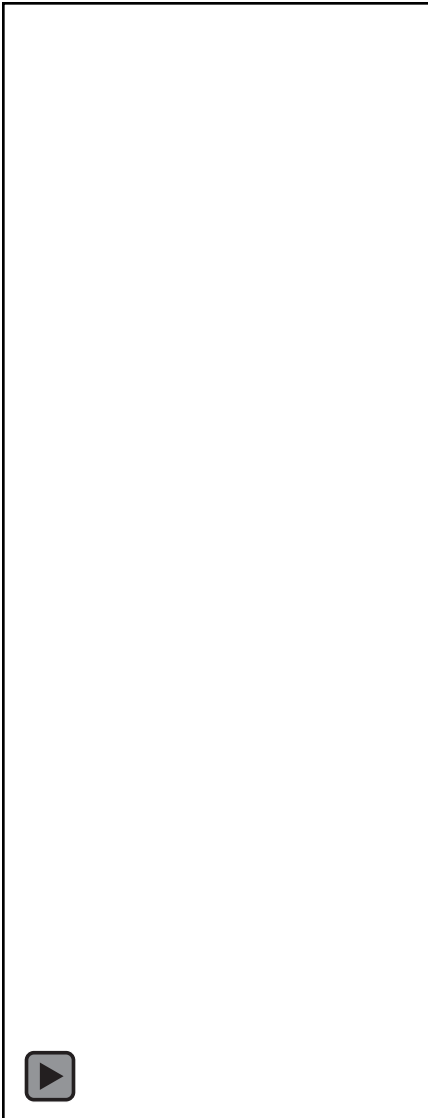




Marc Gibson
NASA's Glenn Research Center

Kilopower Reactor
Development and Testing

May 2, 2018





Kilopower 1-3 kWe Multi-Mission



1000 W: 400 kg

Titanium/Water Heat Pipe Radiator

Stirling Power Conversion System

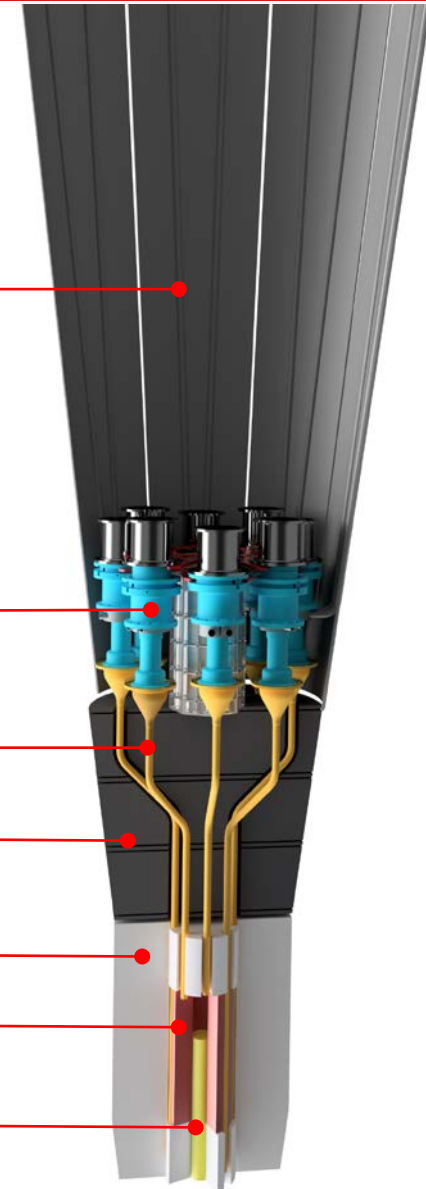
Haynes 230/Sodium Heat Pipes (Reactor Coolant)

