Lockheed martin sustaining lunar development

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Our future in space leaves fossil fuels behind. Powerful, safe and clean nuclear technologies keep the lights on through the dark lunar night and propel us faster and farther into the solar system.

This new space age will be a collaborative effort between space agencies and private companies. A robust lunar economy that provides value to Earth is the most effective way to build an efficient, permanent presence.

Multipurpose mobility will allow us to explore the Moon"s extreme surface terrain, discover useful resources like water, build roads and landing pads, assemble habitats, offload cargo from landers and accomplish groundbreaking NASA science. All sizes and capabilities are needed -- from tiny, short-distance helpers to vehicles capable of transporting hundreds of pounds across (or over) hundreds of miles in the dark lunar night.

In the words of Robert Heinlin, "The Moon is a harsh mistress," with long periods of darkness at the equator and areas of the poles in perpetual shadows. Towering solar arrays capture the Sun"s power with an emerging power grid of cables and energy beams that carry power over rough terrain and into craters of permanent darkness. Nuclear fission provides high, continuous power regardless of the Sun"s location.

Habitats at the Moon, whether on the surface or in orbit, need to be safe, reliable, lightweight, spacious and able to shelter us from the radiation and dust of the harsh lunar environment. Inflatable "softgoods" technologies outperform traditional metal structures, including better radiation protection, higher strength, lower cost and the ability to launch tightly packed then expand on the surface.

The path to Mars has always been through the Moon. It is water-based, nuclear-enabled and commercially invested -- and it"s a path we"re excited to travel with you.

In certain locations, the Moon"s south pole gets sunlight 80 to 90 percent of the time, making it ideal for harnessing solar energy to build and sustain a long-term lunar presence.

In 2021, Lockheed Martin was one of five companies selected to design a solar array concept that can autonomously deploy vertically and retract for relocation on the Moon.

Lockheed Martin developed its history and expertise in space solar power through the build of hundreds of satellites and deep space spacecraft, the design and build of the solar arrays on the International Space Station and most recently, the development and launch of our new, flexible Multi-mission Modular (MM) Solar Array.

"The MM Solar Array was first used in our commercial vehicles and we"re excited to apply it to NASA"s

Vertical Solar Array Technology (VSAT)," said Alya Elhawary, Lockheed Martin"s VSAT Program Manager. "When designing solar arrays for the Moon, we have to think about cost, mass efficiency and resiliency for surviving the lunar environment."

"In addition to rigorous thermal and environmental testing, one specific factor we have to think about is regolith (Moon dust), which can affect VSAT due to the dust"s electrostatic properties," said Elhawary. "We"re applying lessons from other missions that"ve operated in dusty environments such as the InSight Mars Lander."

Lockheed Martin"s VSAT design will stand at about the length of two school buses, making it easier to take advantage of sunlight. Lockheed Martin will test the prototype"s ability to extend and retract for easy launch from Earth and movement around the Moon.