

Space Scientists, Engineers Call for ‘Sustained Human Presence on Moon’

Seventy-six lunar and planetary scientists, engineers, and entrepreneurs have called for “a sustained American human presence on the Moon,” in a letter to leaders of the U.S. Senate Committee on Appropriations. They wrote in reference to NASA’s Lunar Discovery and Exploration Program. The following letter was [posted](#) by SpaceRef, a new media company focused on the space sector. A subhead has been added.

August 9, 2019

Dear Chairman Shelby and Ranking Member Leahy, and Chairman Moran and Ranking Member Shaheen:¹

As we celebrated the 50th Anniversary of the Apollo 11 human lunar landing this summer, it was painfully apparent to many Americans that the United States has not built upon the historical successes of the 1960s and early 1970s. Subsequently we have learned much in low-Earth orbit over the past two and a half decades with a continuously tended space station; however, exploration of the Moon continued only with orbital robotic missions until China landed a robotic rover on the Moon’s nearside in 2013. Earlier this year, China became the first nation to successfully land a rover on the Moon’s farside. It is now evident that other nations consider the Moon as an important destination not only for robotic exploration, but also for human explorers. As scientists and exploration experts in the broad and growing lunar and planetary science community, we write today to voice our strong support for the FY2020 Budget Request for NASA’s Lunar Discovery and Exploration Program and moving humans forward to the Moon sustainably, this time with long-term objectives for developing a sustained human presence.

As you are aware, the Lunar Discovery and Exploration Program (LDEP) is the continuation of a credible

1. The letter is addressed to the chairman and the ranking member of the U.S. Senate Committee on Appropriations, Richard C. Shelby (AL) and Patrick J. Leahy (VT), respectively, and to the chairman and the ranking member of its Subcommittee on Commerce, Justice, Science, and Related Agencies, Jerry Moran (KS), and Jeanne Shaheen (NH), respectively.

plan to re-engage in lunar surface exploration that has evolved and matured in the past few years, and shown significant progress in the last year. After years of planning next steps toward the Moon, we believe this program is designed for both expediency and cost-effectiveness. That is why we urge its full funding in FY2020, thereby ensuring the continued operation of the Lunar Reconnaissance Orbiter spacecraft, and restoring U.S. access to the surface of Earth’s nearest neighbor for the first time in almost five decades.

With the LDEP, NASA, in coordination with American universities, research institutions, and commercial companies, is now empowered to start addressing decades-long lunar science and exploration objectives. These were articulated at length in comprehensive strategic reports such as the 2007 National Research Council’s Report on the Scientific Context for the Exploration of the Moon, the NASA Planetary Science Decadal Survey, the 2016 Lunar Exploration Roadmap formulated by the Lunar Exploration Analysis Group [LEAG], and the 2017 LEAG Advancing Science of the Moon. In addition, the program will provide opportunities to address Strategic Knowledge Gaps for the Moon Permanent Human Exploration Scenario. We believe that the LDEP is critical to a vibrant space economy that will bring new and exciting employment opportunities to the next generation of scientists and engineers, as well extend beyond to all sectors of society.

The LDEP will give the United States the opportunity to, at long last, systematically prospect for lunar resources, gather comprehensive new samples from many new locations, explore lunar lava tubes, investigate magnetic anomalies, and address a long list of unanswered geophysical questions whose answers have deep implications for advancing our knowledge of the formation of the Solar System and key planetary processes. As the 2017 LEAG Advancing Science of the Moon report stated, “The Moon is a resource-rich, readily accessible target for future United States human and robotic missions that will enable fundamental scientific advances impacting our understanding of the Solar System.” The LDEP has the potential to answer signifi-

cant questions regarding lunar resources, not least of which is to show the reserve potential (i.e., sufficient quantities of extractable and refineable material that can be utilized at lower cost than being transported from Earth), which is enabling for a sustained human return to the lunar surface, constructively and successfully working in a space environment that would prepare us for sending humans to Mars.

