LSIC Surface Power Focus Group

May 27, 2021

Begins at 11:03

Lunar Surface Innovation Consortium

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Confluence Discussion:
https://lsic-wiki.jhuapl.edu/display/SP/27+May+2021+-+VSAT

Overview

- LSIC community updates
  - LSIC Calendar Changes
  - Spring Meeting/Other FG updates on Confluence
  - Upcoming activities
    - Who's Who in Surface Power: keep it up!
    - Power User Survey – off cycle meeting before June meeting
    - Power Beaming Workshop: save the date July 15-16

- VSAT
  - VSAT PM Chuck Taylor
  - Additional content from awardees
  - Q&A on VSAT Content

  - Dust Mitigation Content, then Q&A
  - Extreme Environment Content, then Q&A
  - Surface Power Content, then Q&A

LSIC | Surface Power User Survey

What do we need to know to further our work?

- How much power over time
  - Through lunar eclipse and changes through architecture phases
- Where is it needed
- What form

- Solicit opportunities for standardizing power components and interfaces

- Relates to Surface Power activities:
  - Developing standards and informing on the potential user base.

LSIC | Surface Power Focus Group Upcoming Activities

Power Beaming Workshop
July 15-16, 2021
Day 1: Context and Demand
Day 2: Deeper Technical Discussions

Planning Session held April 16th, next TBD

https://lsic-wiki.jhuapl.edu/display/SP/Power+Beaming+Workshop

LSIC | VSAT Presentations

Chuck Taylor, Project Manager for VSAT

Space Systems Loral (Maxar Technologies)
Doug Hemingway

Honeybee Robotics
Richard Margulieux

ATK Space Systems (Northrop Grumman)
Michael McEachen

Lockheed Martin
Christy Edwards

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VSAT Q&A

Confluence page:
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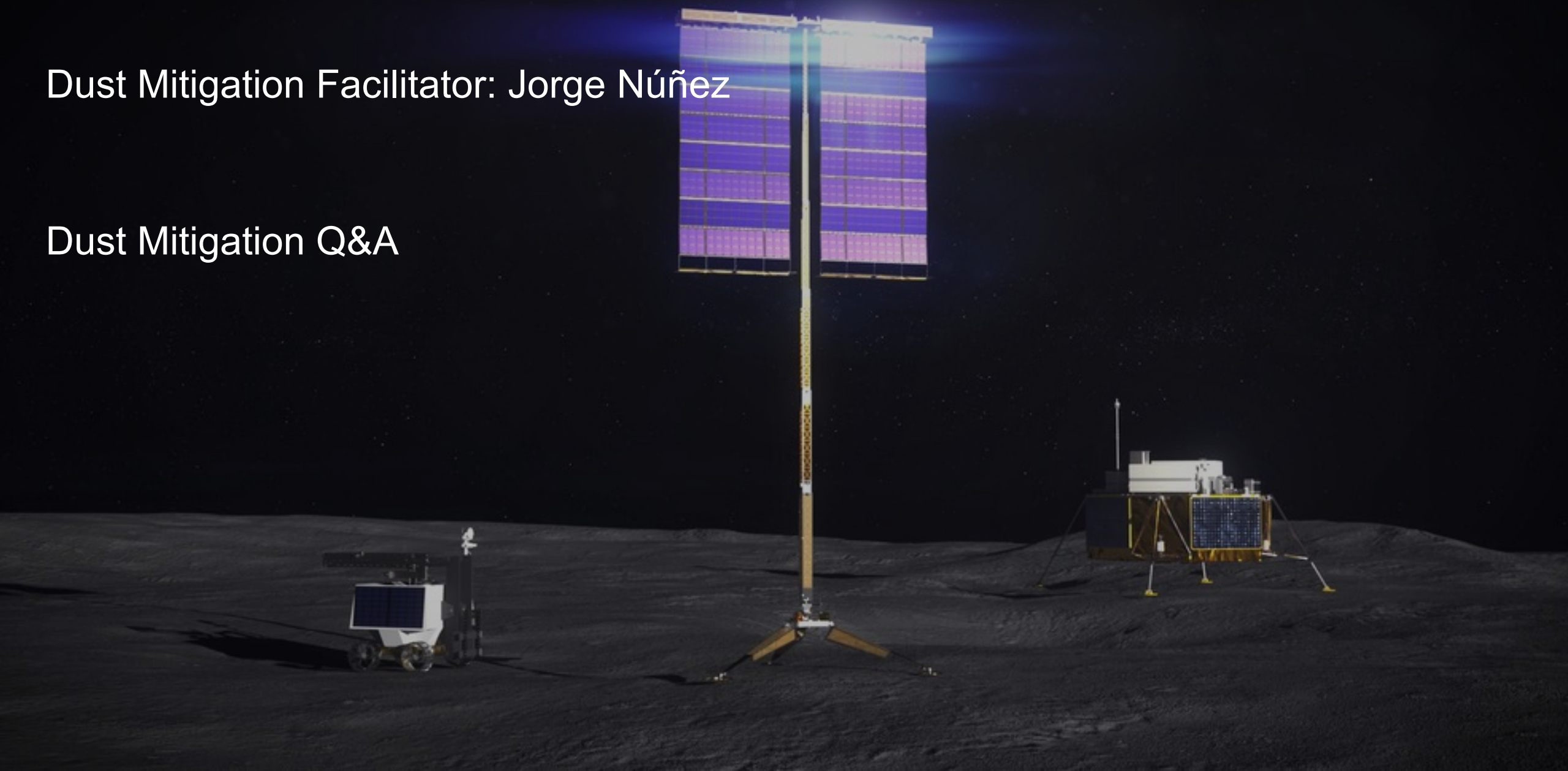
Dust Mitigation Facilitator: Jorge Núñez

