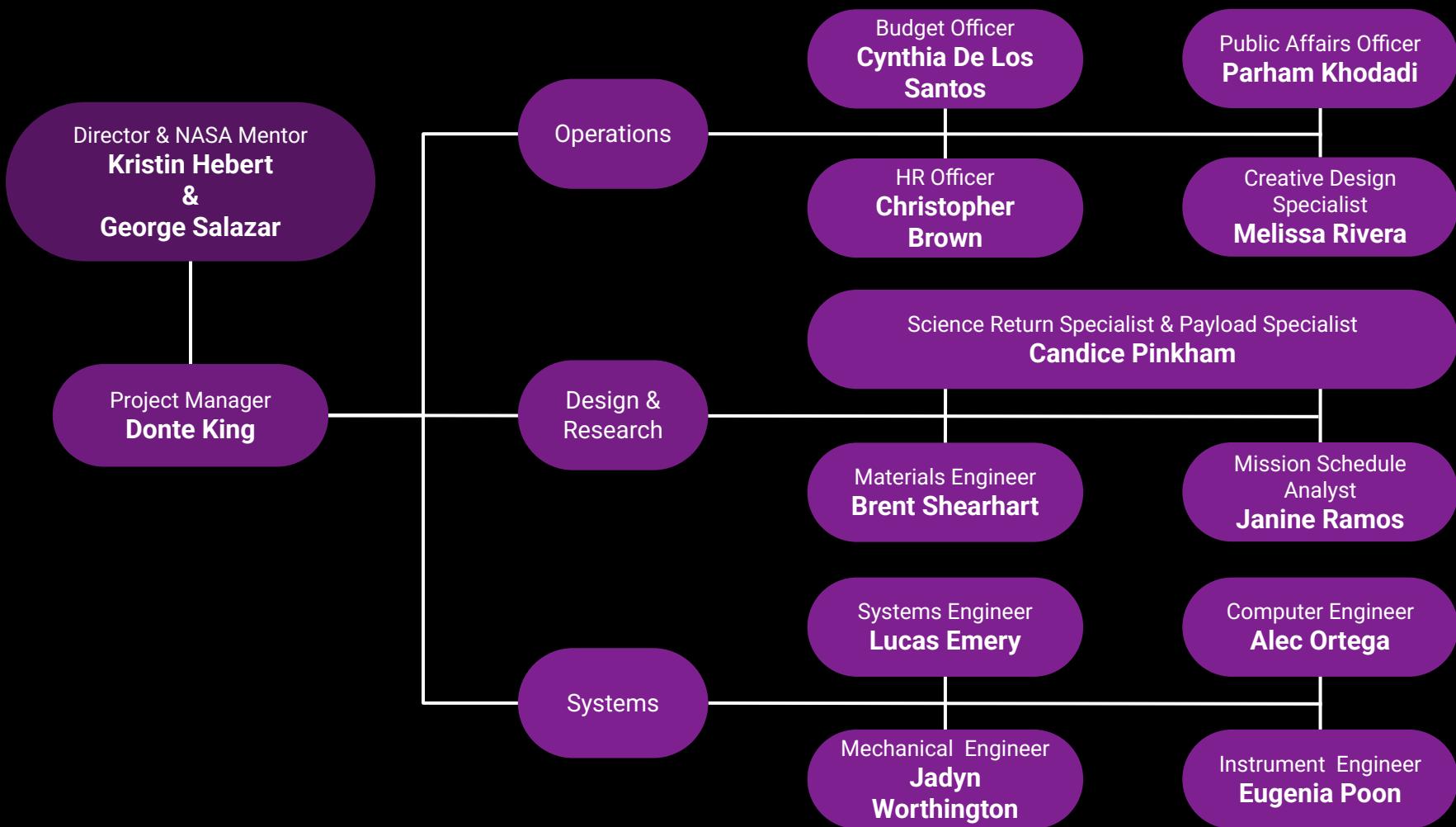


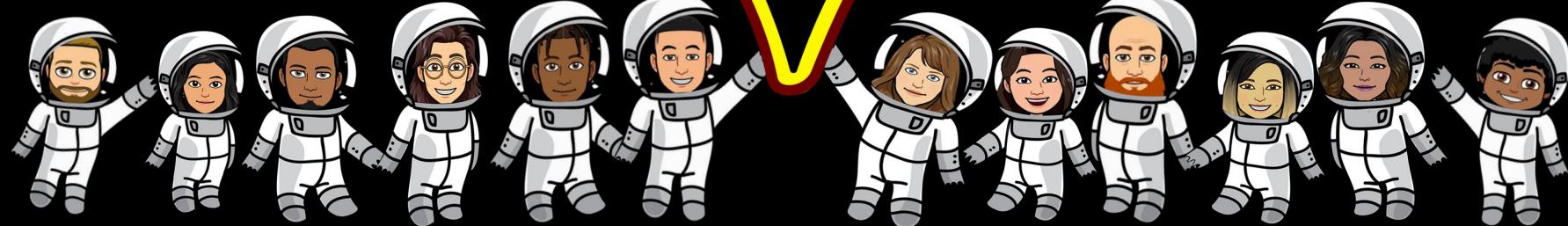


# ASTREA

GEMINI GOLD







# Goal #1



## Safely Transport:

- Astronauts
- Life supporting systems
- Scientific equipment
- Mobility vehicle and lunar habitat

