



Prioritized Technology: High-Temperature Compatible Power Systems

Power Generation

Capability Description

- Power generation systems for Venus surface missions. These will be used to recharge batteries and to extend the life of a surface mission.
 - Produce power through chemical or mechanical means.
 - Rely on atmosphere to provide either mechanical or chemical energy.
 - Can be used as primary power or to charge batteries.
- Need to operate at 450 C, 90 bar, corrosive environments.
- Need to produce 28 VDC and last for 3000 hours.

Capability Status

- Wind turbines and lithium combustion are under development.
- Wind turbines would utilize Venus surface winds to turn the generator. TRL 3.
- Lithium combustion is a common technology for underwater military applications.
 - It can be modified for use in a CO₂ atmosphere and can operate at high temperature.
 - TRL 3 for Venus. TRL 9 for the Navy.
 - There is an existing HOTTCH award for Lithium Combustion.

Mission Applications

- These power sources can be used for missions on the Venus surface and lower atmosphere.
 - For near term Venus missions, power demands are likely to be modest and can be met with small scale generators.
- Most could also be applied to Jupiter atmospheric missions.
- Possible to adapt to Europa ice melting applications.

Development Cost and Schedule