

SPACE
POWER

Powering
Spacecraft Into a
New Era

EPIC Photonics for Earth
Observation and Monitoring

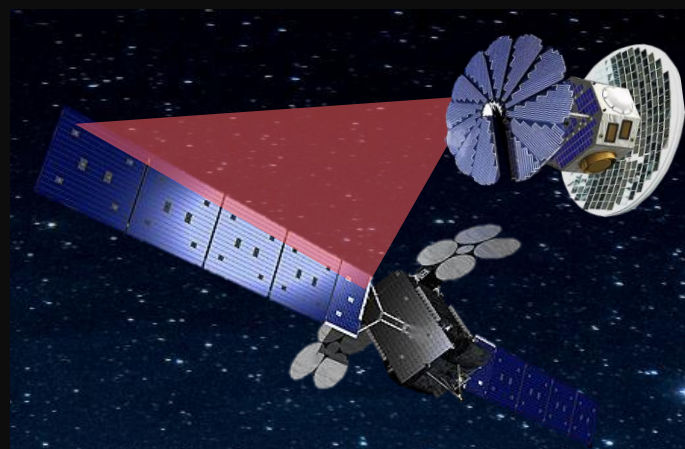
POWER BEYOND...

TECHNOLOGY SCALABLE TO ALL VACUUM ENVIRONMENTS

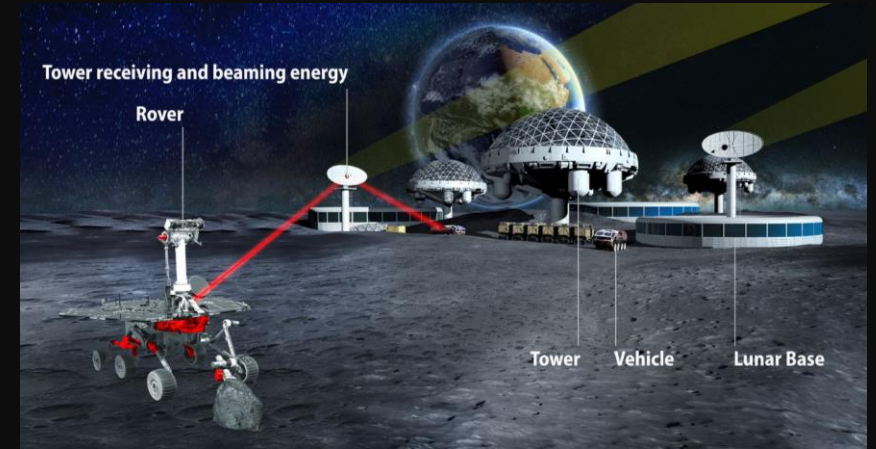
Current missions:



On-demand energy for LEO constellation and cluster support



GEO life-extension and emergency power boosts through eclipse



Permanently Shadowed Region and Lunar Night power support

Future markets:



