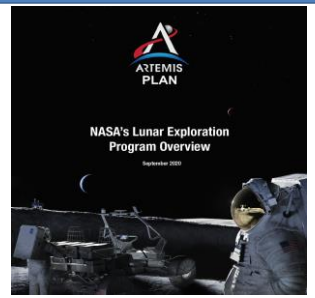
Today's Class: Project Artemis – Guest lecture by Lockheed Martin Chief Exploration Architect T. Cichan & Deputy Dr. Christine Edwards

- Continue to read about Artemis & Science on the Moon using NASA report referenced on class website for Oct. 11.
- Homework #4 will be handed out next week.



1

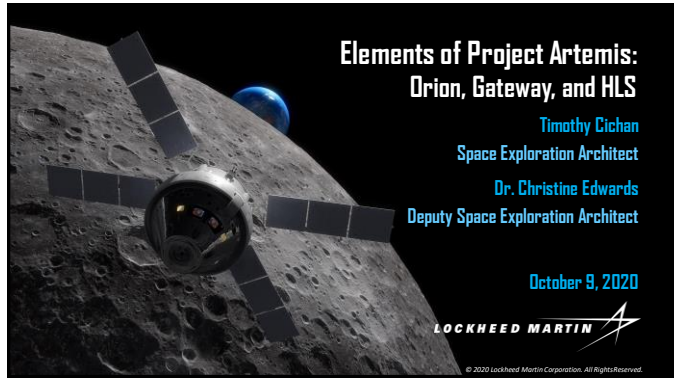
Poem by 2020 Literature Nobel Laureate

Telescope by Louise Glück

There is a moment after you move your eye away
when you forget where you are
because you've been living, it seems,
somewhere else, in the silence of the night sky.
You've stopped being here in the world.
You're in a different place,
a place where human life has no meaning.
You're not a creature in body.
You exist as the stars exist,
participating in their stillness, their immensity.

Then you're in the world again.
At night, on the cold hill,
taking the telescope apart.
You realize afterward
not that the image is false
but the relation is false.
You see again how far away
everything is from every other thing.

2



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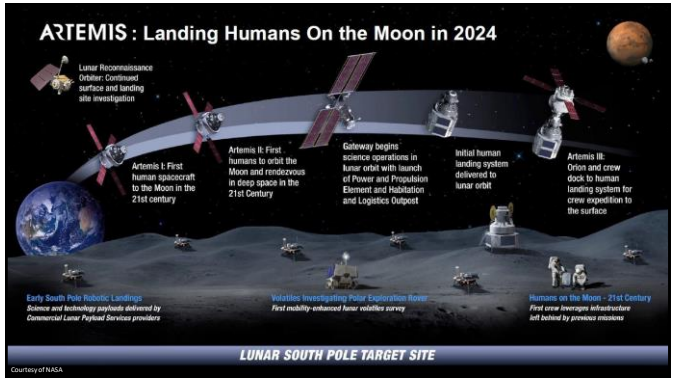

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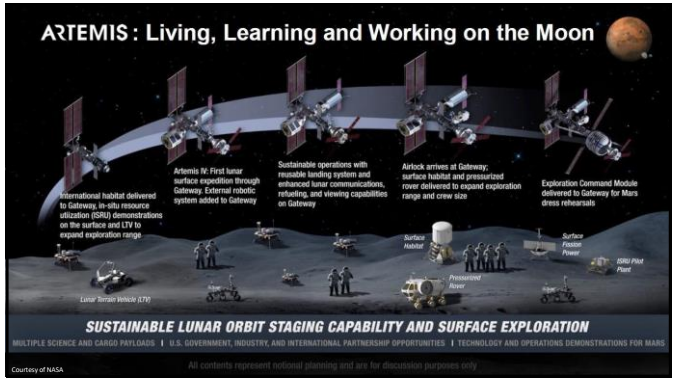

