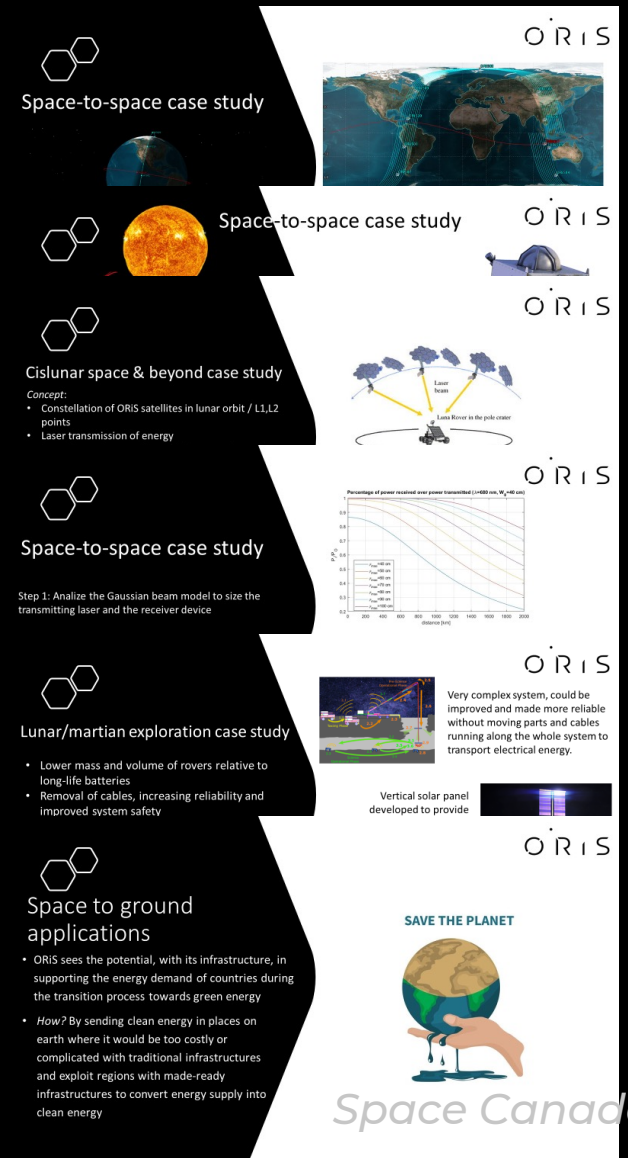
ORiS

Orbital Recharge in Space

Space Canada – IAC 2022

Introduction – where we left off

- We decided to concentrate on an application for bringing energy to the Lunar surface
- Same technology
- Same concept of orbital placement
- Different application, different market
- Different Value Proposition



Why the moon?

- In the next few years, cislunar space will become more crowded
- Future plans to build a lunar habitat: 5 kW of estimated nighttime energy demand
- Shackleton Crater – future moon landing site, is at the lunar south pole