Lithium Hydride/Tungsten Shielding

Beryllium Oxide Neutron Reflector

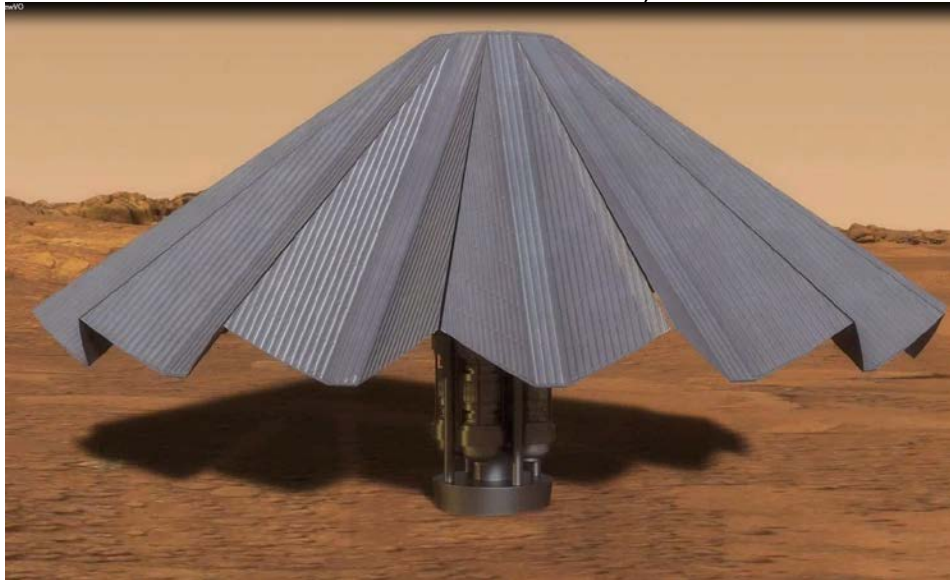
Uranium Molybdenum Cast Metal Fuel

B₄C Neutron Absorber Control Rod

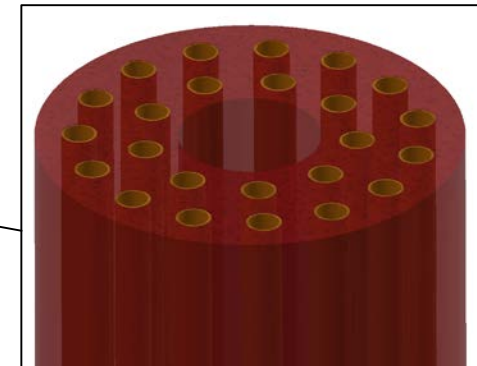
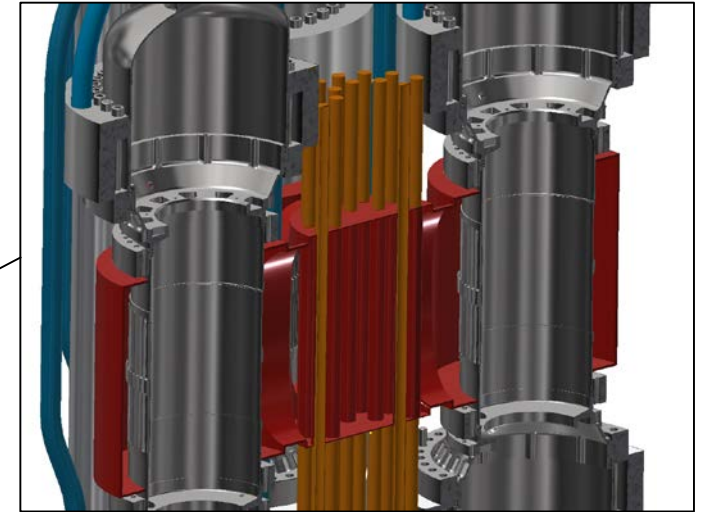
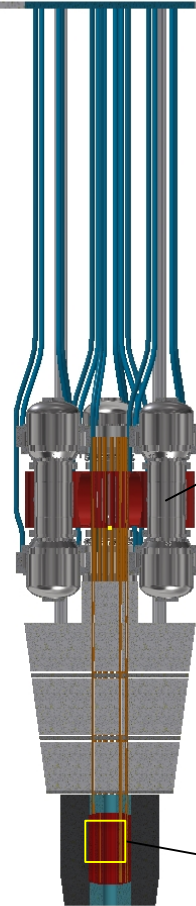




3-10 kWe Surface Concept



10,000 W: 1500 kg





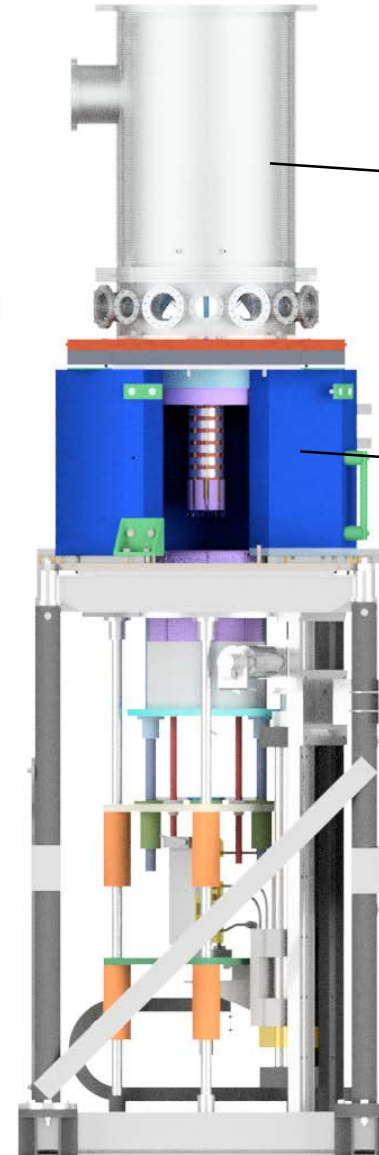
KRUSTY: Kilopower Reactor Using Stirling Technology