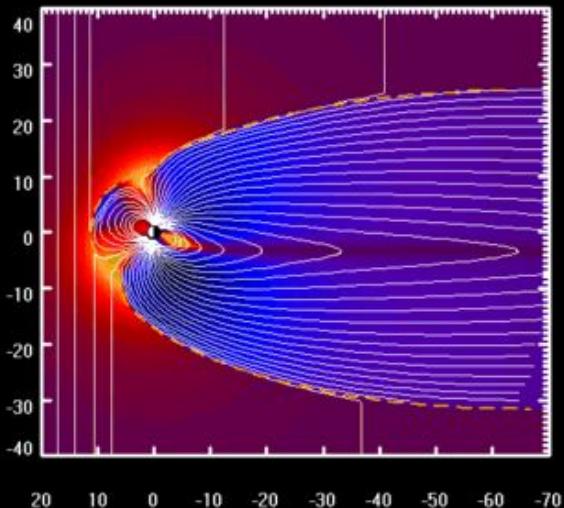
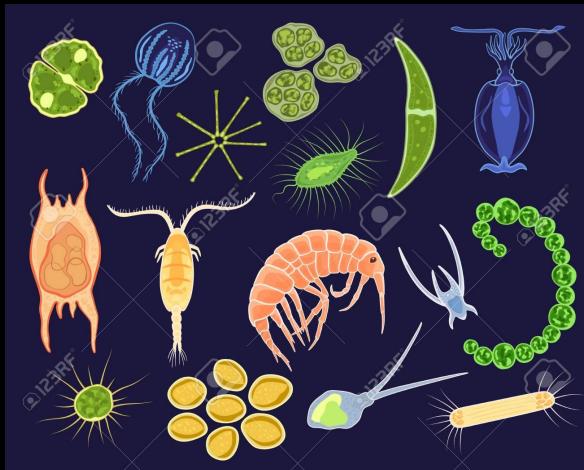
## Tasks in 6 Months:

- Construct Homestead
- Setup scientific lab
- Collect and store water
- Conduct research

# Goal #2

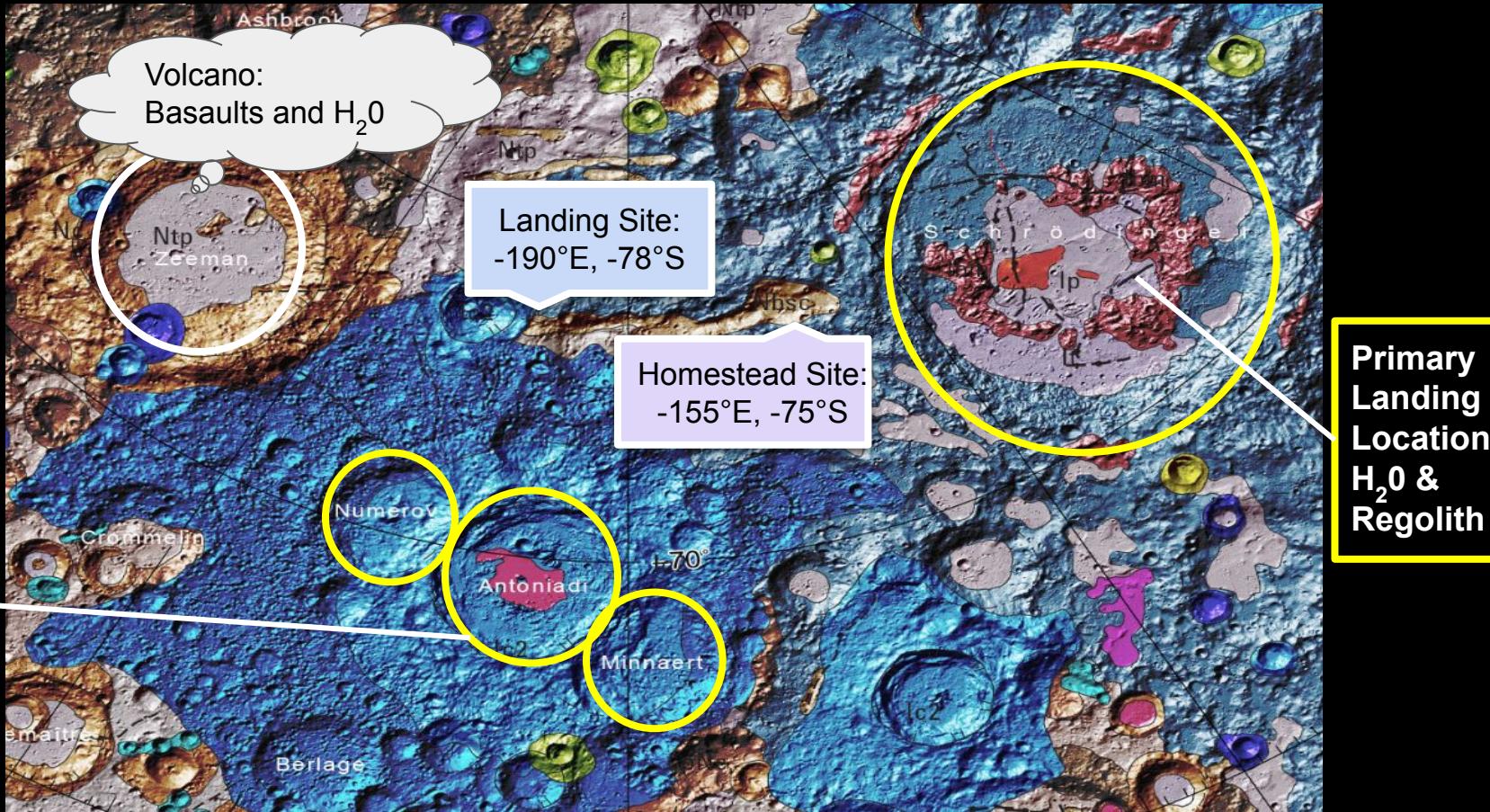
Access lunar water from regolith for long-term sustainability of Astrea and Artemis