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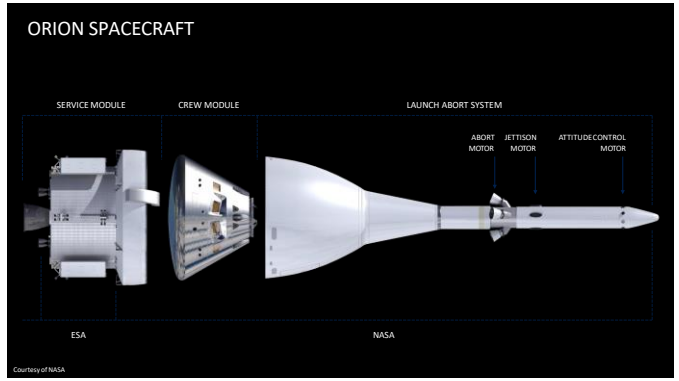

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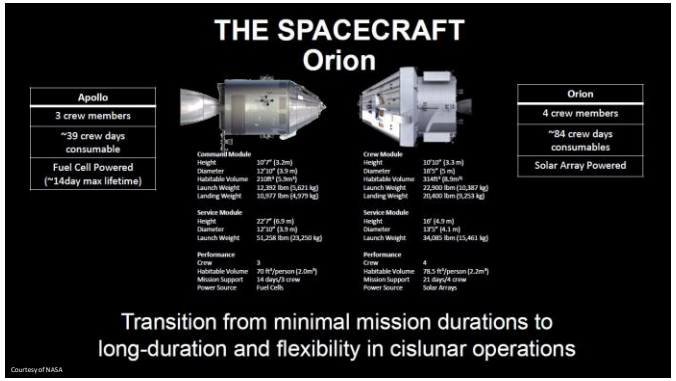
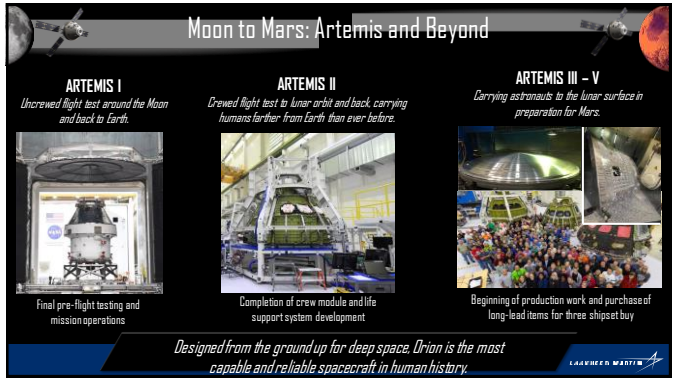
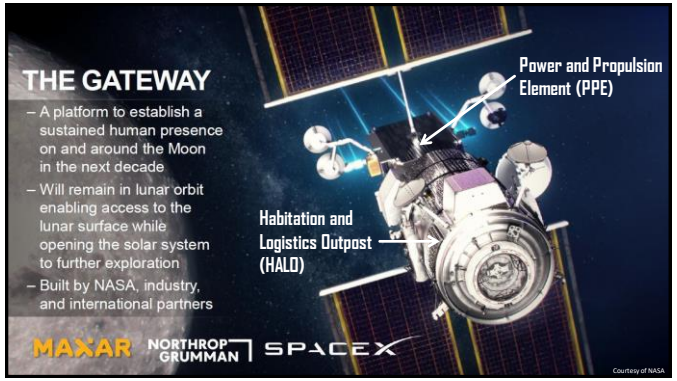

THE SPACECRAFT
Orion
Apollo
3 crew members
~39 crew days consumable
Fuel Cell Powered (~14day max lifetime)
Orion
4 crew members
~84 crew days consumables
Solar Array Powered
Transition from minimal mission durations to long-duration and flexibility in cislunar operations
Courtesy of NASA