LEO Power Grid Constellation



Asteroid prospecting and extra-terrestrial mining



SPACE POWER REVOLUTION

PROVIDING WIRELESS SUSTAINABLE ENERGY IN SPACE

The Business

Manufacture and supply LASER-based power banks for spacecraft

Patent pending, award-winning technology

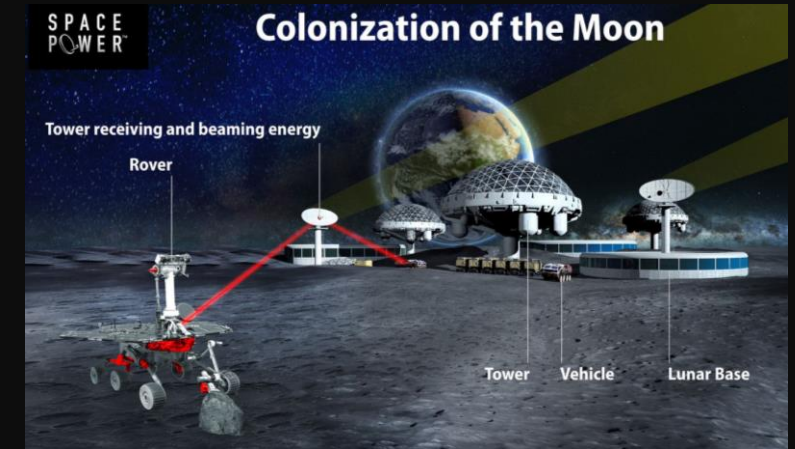
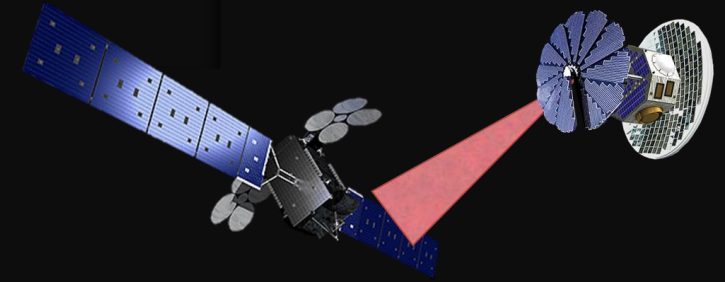
Offering backwards compatibility to serve an immediate market representing 95% of existing and future spacecraft.

In-orbit demonstrator

Proposal signed with BAE to launch in 2025 for a first-of-a-kind mission in 2025, proving the technology directly with our customers

SPOC (Space Power Optical Charge) modules

Scalable to any environment. Interest has grown quickly for Lunar and Martian uses, reflected in the grants released by ESA and UKSA as well as private enquiries.



AI-Tracked, LASER powered Lunar Rover Terrestrial Demonstrator: TeD-e

SPOC MODULE

SPACE POWER OPTICAL CHARGE

Space Power's power payload.

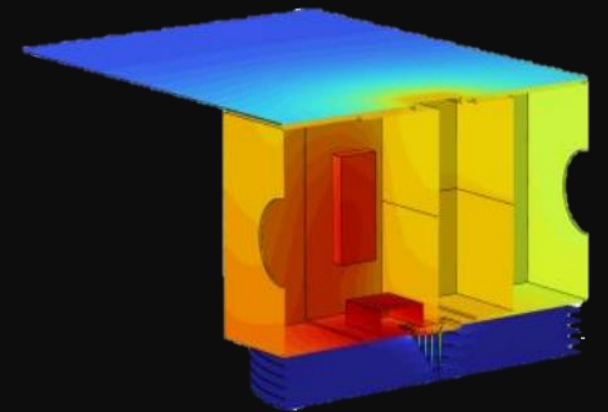
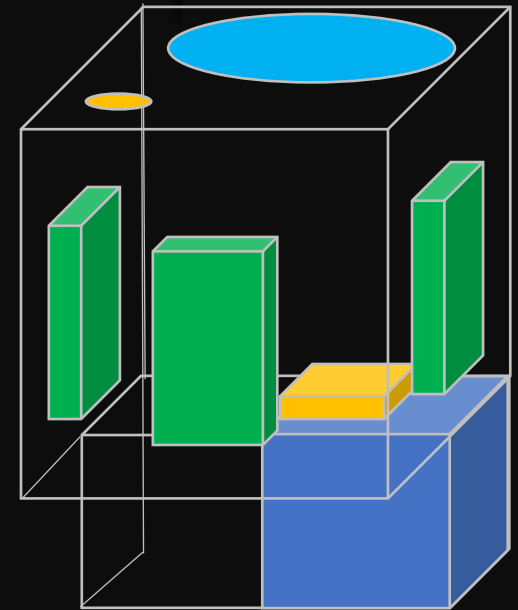
This is the SPOC module, the basis of Nightlight and Starlight products.