Research life support systems, lunar environment, astronomy, and Earth from a new vantage point



# Mission: ASTREA





# Habitat Design

Front



Airlock

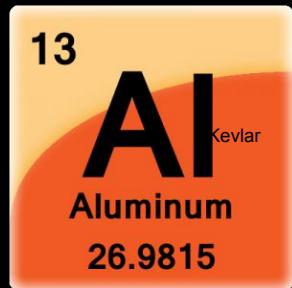
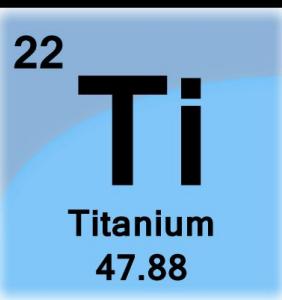
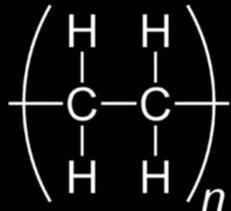
Habitable Volume

Habitable Mobility Platform Dock and Airlock

Back

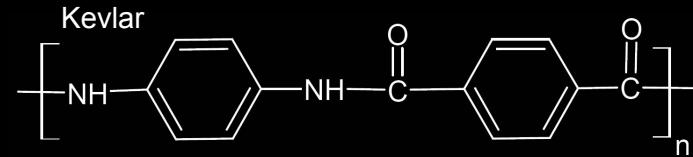
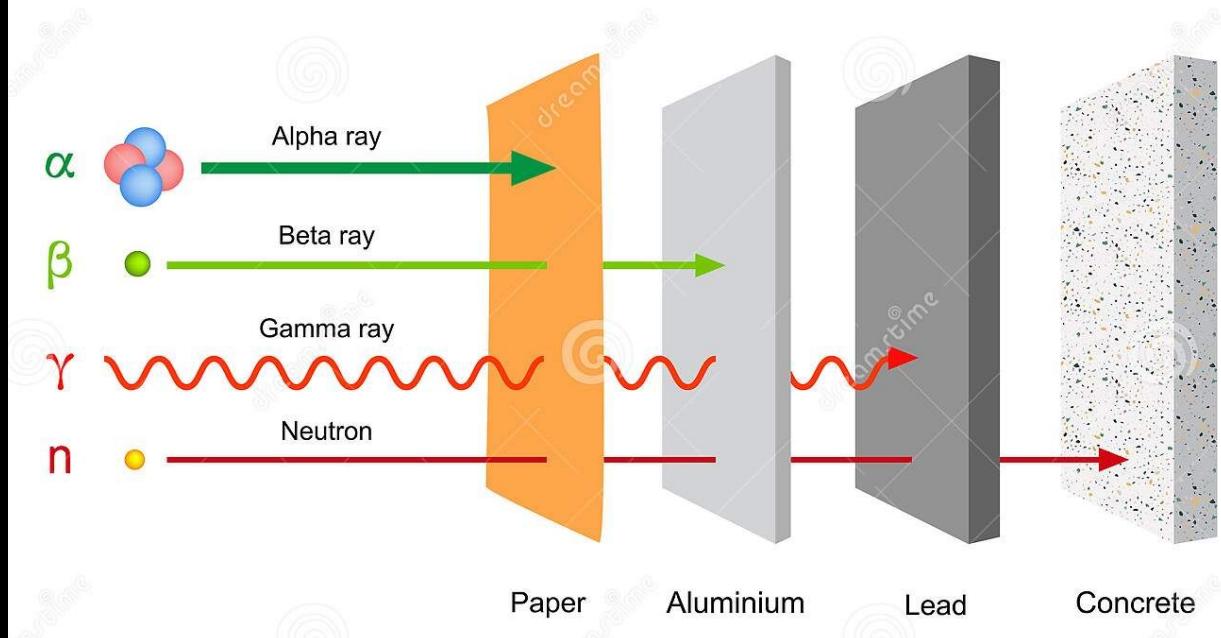