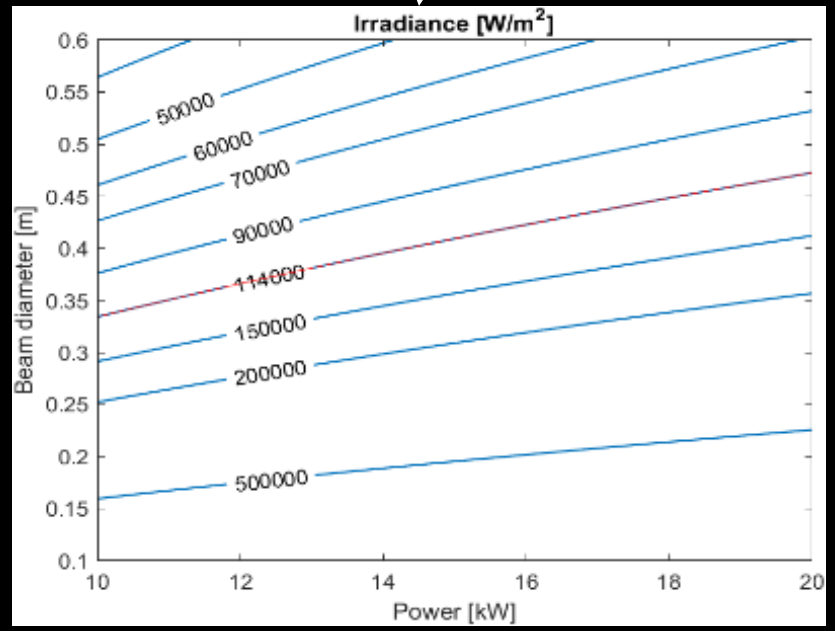
ARTEMIS

HUMANITY'S RETURN TO THE MOON

ORiS's solution

- Frozen orbits: candidate orbits and choice of the optimal configuration
- The objective of this presentation
  - System's main features
  - Receiver analysis
  - Laser features such as power output, collimation, irradiance
  - System feasibility, trade-off study