It is integrated into the appropriately sized satellite bus according to the customer's individual requirements:

- Power: Amount and frequency
- Budget
- Location (LEO, GEO, Lunar)

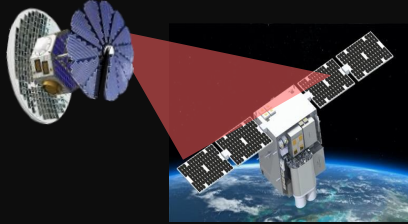
We have now completed extensive simulations and developed several designs which will power CubeSats (16U, 15W) as well as a design for GEO (<250kg, 400W)

We have completed initial designs for the Lunar environment, to include the impact of Lunar dust, radiation and orbital anomalies.



TECHNOLOGY & PRODUCT DEVELOPMENT

DELIVER THE MVP AND SECURE KEY IP



Nightlight v1 is the MVP – essential core services for single satellite or constellation power services. GEO and LEO.

Technology serving custom GEO and LEO missions



Starlight v1 is the Advanced Power Beaming service for LEO – developed pointing and tracking for several spacecraft, more LASERs for higher efficiencies with a wider range of satellites and more advanced LASERs for better power delivery and range.

Technology for in-orbit power grids (LEO, Lunar, Martian), Asteroid Prospecting



TeD-e v0 is our Terrestrial Demonstrator – to showcase our capabilities. Serves as a practical test bed for new technologies e.g. High Power Multi-Junction beaming and advanced pointing and tracking for use in Nightlight and Starlight.

Technology for extra-terrestrial bases



INDUSTRY LEADERS

THE ONLY COMPANY CAPABLE TO SERVE THE EXISTING MARKET

	Space Power 2019	Powerlight Technologies 2009	US Naval Research Labs <2000	New Space Start-ups (3 others) >2022	Luminspace, Photonicity (<2020)	Primes (Airbus, BAE, NG)
Institute Description	First Space to Space Commercial Power Beaming Company	Microwave focused Power Beaming company	Research Institute - US Navy	Early stage, Pre-Seed companies	Previous competition (Earth to Space)	Established engineering firms
Backwards compatible tech	✓	✗	✗	✗	✗	✗
Experts signed End to End	✓	✓	✓	✗	✗	✓
Competitive IP registered	✓	✓	✗	✗	✗	✗
Brand Commercial Awareness	✓	✓	✗	✗	✗	✗
Terrestrial Demonstrator (view)	✓	✓	✓	✗	✗	✗
In-Orbit demonstrator	Concept Design, Launch signed	✗	✓	✗	✗	✗
Commercial Customers	✓	✗	✗	✗	✗	✗

Only Space Power can serve any existing solar panel

PERFORMANCE REQUIREMENTS

MAXIMISE RANGE, MAXIMISE POWER

Power Performance is determined by

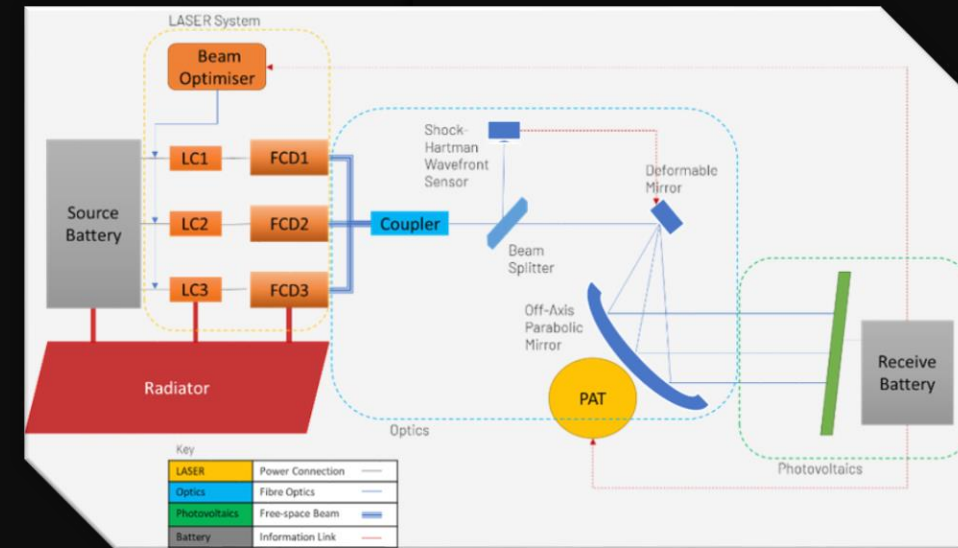
- Power tolerance (Fibre, Optics)
- Absorption (fibre, optics)
- Leakage (fibre, collimation)
- Thermal conduction (from component to radiator)