# Polyethylene



# Habitat Material

Penetrating power of Alpha, Beta and Gamma ray through Paper, Aluminium, Lead and Concrete

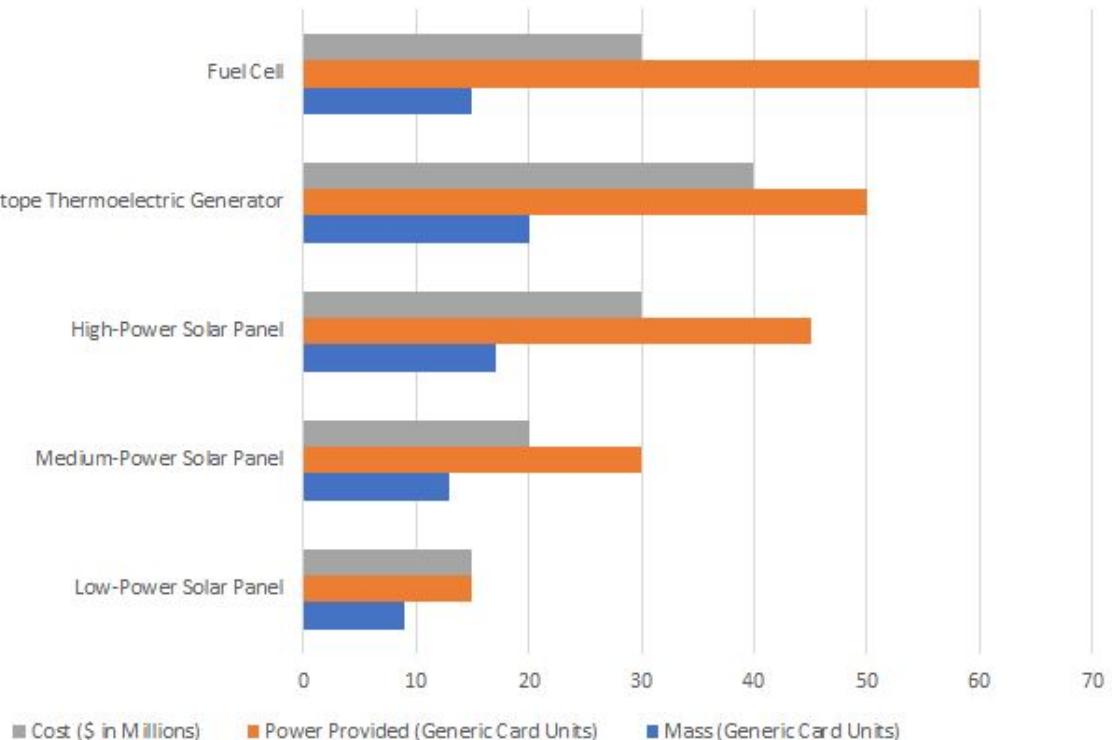


# Power Supplies

Primary:  
Proton-Exchange  
Membrane Fuel  
Cell

Secondary:  
Multi-Mission  
Radioisotope  
Thermoelectric  
Generator

Power Supply Comparison



# Proton-Exchange Membrane Fuel Cell



Cost: 30

Mass: 15

Power limit:

60

Greatest  
Amount of  
power

ISRU  
opportunity

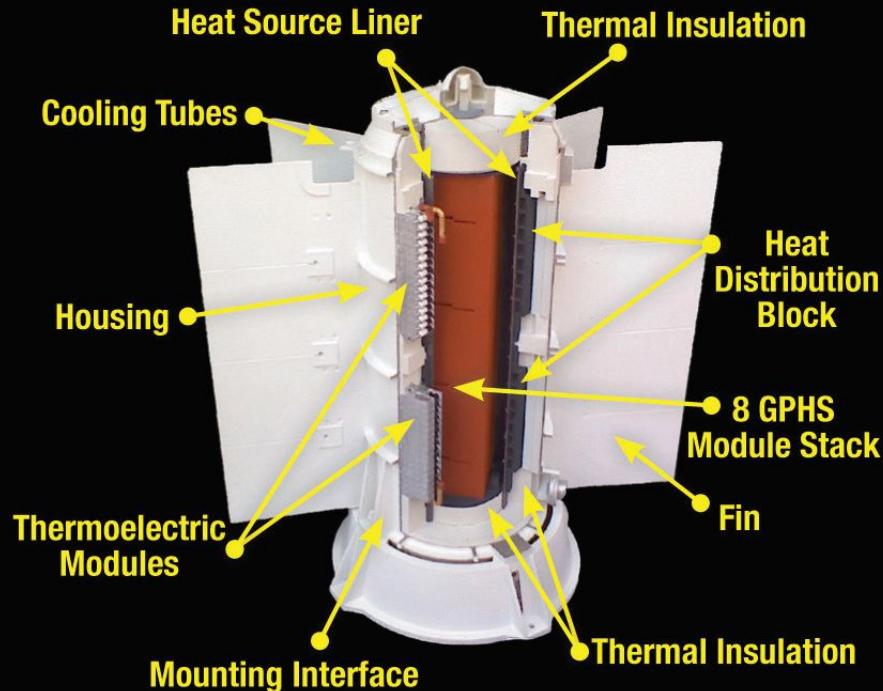
Proof of  
Technology



# Multi-Mission Radioisotope Thermoelectric Generator

TRL 9

Proof of RPS for  
future human  
exploration  
missions

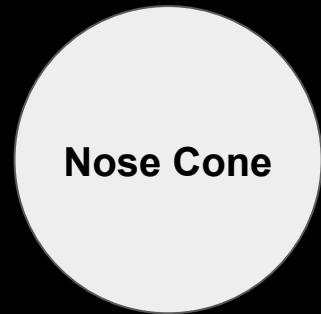


Cost: 40

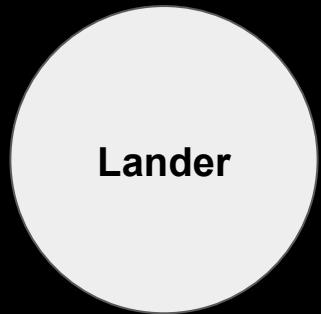
Mass: 20

Power limit: 50

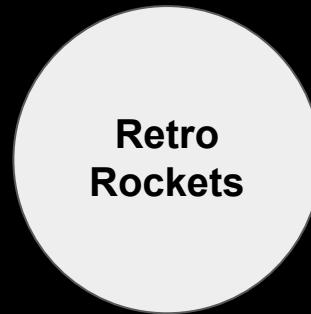
# Rocket and Entry, Descent, and Landing



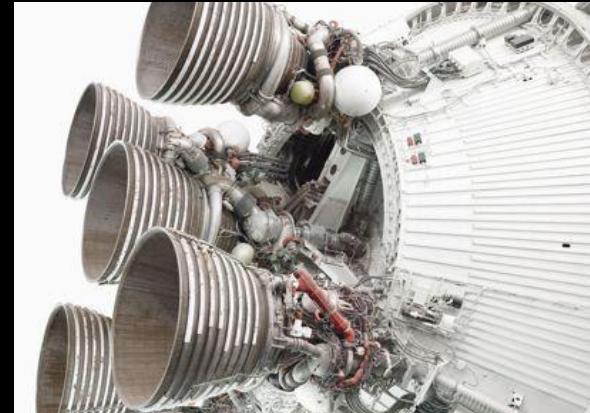
Cost: 10 Mass: 7  
Science: 0



Cost: 20 Mass: 25



Cost: 10 Mass: 40  
Science: 0



# Habitable Mobility Platform



Habitat Mobility  
Platform:  
45 Days

vs.

Surface  
Exploration  
Vehicle:  
14 Days



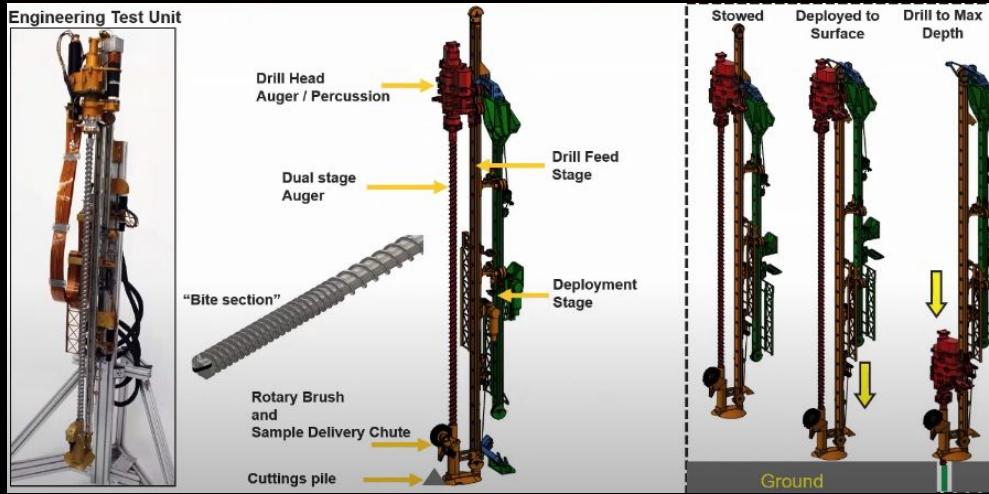
Cost: 20 Mass: 15

Power: 10 Science: 3

Radiation  
hardened with  
ability to serve as  
shelter (SEP)