Creating a Vibrant Lunar Economy

Because of your committee’s leadership in the FY2019 CJS [Subcommittee on Commerce, Justice, Science and Related Agencies] appropriations bill, NASA has been able to establish a program within the Science Mission Directorate (SMD) to procure transportation and logistics services from private U.S. companies for lunar surface missions. The Commercial Lunar Payload Services (CLPS) program has nine teams on contract. The teams compete amongst themselves for task orders NASA puts together for delivery of science instruments and experiments to the Moon. To much fanfare, two companies are now delivering on awards from NASA to deliver such payloads beginning in 2021. These companies are currently busy readying their landers for their assigned tasks while lunar scientists anxiously prepare for lunar surface access for the first time since 1972. This program represents the beginning of a new era of US-led lunar exploration and discovery, starting with small robotic landers and leading to sustained human presence on the Moon; a necessary condition to truly harness the economic potential of the Moon and enable a vibrant cislunar economy. By incorporating the Moon into our economic sphere, we will realize the enormous potential to create new wealth, new jobs, new technologies, and new industries for Americans.

The CLPS program leverages NASA’s previous work with commercial entities through the Lunar CATALYST [Cargo Transportation and Landing by Soft Touchdown] program. There are currently planned mis-

sions using these commercial partners that will begin to address key science and exploration objectives on the lunar surface. The CLPS program highlights NASA’s intent to catalyze the science community to gain knowledge and insight on Solar System evolution, while gathering important data for human exploration and sustaining human life off-Earth. It has become very evident that the data needed for science are the same as those needed for exploration. Also, the knowledge we regain about how to operate in the lunar environment will inform future science and exploration missions that are larger in scope with likely extensibility to systems that will be used to return humans to the Moon’s surface. While the CLPS program is within SMD, it has vital cross linkages with the human exploration side [Human Exploration and Operations Mission Directorate] that need to be encouraged.

As other countries like China and India continue to mature their own space exploration campaigns—each containing robust plans and capabilities for the Moon—we recognize the importance for the United States to press ahead and demonstrate leadership in this arena. It is vital to our future in space that we not cede leadership in surface exploration of the Moon and in cislunar space, as well as the lunar lander market to other nations. As such, the science and exploration experts represented below strongly support the proposed Lunar Discovery and Exploration Program within the FY2020 budget request and its approach to ensure the fastest possible return to the lunar surface, as well as getting Americans on the surface of the Moon to explore, prospect, and prosper. A sustained American human presence on the Moon is vital to our continued leadership in space and our prestige with our international partners. A new sustained human presence will expand on the legacy of Apollo’s history-changing first forays 50 years ago to explore another world, by continuing our quest for knowledge and its promise to benefit all humanity back on Earth.

Sincerely,

Clive R. Neal, Professor, University of Notre Dame, IN

Dr. Harrison H. Schmitt, Apollo 17 Astronaut; Independent Lunar and Planetary Scientist, Albuquerque NM