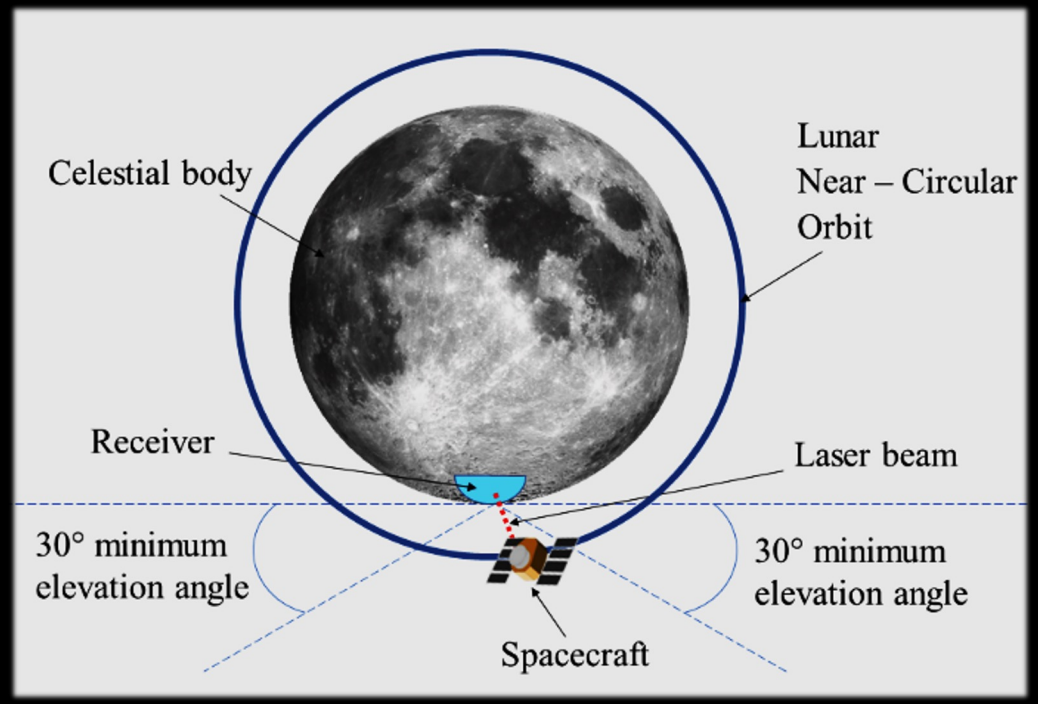
Technology

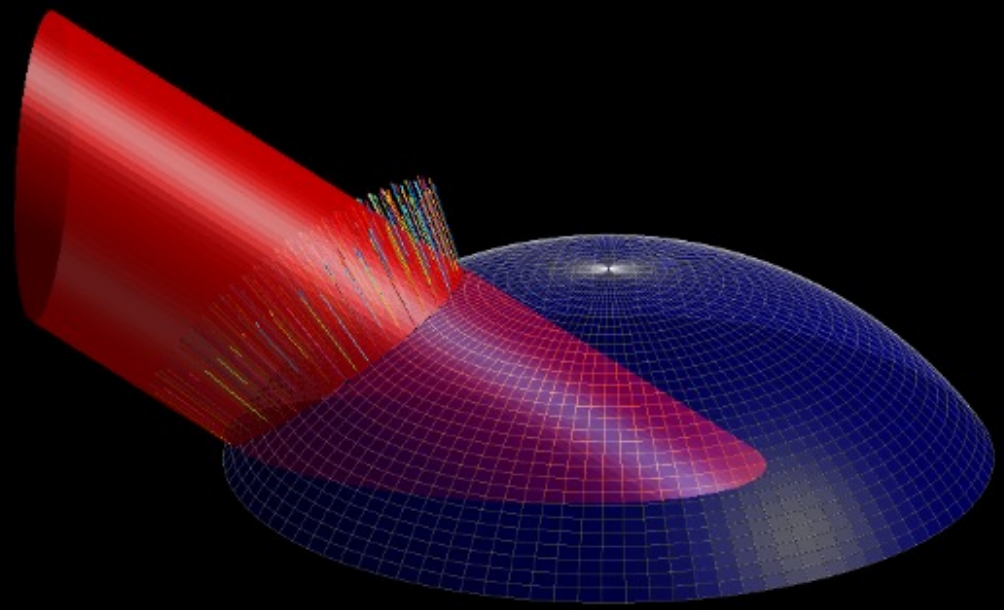


- Design process:
  - laser energy output: higher than for space-to-space applications
  - receiving technology: Photonic Power Converters & monochromatic photovoltaic cells
  - Pointing accuracy
  - EPS system sizing

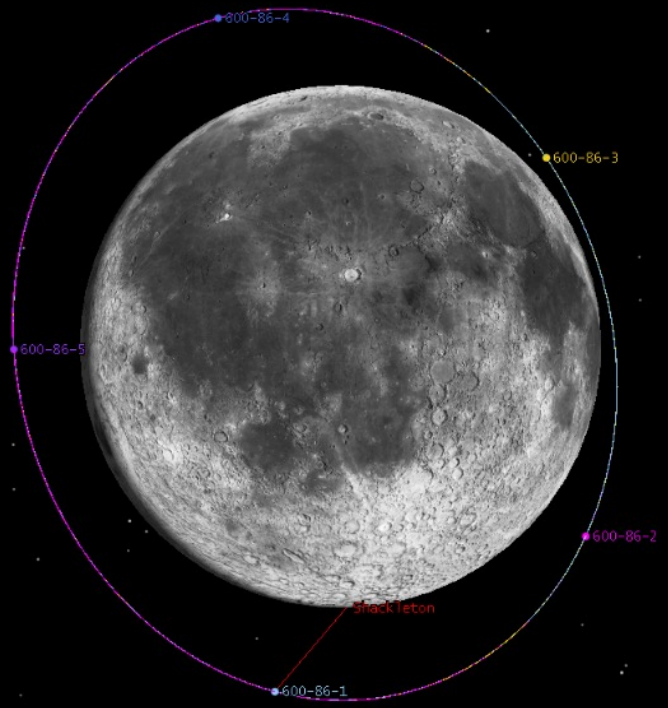
Calculations

- Receivers on the lunar surface → maximum size estimation
- Receiver shape optimization to minimize loss





Conclusions



- Figures of merit
- Trade off analysis

Table 5. Altitude trade-off study

Altitude	Energy in one year	Receiver dimensions	Pointing accuracy	EPS weight	*Score*
300	3	9	9	9	105
400	6	8	8	7	107
500	5	8	7	6	95
600	**9**	**7**	**6**	**6**	**108**
700	8	7	5	5	96

Thank you!