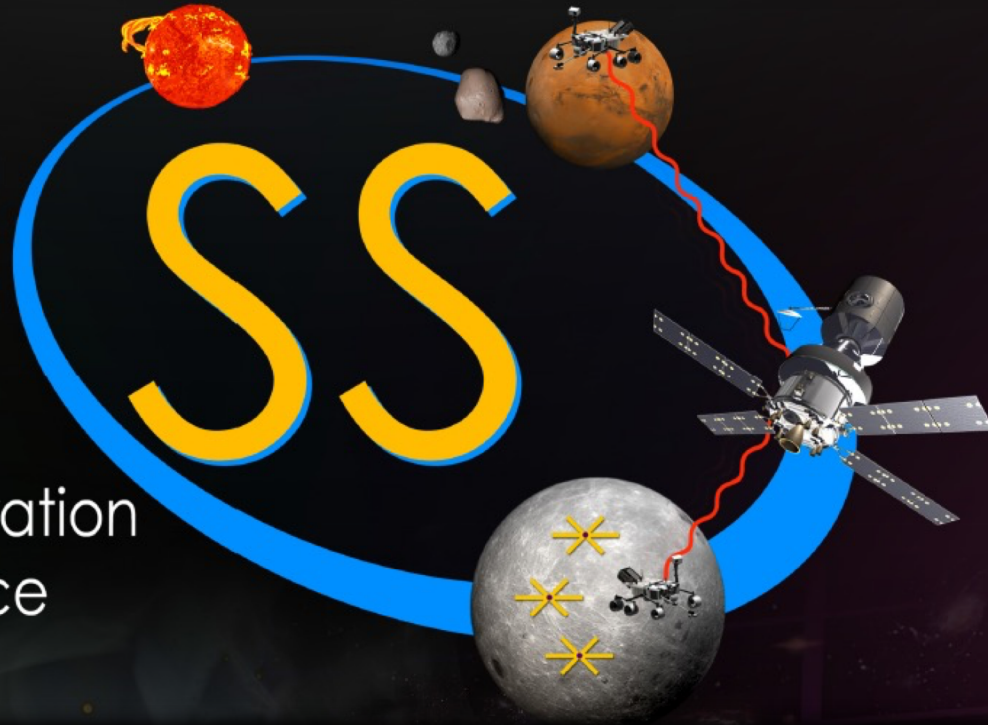


NESS

Network for Exploration
and Space Science



University of Colorado
Boulder



UCLA



ASU

Caltech



Ball Aerospace



8:30 **Welcome & Overview of the day – Burns**

8:45 **Updates on NESS and SSERVI**

- NESS budget negotiations - Burns
- Status of Cooperative Agreement from Ames to Colorado and Subcontracts – Burns
- NESS website and social media presence - Rapetti
- Summary of SSERVI EC meeting at Stony Brook – MacDowall
- Diversity on the NESS team - MacDowall
- Monthly and yearly deliverables – Burns
- Exploration Science Forum 2017 at Ames - Burns
- Ideas on NESS community workshop in 2018

9:30 **Cosmic Dawn Science**

- Theory and Modeling – Furlanetto
- MCMC Pipeline for extraction of 21-cm Global Signal – Tauscher & Rapetti