Dust Mitigation Q&A



LSIC | Surface Power Focus Group Upcoming Activities

Extreme Environments Facilitator: Ben Greenhagen

Extreme Environments Q&A

LSIC | Surface Power: VSAT Questions for Q&A

VSAT in the larger system

What does it enable and what requires it?

What else is needed to get the tight amount and at the right place and time?

What modularity can be built into VSAT systems? How can we encourage an ecosystem of compatibility with multiple providers?

TABLE 1.—POWER LEVEL RANGE OF VARIOUS MISSIONS OR ACTIVITIES ON LUNAR SURFACE

Mission	Power level range, kW	Notes
Habitat/base camp power	30.0 to ≥ 100.0 (avg. 5 to 10 kW/person)	This power level is directly related to size of habitat and number of people it will need to support.
Communications system power	0.3 to 1.0 per transmitter (surface to surface and surface to orbit)	The power levels are for powering a single transmitter. The total communications system may also be powered from a central power source.
Support equipment power (vehicles, rovers, etc.)	2.0 to 10.0	This power level depends on activity that vehicle is supporting, and whether it is manned or unmanned.
Long range rover power/heavy equipment vehicle	7.0 to 30.0	For long-range pressurized rover, the power level will depend on the number of people it needs to support.
Charging station power	1.0 to 10.0	The charging station output power will vary depending on the number of vehicles charged and the desired charge time.
Electrostatic/electric field radiation shielding power (cosmic rays and solar protons)	1.0 to ≥ 10.0	A number of factors determine the power level such as distance of the field and shielding required. The shield uses very high voltage to produce deflection of particles but not much power.
In situ resource utilization (ISRU) processing heat and power (O_2 and raw material production)	10.0s to 100.0s (thermal) 10.0s to 100.0s (electrical)	Thermal and electrical power requirements are highly variable depending on process used and rate of production.
Long distance rover (magnetic field mapping, general science) power	0.1 to 5.0	Power level depends on rover size and type of science performed.
Water ice exploration and recovery heat and power	10.0s to 100.0s (thermal) 10.0s to 100.0s (electrical)	As with general ISRU, this will depend on amount of water that is to be processed.
Remote, stand-alone geology station power	0.1s to 1.0	Sensor requirements, heating for nighttime operation, and communications will determine power requirement.
Remote, stand-alone astronomy observatory power	0.1s to 1.0	Communications and nighttime operation are main power consumption items.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