Increases range  
& safety of  
surface research

# Mechanical Systems



Cost: 5  
Mass: 10

**TRIDENT**  
Drill

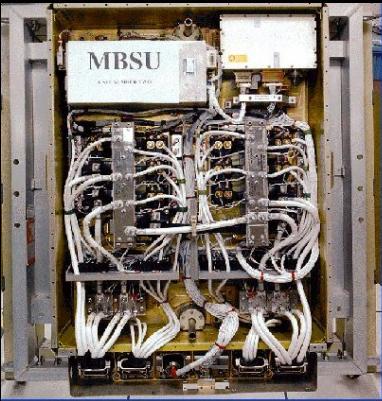
Power: 5  
Science: 4

# Computer Systems

Main Bus  
Switching Unit  
(MBSU)

Standard  
Microprocessor

Cost: 20  
Mass: 5  
Power: 1  
Science: 3



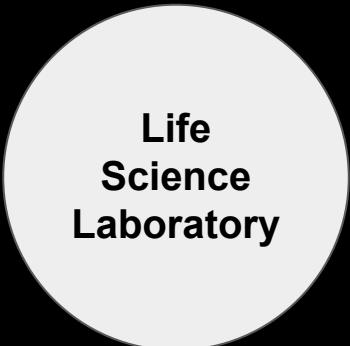
Cost: 5  
Mass: 1  
Power: 1  
Science: 1



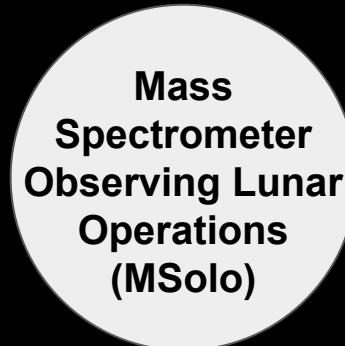
# Research



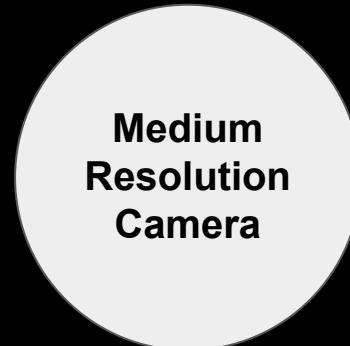
Cost: 40 Mass: 20  
Power: 25 Science: 15



Cost: 10 Mass: 2  
Power: 2 Science: 3



Cost: 10 Mass: 4  
Power: 2 Science: 7



# Crew Health

**Advanced  
Resistive  
Exercise Device  
(ARED)**



Cost: 5

Mass: 1

Power: 1

Science: 5

**Radiation  
Assessment  
Detector (RAD)**



Cost: 7

Mass: 1

Power: 3

Science: 4

# Communication Systems



Cost: 10 Mass: 2  
Power: 5 Science: 2

Cost: 5 Mass: 2  
Power: 3 Science: 1

Cost: 5 Mass: 1  
Power: 3 Science: 3

**High-Gain  
Antenna**

**Low-Gain  
Antenna**

**Main Memory  
Card**

# NASA Alignment

## Goals

#1

Find and use water and other critical resources needed for long term exploration

#4

Prove the technologies needed before sending astronauts on mission to Mars, a +3 year mission roundtrip

#3

Learn how to live and operate on the surface of the Moon where astronauts are just three days from home



IN THE YEAR 2024

# ASTREA TIMELINE



MAR 19

Launch date

MAR 22

Transportation from the landing site to the habitat site  
(Duration: 3.5 hours)

APR 24 -  
SEPT 24

Occupation of the base to do research

MAR 22

Moon landing

MAR 23 -  
APR 23

Preparation of lunar habitat and other science instruments

SEPT 25

Rotation of the astronauts out of the lunar base using Gateway, leaving the facility open for other missions to do their own research

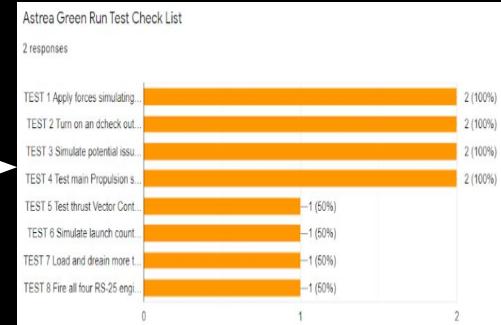
# Notable Setbacks



NCAS St  
Artemis, CA, 93128

INVOICE #3  
DATE: JULY 23, 2021

TO:	FOR:		
Innovative Hydraulics LLC 305 S 84 <sup>th</sup> Ave Wausau, WI 54401	ASTREA mission		
<p>After thorough investigation, the rocket test failure was concluded to be the fault of Innovative Hydraulics. Per the contractor agreement, Innovative Hydraulics is bound to pay Gemini Gold the full amount of cost and repairs for the rocket.</p>			
DESCRIPTION	HOURS	RATE	AMOUNT
Cost and Repairs	10,000	500	5,000,000



