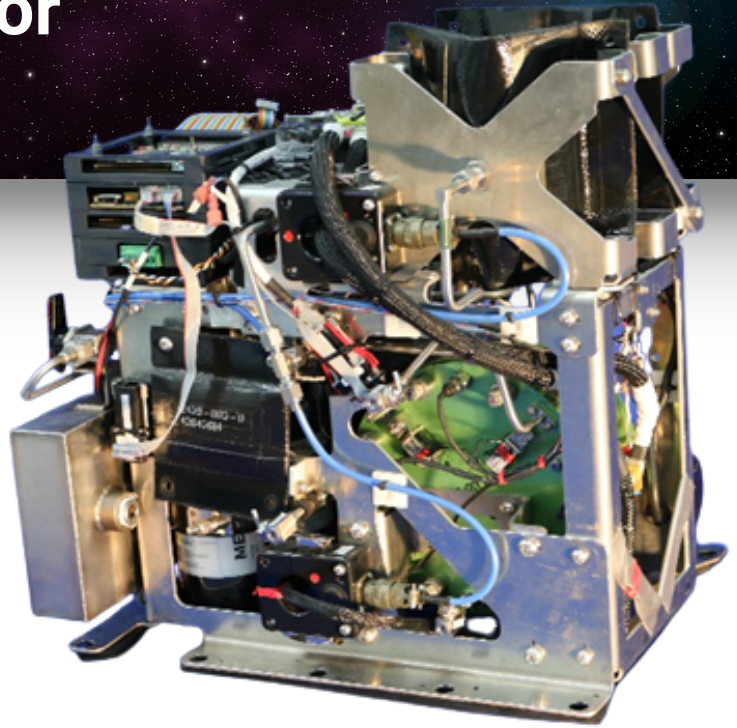


AMPES

Advanced Modular Power & Energy System Demonstrator

AMPES successfully demonstrated zero-emission fuel cell power across two Blue Origin New Shepard missions.



Under a NASA Space Technology Mission Directorate Program, Infinity's AMPES (Advanced Modular Power & Energy System) was designed to demonstrate fuel cell technology in a relevant environment for space applications. Being launched as a payload on Blue Origin's New Shepard launch vehicle provided a unique challenge to perform a demonstration during flight without the ability to output any heat, gas, or product water. The only inputs available from the launch vehicle were signal commands regarding vehicle or mission status.

Given vehicle constraints, the system was designed with enough integrated reactant storage for the entire mission, a variable load to simulate various power outputs during the mission, a phase change heat exchanger to provide cooling to the system without emitting any heat to the capsule, and bladders to capture product water and vent gas generated during the demonstration. The system successfully completed environmental qualification testing, including testings at NASA Johnson Space Center, and flew on two New Shepard missions (NS-23 and NS-24). AMPES operated as designed throughout both missions, demonstrating reliable operation through emergency escape conditions (NS-23), and consistent operation in microgravity (NS-24). Results from these demonstrations advanced the system's Technology Readiness Level (TRL) from TRL 4 to TRL 6.

Key Advantages & Benefits

Custom controller with automated start/stop capability
Ability to receive external commands from launch vehicle
Fully integrated reactant storage
Integrated thermal management
Variable load capability for mission-representative power profiles
Flight tested zero-G operation
Patented Advanced Product Water Removal



Product Features



Maximum Output Power	500 Watts
Voltage Range	3.5-7.5 Volts
Current Range	0-100 Amps

Environmental Testing Performed

Sub-Orbital Flight (New Shepard-24 and New Shepard-23)
Shock & Vibration (NASA Johnson Space Center)
Thermal Vacuum (NASA Johnson Space Center)
Electromagnetic Interference (EMI)