Range performance is determined by

- Beam diameter (OAP) [100mm - 200mm]
- Beam quality / collimation (M^2) [< 2]

Components:

LASER - Fibre optics (3x) - Fibre Coupler (3x) - Main Fibre - Adaptive Optics - OAP Setup



OPTICS REQUIREMENTS

WIDE SPECTRUM, HIGH REFLECTANCE, HIGH POWER



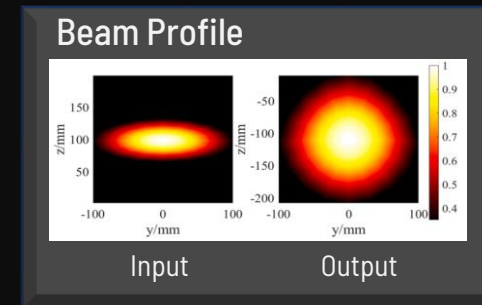
Primary Function: Correct beam shape from Diode LASERs (different wavelengths), correct beam shape and collimate for transmission to customer

Input - Fibre Coupled Diode beam: Divergent, narrow bandwidth beam with asymmetric profile

Output - Consistent diameter, collimated beam with Gaussian distribution

Optics Function [Beam Steering, Beam shaping):

- Improve the beam profile to a Gaussian profile, maximising the range.
- Maximise the beam diameter, minimising divergence and maximising range
- Collimate the beam, minimising divergence and maximising range



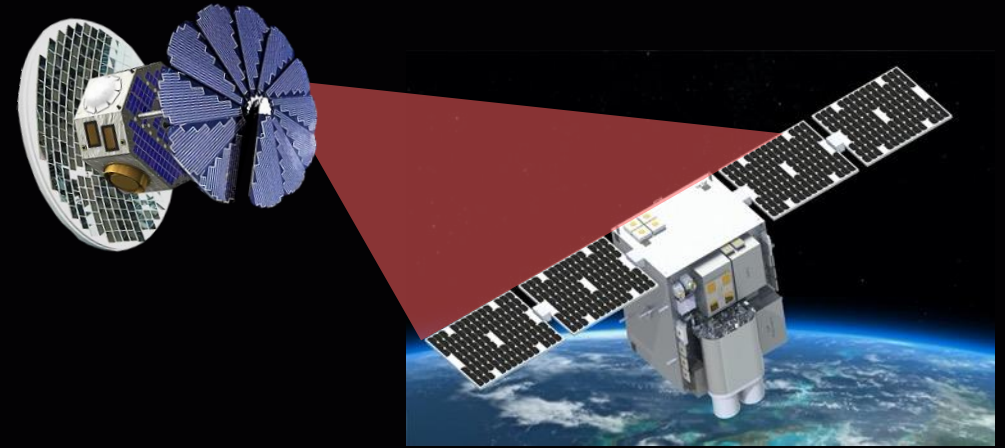
Why Space Power

LEO Spacecraft are always power limited:

- 15 eclipses per day, managed with battery which is charged during sunlit phase of orbit
- Payload operation restricted
- Data processing restricted
- Data downlink restricted

Power boost in eclipse:

- Direct energy for operating SAR and RF collect payloads in eclipse
- Boost the battery in eclipse so that data collection and download can be performed more frequently, when the customer really needs it



Demonstrator Targets:

- Deliver power over 2 km
- Output 100W to Multijunction Cells
- Deliver >10% efficiency
- Validate modelling and simulations

KEY MILESTONE: IN-ORBIT DEMONSTRATION

COLLABORATION ACROSS THE ATLANTIC

The US NRL SWELL project has demonstrated in-orbit LASER power beaming in Q2 2023 – highlighting the strategic push for fractionated spacecraft as well as additional, on-demand power services.

