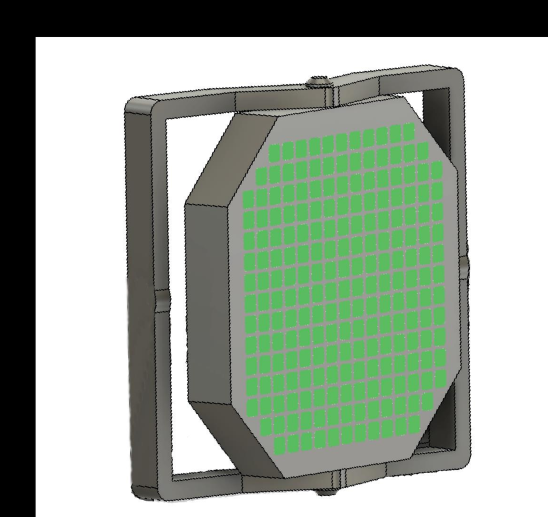
Xtraordinary Innovative Space Partnerships, Inc.

www.xisp-inc.com

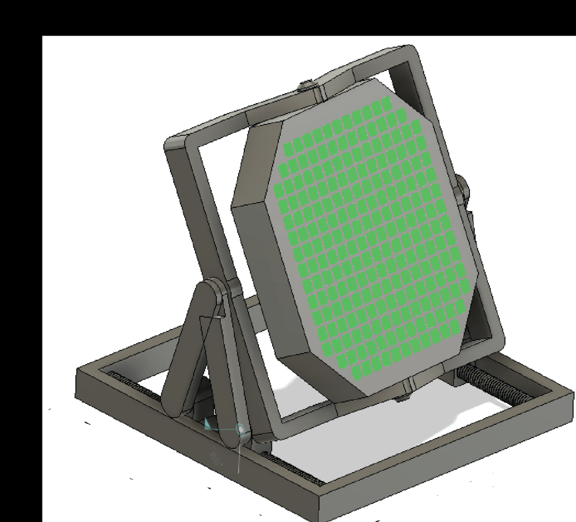
XISP-Inc Is seeking customers In need of power and ancillary services on the lunar surface as well as lander partners that can accommodate our evolving power and ancillary services beaming infrastructure



Conformal Transceiver



1-Axis Gimbal Transceiver



3-Axis Gimbal Transceiver

Beaming Power Density and the Solar Constant

$$p_d = \frac{A_t P_t}{\lambda^2 D^2}$$

p_d is the power density at the center of the receiving location
P_t is the total radiated power from the transmitter
A_t is the total area of the transmitting antenna
λ^2 is the wavelength squared
D^2 is the separation between the apertures squared

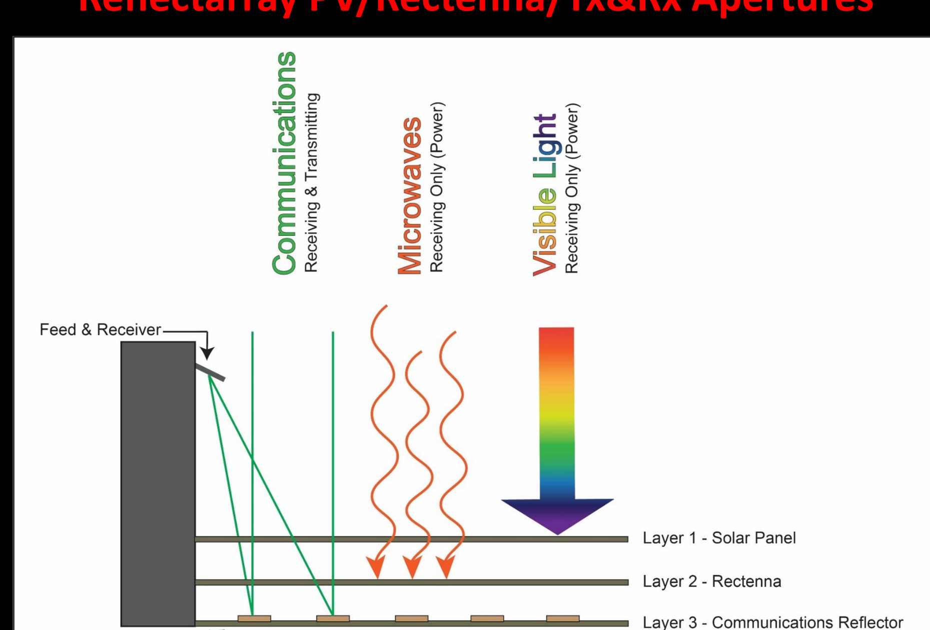
	Power Density (Watts/cm^2) P_d Case 1 @26.5 GHz	Power Density (Watts/cm^2) P_d Case 2 @36 GHz	Power Density (Watts/cm^2) P_d Case 3 @95 GHz
Table 1. Power Density with D=200 m, P_t= 3000 W and A_t = 1642 cm^2	0.00964	0.01774	0.12331
Table 2. Power Density with D=200 m, P_t= 6000 W and A_t = 1642 cm^2	0.01929	0.03549	0.24661
Table 3. Power Density with D=200 m, P_t= 3000 W and A_t = 10000 cm^2	0.05874	0.10809	0.75108
Table 4. Power Density with D=200 m, P_t= 6000 W and A_t = 10000 cm^2	0.11747	0.21617	1.50216

I_{sc} = Solar Constant at 1 AU = 0.1367 Watts/cm2

P_d significantly lower than I_{sc}
P_d similar to I_{sc}
P_d significantly higher than I_{sc}

1 - Barnhard, Gary Pearce Space-to Space Power Beaming AIAA Space 2017
2 - William C. Brown, Life Fellow, IEEE, and E. Eugene Eves, Beamed Microwave Power Transmission and its Application to Space, IEEE Transactions On Microwave Theory and Techniques, Vol. 40, No. 6. June 1992

Reflectarray PV/Rectenna/Tx&Rx Apertures



ISRU WaterWitch Lunar Regolith Processing Concept

Scaled Sustainable Infrastructure