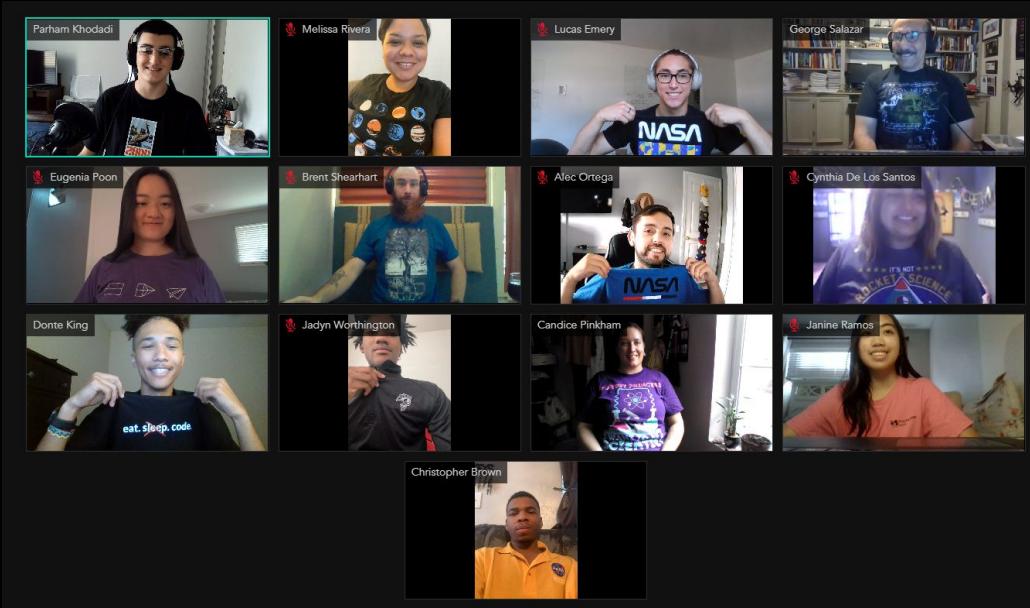
Independent contractor solved the issue in accordance to our agreement