10:30 **Break**

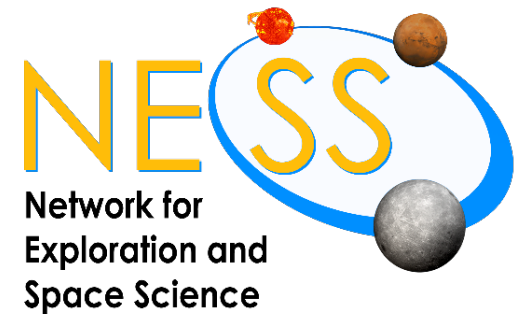
10:45 **Radio Heliophysics Science**

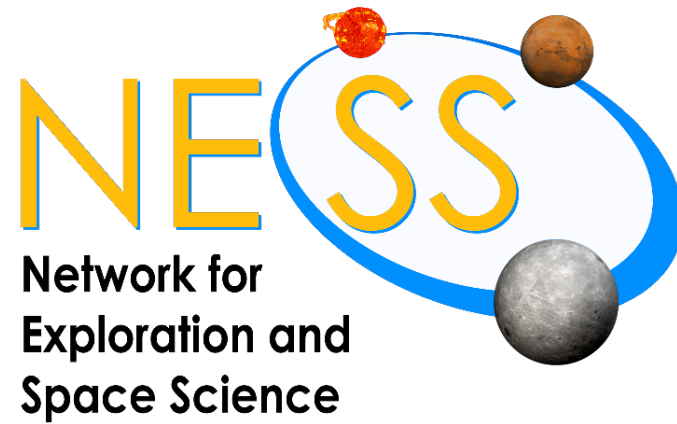
- Solar radio bursts observed below 10 MHz – MacDowall
- Coronal Mass Ejections, Shocks, and Space weather alerts - MacDowall
- Dust in Space and on the Lunar Surface – Kasper
- Imaging synchrotron emission from Earth's radiation belts – Kasper
- Requirements for imaging/detecting these sources – MacDowall & Kasper

11:45 **Radio Emission from Exoplanets - Hallinan**

12:05 **Design/Trade Study of Lunar Low Frequency Radio Telescopes I.**

- Goals for a Trade Study in Year 1 – Bowman
- Lessons from LWA, MWA, SKA – Hallinan, Bowman
- Can a single array do Cosmic Dawn, Heliophysics, & Exoplanets? – MacDowall, Bowman, Hallinan





SSERVI Monthly Deliverable



SSERVI Central Mar. 2017 Report



Progress Report

Programmatic

- Announced CAN 2 Selections,
- Worked on SSERVI Budget and new Team CoOp Agreements
- JSC Workshop with Space Suit & EVA Teams
- Presented to AES Mid-Year Review
- Reporting; ARC BPR report; Wrote and edited content for 2017 Annual Report.
- Identified potential SOC members
- Collected all ESF award nominations

Web/Tech

- Produced the Pre-Proposal Conference “Space Radiobiology and Human Health Countermeasures Topics.”
- Produced five SSERVI CLASS Tech and Future of ISRU Seminars featuring Oscar Monje, Phil Metzger, Tony Muscatello. Jason Dunn and Rob Mueller
- Provided Adobe Connect training sessions for NESSF Panel Reviews
- Prep support for the HRP Pre Proposal briefing; Production support and pre-production training and testing of remote presenters for the AES Mid-Year review.
- Website development for awards and forum; server updates; system support and procurements; cloud infrastructure discussions

Communication Outreach

- Participated in Journey Through the Universe event; produced outreach book “Yes I work for NASA. No I’m not an astronaut;”
- Logo design for Small Sat Virtual Inst.;
- sourcing and production for Lunar Eclipse glasses;
- Initial design layout and illustration for ELS, Toulouse.
- Created web graphics and posted articles to SSERVI website—team relevance includes: “ExMASS” (Kring; CLSE); Sudbury Field Camp (CLRN/CLSE); Vision 2050 (Kring/CLSE); “Earth’s First Stable Continents” (Bland/AUS);
- ARC Podcast (Pendleton/all teams);
- Posted social media highlights.

Key Upcoming Events

- Glotch Team Site Visit Apr. 27-28
- ELS 2017, Muenster, May 2-3
- New Views of the Moon II, Muenster, May 4-5
- CAN-2 Teams Start, June 1
- ESF, NASA ARC, July 18-20
- Autonomous Missions for SMD Workshop, NASA ARC, July 21

Funding Status

- **Reminder: CR through 4/28 after which either a full year CR or budget will be passed at that time.**
- **Still awaiting authorization for some of FY17 AES coverage funds.**
- **If your team is in immediate need of funds, please let us know so we can prioritize your team.**
- **For CS teams and CO-Is, The next installment will be sent after 4/28.**