Anne Spudis, U.S. Lunar Enthusiast, Houston, TX

Dr. Gary Lofgren, Original Apollo PI; U.S. Lunar Scientist, TX

James Head III, Original Apollo PI; Professor, University of Rhode Island, RI

Robert M. Kelso, Founder/CEO, Kelso Aerospace LLC, TX

Scott Hughes, Texas A&M University in Kingsville, TX

J. B. Pleiscia, Adjunct Professor, University of Maryland, MD

Dr. Peter J. Chi, Research Geophysicist, UCLA, CA

Kirby Runyon, Lunar Geologist and Exploration Planner, MD

Cameron Mercer, U.S. Lunar Scientist, Greenbelt, MD

Carle Pieters, Professor (Research), Brown University, RI

- Cesare Grave**, Southwest Research Institute, San Antonio, TX
- Nicolle Zellner**, Professor, Albion College, MI
- Ian Garrick-Bethell**, Associate Professor, University of California, Santa Cruz, CA
- James Crowell**, Founder, Crow Industries, AZ
- Timothy Glotch**, Professor, Department of Geosciences, Stony Brook University, NY
- Nicholas Schmerr**, Assistant Professor, University of Maryland, College Park, MD
- Youxue Zhang**, Professor at the University of Michigan, MI
- David A. Williams**, Professor, Arizona State University, AZ
- Andrew Shaner**, U.S. Lunar Educator, Houston, TX
- Dr. Dana Hurley**, Planetary Scientist, Laurel, MD
- Dr. Heidi Haviland**, U.S. Lunar Scientist, Huntsville, AL
- Dr. Ryan N. Watkins**, Research Scientist, Planetary Science Institute, MO
- Matthew Borden**, Undergraduate Student, University of Notre Dame, IN
- Hannah O'Brien**, Undergraduate Student, University of Notre Dame, IN
- Dr. Edward L. Patrick**, Sr. Research Scientist, Southwest Research Institute, TX
- Dr. Brett W. Denevi**, U.S. Lunar Scientist, Laurel, MD
- Michael Torcivia**, Graduate Student, University of Notre Dame, IN
- Juliane Gross**, Associate Professor, Rutgers University, NJ
- Donald Welsh**, Undergraduate Student, University of Notre Dame, IN
- Geoffrey S. Webb**, Graduate Student, University of Notre Dame, IN
- Dr. Karl Cronberger**, Research Technician, University of Notre Dame, IN
- Kim A. Cone**, Graduate Student, Colorado School of Mines, CO
- Dr. David Blewett**, U.S. Lunar Scientist, Laurel, MD
- Dr. Kris Zacny**, VP, Honeybee Robotics, Pasadena, CA
- Kevin D. McKeegan**, Distinguished Professor of Cosmochemistry & Geochemistry, UCLA, CA
- Dr. Charles Wood**, U.S. Lunar Scientist, Wheeling, WV
- Amanda Nahm**, U.S. Lunar Scientist, AZ
- Jack Burns**, Professor, University of Colorado, CO
- Dr. Morgan Shusterman**, U.S. Lunar Scientist, Tempe, AZ
- Bradley L. Jolliff**, Professor, Washington University in St. Louis, MO
- Dr. William Ambrose**, Senior Research Scientist, Bureau of Economic Geology, University of Texas at Austin, TX
- Leonard David**, Space Journalist, Golden, CO
- Dr. Lillian R. Ostrach**, U.S. Lunar Scientist, Flagstaff, AZ
- Craig Hardgrove**, Assistant Professor, Arizona State University, AZ
- Dr. Alan Stern**, New Horizons PI, Southwest Research Institute, CO
- Dr. Carleton Moore**, Original Apollo PI, Founding Director of Center for Meteorite Studies, ASU, AZ
- Farouk El-Baz**, Original Apollo Scientist, Professor, Boston University, MA
- Dr. Steve Simon**, U.S. Lunar Scientist, Albuquerque, NM
- Stephen M. Elardo**, Assistant Professor, University of Florida, FL
- Dr. Joshua Cahill**, U.S. Lunar Scientist, Laurel, MD
- Dr. Kurt Klaus**, Boeing, Retired, Houston, TX
- G. Jeffrey Taylor**, Emeritus Research Professor, University of Hawaii, HI
- Dr. Catherine A. Dukes**, Director, Laboratory for Astrophysics and Surface Physics, University of Virginia, VA
- Mark Robinson**, PI, Lunar Reconnaissance Orbiter Camera; Professor, Arizona State University, AZ
- Dallas Beinhoff**, Founder, Cislunar Space Development Company, LLC, Annandale, VA
- Dr. Carolyn Crow**, U.S. Lunar Scientist, Boulder, CO
- Dr. Benjamin T. Greenhagen**, U.S. Lunar Scientist, Laurel, MD
- Abhijit Basu**, Emeritus Professor, U.S. Lunar Scientist, Bloomington, IN
- Rachel Klima**, U.S. Lunar Scientist, Laurel, MD
- Dr. Julie Stopar**, U.S. Lunar Scientist, Houston, TX
- Nicholas J. Dygert**, Assistant Professor, University of Tennessee, TN
- Dr. Gerald Patterson**, U.S. Lunar Scientist, Laurel, MD
- Dr. Georgiana Kramer**, Planetary Science Institute, Houston, TX
- Dr. Micah J. Schaible**, Post-Doctoral Fellow, Georgia Institute of Technology, GA
- Sarah Roberts**, Graduate Student, University of Tennessee, TN
- Dr. Linda Martel**, U.S. Lunar Scientist, Honolulu, HI
- Dan Hendrickson**, VP, Business Development, Astrobotic (astrobotic.com), PA
- Dr. Amy Fagan**, U.S. Lunar Scientist, Sylva, NC
- David J. Lawrence**, U.S. Lunar and Planetary Scientist, Laurel, MD
- Dimitri A. Papanastassiou**, Visiting Associate, Geological and Planetary Sciences, Caltech, Pasadena, CA
- Dr. Stephen Mackwell**, U.S. Lunar and Planetary Scientist, Columbia, MD
- Dr. Charles K. "Chip" Shearer**, Senior Research Scientist III, University of New Mexico, Albuquerque, NM
- Bob Richards**, Founder and CEO, Moon Express (moonexpress.com)
- Dr. Bradley Thomson**, U.S. Lunar Scientist, Knoxville, TN