# Challenges and Lessons Learned

Team meetings

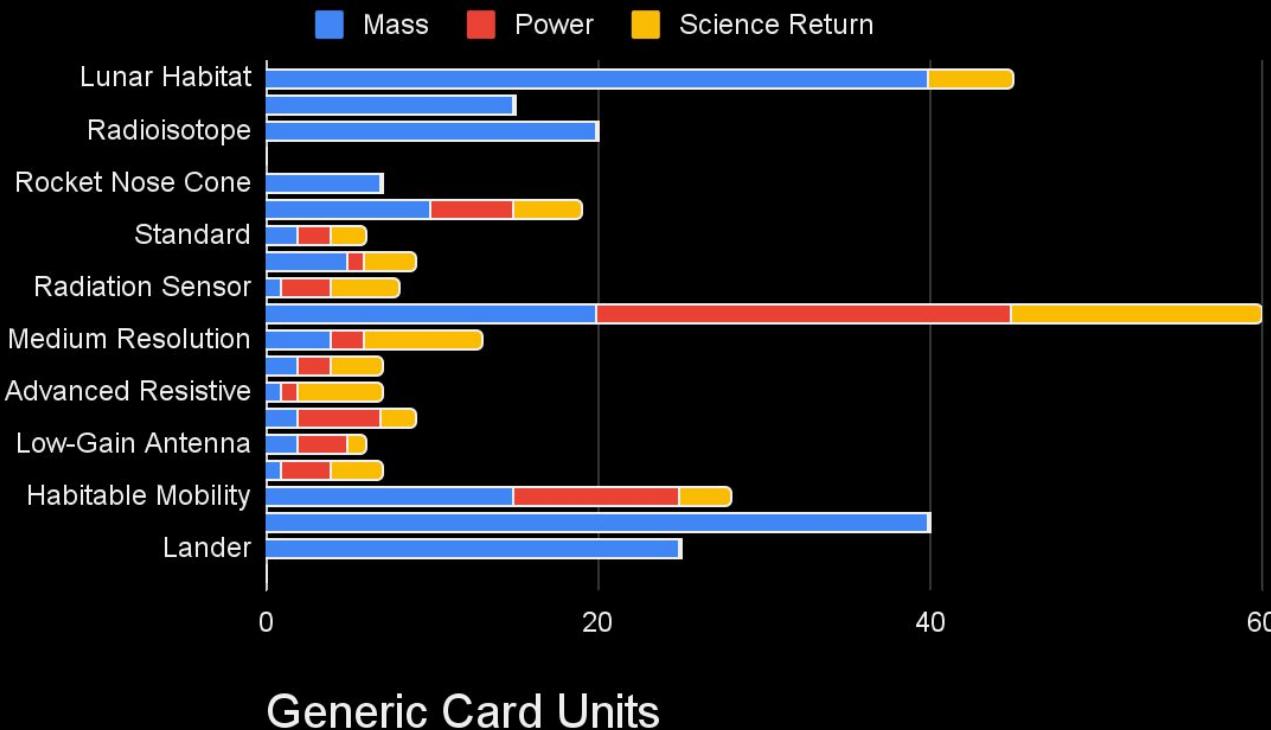
Communication  
Forums

Planning mission  
within constraints



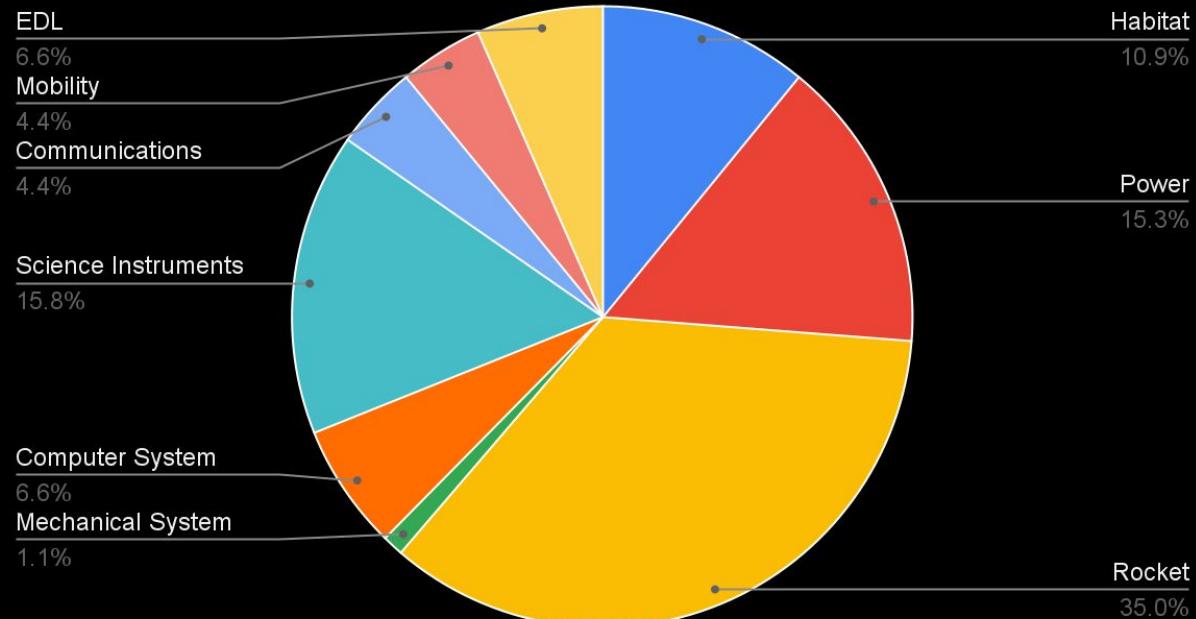
# Budget and Expenditure

## Mass, Power, and Science Return for all Items



# Cost Statistics

## Mission Costs



Total Earned: 469.5 million  
Total Spent: 469.5 million



# Marketing Plan

## Mission Marketing

### Advertisement

Fundraiser Video



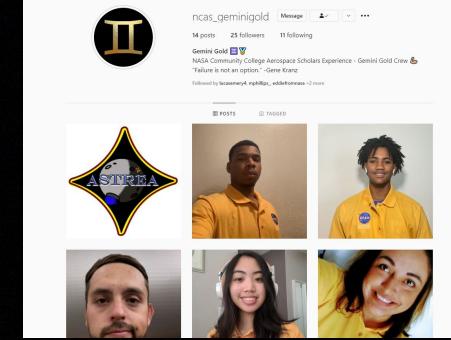
### Search Engine Optimization

Webpage



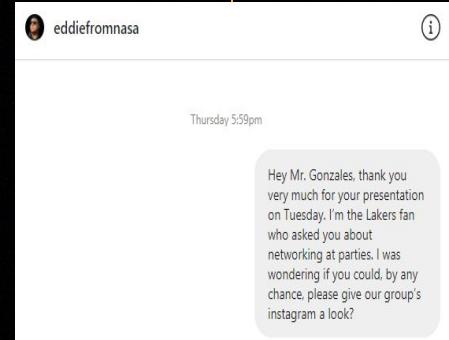
### Content Strategy

Instagram Posts



### Social Outreach

Direct Messaging Influencers





Astrea

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