SSERVI Mar2017 Report

DREAM2/PI Farrell



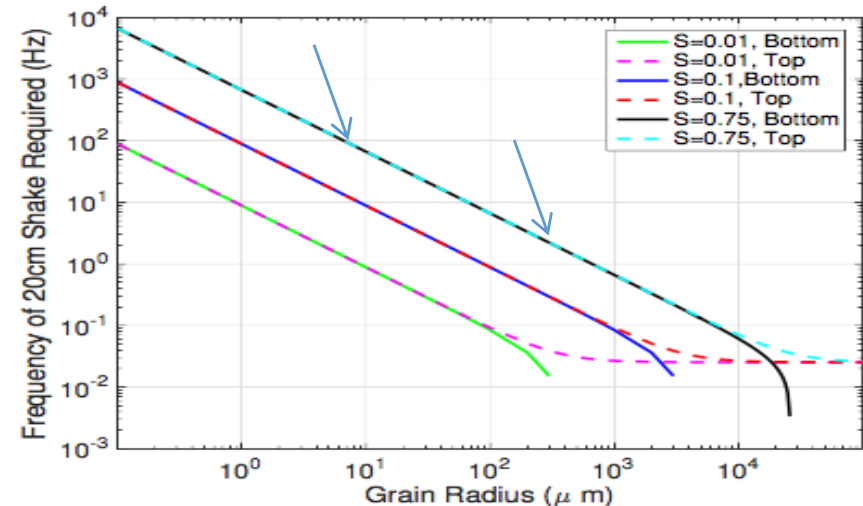
Progress Report

- **DREAM2 Papers:** 71 total; 59 in press or published.
- **LPSC:** Another great meeting with 10 DREAM2 presentations and Outreach team leading presentation on NPP opportunities.
- **SSERVI/JSC Meeting:** At LPSC meet with JSC's Exploration team to determine where SSERVI could fill niche/needs. It was determined that key environmental information on plasma and dust would be of assistance...will discuss more at EC.
- **Two-Beam Radiation Experiment's 'First Light':** The dedicated DREAM2 high energy beam line at the GSFC rad facility is now operating. The goal is to use 1 MeV Ar ions to create surface defects and then use a second low energy 2 keV D_2^+ to implant D and to determine if enhanced OD levels are produced in a defected surface. Some initial tests run on sapphire and olivine.
- **'Space Environment in Stickney Crater' Paper Set (so far):**
 - Poppe et al 2016: Phobos neutral and ion torus, JGR [published]
 - Farrell et al. 2017: Hydroxylation at the Moon and Phobos, JGR [published]
 - Killen et al. 2017: General Scaling of Exospheres, ASR/SB [just submitted]
 - Hartzell et al. 2017: Cohesive regolith on human explorers, ASR/SB [just submitted]
 - Farrell et al. 2017: Electrical environment at Phobos, ASR/SB [submitted recently]

Upcoming Events

- RISE4 Site visit 4/27-28
- DREAM2 F2F 6/20-22
- DREAM2Explore Teacher workshop 6/26-30
- Exploration Science Forum 7/18-20

Moment of Science



Hartzell et al. Frequency at which an astronaut must shake his/her glove with a 20cm amplitude in order to detach a dust grain. 'Top' and 'Bottom' refer to the side of the glove to which the dust is in contact. Grains on the bottom of a glove will detach without any vibration above a certain size, causing the required shake frequency line to terminate. Variable S is the 'cleanliness factor which is $S \sim 0.75$ for lunar regolith.



SSERVI Mar 2017 Report

Monthly Report for VORTICES/Rivkin



Progress Report

- **LPSC:** 14 VORTICES co-Is attended, several VORTICES-specific papers presented
- **Rivkin:** Attended Vision 2050 workshop
- **Plescia:** PI of a selected SmallSat study proposal, to rendezvous with Apophis and study its interior
- **SSERVI:** Several VORTICES members are associated with new teams—Rivkin, Klima, Hibbitts are collaborators on ESPRESSO; Co-I Orlando leads the REVEAL team (along with Hibbitts, who is a Collaborator).
- **More SSERVI:** Also have made informal offer to Maryland-based members of TREX team for occasional use of VORTICES meeting space at APL

Upcoming Events

- Asteroids, Comets, Meteors 10-14 April
- New Views of the Moon 2—Europe 4-5 May
- Planetary Defense Conference 15-19 May

Science Highlight

El Mir et al (LPSC): Developed code based on Tonge-Ramesh material model, coupled with pkdgrav N-body code. This calculates damage in each cell of a 3-D space, and then moves on to calculating ejecta/particle dynamics. An initial run shows less thorough fracturing than current models, and maintenance of a coherent core in situations where earlier codes predicted thorough disruption. Continued modeling is underway.