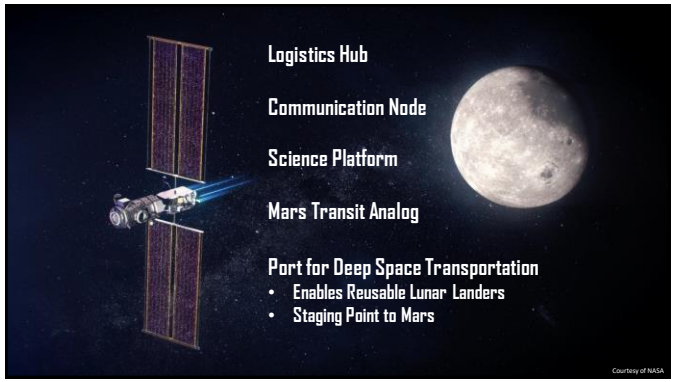
7


Moon to Mars: Artemis and Beyond
ARTEMIS I
Uncrewed flight test around the Moon and back to Earth.
Final pre-flight testing and mission operations
ARTEMIS II
Crewed flight test to lunar orbit and back, carrying humans farther from Earth than ever before.
Completion of crew module and life support system development
ARTEMIS III – V
Carrying astronauts to the lunar surface in preparation for Mars.
Beginning of production work and purchase of long-lead items for three shipset buy
Designed from the ground up for deep space, Orion is the most capable and reliable spacecraft in human history.

8


THE GATEWAY
– A platform to establish a sustained human presence on and around the Moon in the next decade
– Will remain in lunar orbit enabling access to the lunar surface while opening the solar system to further exploration
– Built by NASA, industry, and international partners
Power and Propulsion Element (PPE)
Habitation and Logistics Outpost (HALO)
MAXAR
NORTHROP GRUMMAN
SPACEX
Courtesy of NASA

9


Logistics Hub
Communication Node
Science Platform
Mars Transit Analog
Port for Deep Space Transportation
• Enables Reusable Lunar Landers
• Staging Point to Mars
Courtesy of NASA

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Human Landing System (HLS)
Dynetics
A Leidos Company
SPACEX
NATIONAL TEAM
The Broad Agency Announcement catalyzed the innovation in U.S. Industry it was designed to do.
Three contracts awarded April 30, 2020
Complete lander systems were proposed including launch vehicles for an end to end solution for 2024 and sustaining
Base Period: May 2020 – February 2021
Courtesy of NASA

11

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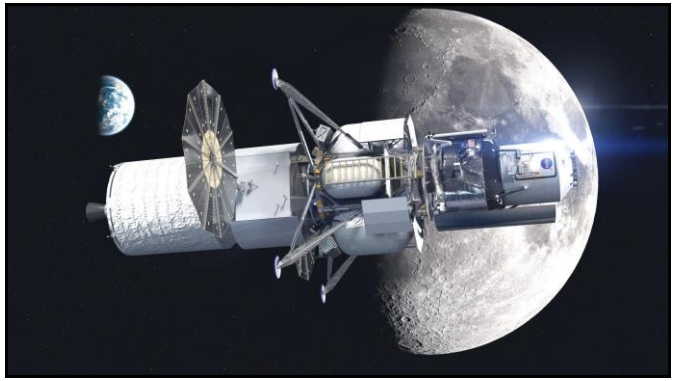

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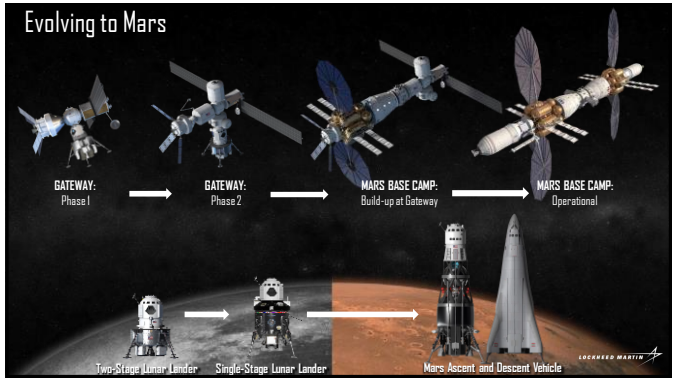
Evolving to Mars
GATEWAY:
Phase I
GATEWAY:
Phase 2
MARS BASE CAMP:
Build-up at Gateway
MARS BASE CAMP:
Operational
Two-Stage Lunar Lander
Single-Stage Lunar Lander
Mars Ascent and Descent Vehicle
LOCKHEED MARTIN

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QUESTIONS?
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ARTEMIS
Images courtesy of NASA

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