

THE LUNAR SURFACE INNOVATION CONSORTIUM. R. L. Klima, M. V. Paul, D. M. Hurley, D. T. Blewett, C. A. Hibbitts, H. M. Meyer, M. E. Nord, J. I. Núñez, G. W. Patterson, M. A. Peck, K. D. Runyon, A. M. Stickle, and the LSIC team, Johns Hopkins Applied Physics Laboratory, Laurel, MD (Rachel.Klima@jhuapl.edu).

Introduction: NASA is working towards a sustainable presence on the lunar surface. The agency's Space Technology Mission Directorate (STMD) created the Lunar Surface Innovation Initiative (LSII) to mature high-priority technologies needed for sustainable operations on the Moon, working to advance their readiness through NASA internal work and public-private partnerships. In order to accelerate development through such partnerships, LSII has established a community of technology developers called the Lunar Surface Innovation Consortium (LSIC). NASA selected the Johns Hopkins Applied Physics Laboratory (APL) to lead LSIC, and an initial kickoff meeting was held in February, 2020. The overarching objective of LSIC is to facilitate the identification and deployment of technologies to enable a sustained campaign of exploration and operation on the Moon's surface by: (1) harnessing the creativity, energy, and resources of academia, industry, and government to keep the nation at the forefront of lunar exploration; (2) identifying lunar surface technology developments most in need of sponsor support and communicate them to NASA; and (3) providing a central resource for gathering and disseminating information, results, and documentation.

LSIC Objectives:

Harness the creativity, energy and resources of academia, industry and government. LSIC is a nationwide alliance of universities, non-profit research institutions, commercial companies, NASA centers and program offices, and other government agencies with an interest in the national campaign to establish a sustained presence on the Moon. Membership is open to any institution with an active interest in NASA/LSII focus areas. Member institutions may support any number of people to participate in meetings and working groups. LSIC will serve the community without bias, welcoming participation in semiannual meetings by members and non-members.

APL serves as a facilitator for the consortium. LSIC is guided by values that focus on building a collaborative and productive environment and involving the community in the organizational structure and leadership of LSIC, harnessing the experience and creativity of members. Recognizing that diversity and inclusion help enable innovation, LSIC will emphasize them in all activities.

Identify lunar surface technology developments most in need of sponsor support and communicate those to NASA STMD. LSIC will be a clearing house for information that efficiently communicates NASA's

needs to the community and will provide timely input to NASA on what technologies are available for deployment to meet the agency's near- and long-term goals of the. Two semiannual meetings will be held, one at APL and one hosted by another member institution. Each year the Executive Committee will identify key technology areas for discussion, inviting thought leaders and technology pioneers to speak. In addition, consortium members will be invited to bring demonstrations, booths, etc. relevant to that year's focus areas.

In addition to these larger, in-person meetings, virtual meetings will be held throughout the year to delve into the technological challenges and member institutions' capabilities in each of the six LSII technology focus areas: (1) In Situ Resource Utilization (ISRU); (2) Sustainable Power; (3) Dust Mitigation; (4) Excavation and Construction; (5) Extreme Access; and (6) Extreme Environments. These technology-based focus groups will be charged with researching the state of technology for their area and identifying needs for future investment. As the consortium matures, we expect that it will produce white papers describing the state of focus technologies, including gaps that require further development in order to create a sustainable lunar infrastructure. These white papers will be provided to STMD and hosted on the LSIC website, <http://lsic.jhuapl.edu>.

Provide a central resource for gathering and disseminating information, results, and documentation. To facilitate communication and distribution of information among the consortium and the greater space exploration community, the LSIC website will host focus-group specific areas to centralize discussions and information, schedules of upcoming meetings (both consortium and other relevant meetings), information about joining LSIC, relevant white papers and other resources, and links to opportunities for early-career scientists and technologists in industry, academia, and government.

The Role of LSIC in the Greater Lunar Community: Collaboration between the Science and Human Exploration sides of lunar discovery have been championed by many groups over the years, including LEAG, LPI, and SSERVI. LSIC leadership will collaborate directly with these and other established lunar advocates in science and exploration to achieve synergy and to avoid duplication of efforts. LSIC is explicitly chartered to focus on technology development so that investments by STMD are building

core capabilities that are driven by the needs of the broader lunar community.