SERVI EXPLORATION SCIENCE FORUM



- **Colorado Group** – Burns, Rapetti, Tauscher, Monsalve, Mellinkoff, Spydell
- **ASU** – Bowman or Mozdzen
- **GSFC** – MacDowall
- **UCLA** - Furlanetto
- **Michigan** – Kasper or Hegedus
- **Caltech** – Hallinan
- Also attending: Doug Currie & Bill Sparks

13:30 Design/Trade Study of Lunar Low Frequency Radio Telescopes II.

- Update on DARE – Burns & Purcell
- 21-cm Global Experiment on the Lunar Farside Surface – Monsalve, Burns, Bradley
- Prototype array for global signal observations? – Bowman, Burns

14:30 Exploration and Surface Telerobotics

- Status & Opportunities with Orion & EM-1/2/3, and Habitat at Deep Space Gateway - Cichan & Norris
- Colorado Student Video Bandwidth Experiment for Teleoperation – Mellinkoff & Spydell
- ISS/K-10 Surface Telerobotics Experiment and Recent Developments – Fong
- Discussion of Workplan for 2017/18 – Burns, Fong, Cichan

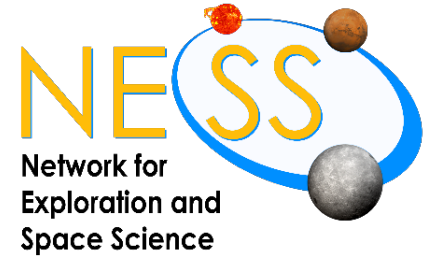
16:00 Break

16:15 General Discussion, Summary of the meeting, and the Path Forward – Burns

18:00 An Evening at the Fiske Planetarium

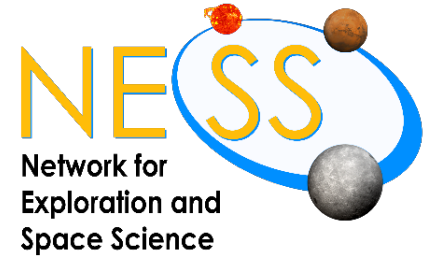
- 18:00 – drinks & conversation
- 18:30 – dinner
- 19:30 – planetarium program

General Discussion, Summary, Path Forward



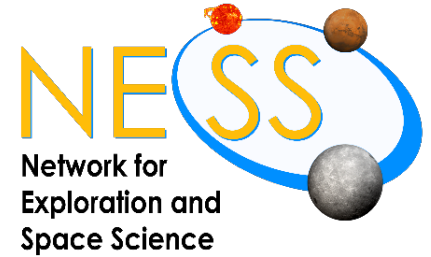
- Work on and review website, send in materials, etc.
 - 6/15/2017
- Schedule NESS meeting as SSERVI ESF in July (Jack)
- Plan AAS meeting in a meeting early June 2018 to cover NESS topics (proposal for January)
- Cosmic Dawn
 - Possible applications of signal extraction pipeline (SVD) to interferometry (Judd, David, Keith)
- Radio heliophysics
 - Space weather alert algorithm prospects (Bob, Alex)
 - Components for pathfinder (Bob)
 - Smallest viable lunar array which can measure type II burst—confirm origin mechanism (Alex)

General Discussion, Summary, Path Forward



- Exoplanets (Greg)
 - Polarization linked to solar CME's
 - Keep a beam on Proxima Centauri B – is this the pathfinder?
- Array design trade study (Judd)
 - Literature review
 - Review lunar properties
 - Define pathfinder
 - Which side of moon?
 - Sensitivity required to see Earth's radiation belt
 - Prepare for decadal review
- Technology roadmap (Judd)

General Discussion, Summary, Path Forward



- 21-cm global signal experiments
 - Global experiment on surface of Moon (Raul)
 - Follow up on compact array for global signal (Judd)
- Exploration and surface telerobotics
 - Joint SSERVI postdoc
 - CU summer student experiment
 - Create workplan (Terry, Jack, Chris)