

NIGHTTIME INTEGRATED THERMAL & ELECTRICITY SYSTEM

SURVIVE THE LUNAR NIGHT

Astrobotic's Nighttime Integrated Thermal and Electricity (NITE™) system is designed to address a key challenge to sustained human presence on the moon: surviving the lunar night.

The NITE system solves this challenge by producing both heat and power in a single low-cost, low-mass, non-nuclear system, enabling landers, rovers, instruments, and other assets to survive the lunar night and extend operations in permanently shadowed regions.



NITE BY THE NUMBERS

1,900

Wh/kg

Specific Energy

0 to 20+

Watts

Power

-250°

Celsius

Min. Temp. Survival

12+

Months

Mission Duration

90%

Thermal Efficiency

ON-DEMAND POWER AND HEAT

- Harnesses a metal oxidation reaction to generate heat and provide fuel cell inputs for electricity
- Controlled exothermic chemical reactions deliver heat and power on-demand
- Recycles reaction products to maximize thermal and electric energy return
- Autonomous operations when temperatures fall below a specified threshold and deactivation during the lunar day

LOW-MASS, NON-NUCLEAR SOLUTION

Due to its higher power density, NITE requires less mass than comparable battery-based solutions.

NITE also mitigates key shortcomings of RTGs & RHUs:

- No radioactive materials reduces hazards
- Avoids the schedule and cost impacts of lengthy, expensive nuclear launch approval process
- Scales to the asset's specific needs.

KEY BENEFITS



Longer Mission Operations

Helps landers, rovers, and payloads operate for up to 1 year or longer



Increased Lunar Accessibility

Enables operations in lava tubes, PSRs, and sunlight-deprived environments



More Heat, Less Mass

Produced significantly more heat per unit mass than an equivalent battery



On-Demand Power and Heat

Can be turned on and off as needed, with ability to throttle power and heat



Less Regulation

Not subject to the prolonged, expensive launch approval process for RHUs/ RTGs



Cost Effective

Saves millions of dollars by reducing mass and avoiding regulatory hurdles