Flight Concept



Flight Prototypic Power System



KRUSTY
Experimental Setup

Vacuum Chamber
for Simulated Space
Environment

Facility Shielding

COMET Machine
used to start and
stop reactor by lifting
reflectors around
core



Flight vs. KRUSTY



Flight Unit

KRUSTY
Experiment

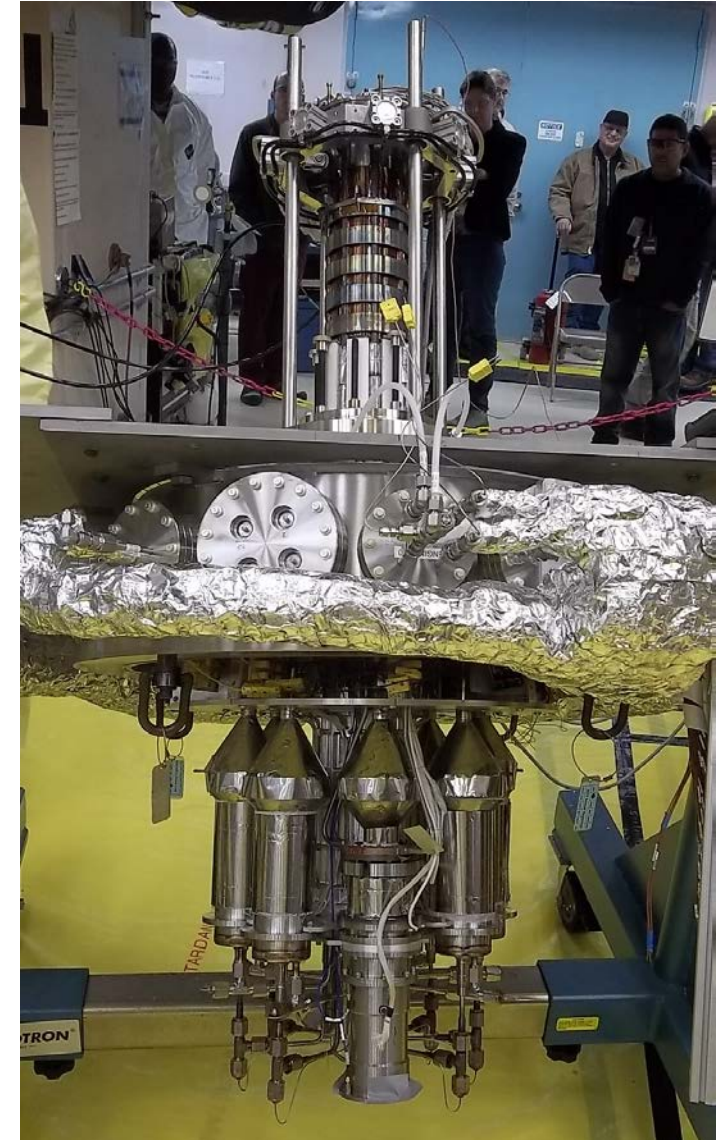


KRUSTY Performance Metrics



Event Scenario	Performance Metric	KRUSTY Experiment	Performance Status
Reactor Startup	< 3 hours to 800 deg. C	1.5 hours to 800 deg. C	Exceeds
Steady State Performance	4 kWt at 800 deg. C	> 4 kWt at 800 deg. C	Exceeds
Total Loss of Coolant	< 50 deg. C transient	< 15 deg. C transient	Exceeds
Maximum Coolant	< 50 deg. C transient	< 10 deg. C transient	Exceeds
Convertor Efficiency	> 25 %	> 35 %	Exceeds
Convertor Operation	Start, Stop, Hold, Restart	Start, Stop, Hold, Restart	Meets
System Electric Power Turn Down Ratio	> 2:1 (half power)	> 16:1	Exceeds

Reactor Assembly



Experiment Assembly