SWELL shows that power can be transmitted in space using LASERs and photovoltaics – safely, reliably and efficiently. It is proving an important step for power beaming acceptance into industry.

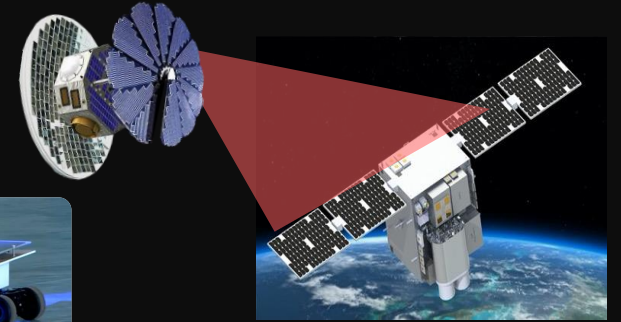
Space Power and US NRL have collaborated together since 2022, however US NRL is not commercial and hence has different programme objectives.

Performance	SWELL	Space Power – Azalea	Effect
Power	1.5W (13W output)	15W (100W / wavelength)	Maximise value of the service
Range	1.5 m	>1 km	Maximise beam time opportunity
Efficiency	11%	15%	Maximise power generated
Compatibility	Single junction cells	Multi-junction cells	MJ enables power delivery to all existing customer solar panels



TIMELINE TO SALES

THE FINAL STEP TO ESTABLISH FIRST MOVER



Founding
Techstars Hackathon
Finalists

2019

Environmental Studies
First of a kind extreme low-temperature studies through SPRINT research grant, investigating in-orbit and permanent shadowed performance of LASER powerbeaming.
Shared novel results with OEM Azur Space, world leaders of space photovoltaics for collaborative R&D

2021

Terrestrial Demonstrator and Simulations
Proof of concept delivered – bringing Pointing and Tracking and Power Beaming together for a free-roam Lunar rover model
Simulations complete, validating performance of all critical sub-systems



2023

In-Orbit Demonstrator
Launch and test in-orbit demonstrator with BAE Azalea cluster

2025

2020

Feasibility Confirmed
Efficiency studies with University of Surrey validate business case for power transmission with different LASERS and photovoltaics

Power beaming lectures with US NRL to understand key technology developments

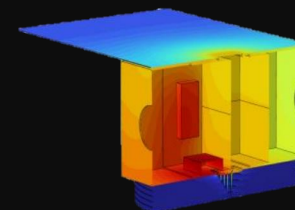
2022

Minimum Viable Product
First of a Kind, award winning research paper on Multijunction Power beaming, giving Space Power unique backwards compatibility to >95% of all spacecraft

GEO Market Confirmation
Customers requesting emergency power services and future power supplies for Life-Extension services

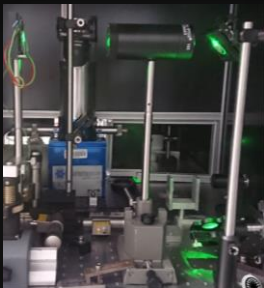
2024

MVP Build
Ground test prototype and In-orbit demonstrator module build for 16U format. Ground test module for space qualification, terrestrial performance testing and ground demonstrations



2026

Commercial Sales
Iterate design with demonstrator performance data, design and build first batch run



JOIN THE SPACE REVOLUTION

GET IN TOUCH TO FIND OUT MORE

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Industrial Partners



Academic Partners



Consiglio Nazionale
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Grants



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