E. MEETING ON FUTURE DIRECTIONS IN SPACE SCIENCE AND TECHNOLOGY

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The Meeting on Future Directions in Space Science and Technology seeks to promote the dream of space exploration by providing a venue for basic research and current technology developments currently underway in various areas of space science and technology that could prove beneficial in the near future. In any integrated space vehicle, there are a large number of independent and interdependent systems that are needed to accomplish mission success. In some cases, there are engineers and scientists that work with fine focus to produce prototypes of high fidelity subsystems (such as navigation or propulsion) that are relevant for next generation spacecraft; while in other cases, teams of engineers and scientists work diligently and carefully to incorporate the latest cutting-edge subsystems into an integrated spacecraft tailor built to accomplish a specific other-worldly task. In all cases, it is critical that engineers and scientists alike be keenly aware of the trade space of available hardware and technology at their disposal so as to allow them to focus their efforts on the real technical innovation challenges.

This meeting is still in planning.
Those wishing to prepare and chair a session, please contact the program chair or co-chairs above.

Papers and presentations are solicited but not limited the following areas of interest:

- Robotic systems to be used in unmanned and manned space exploration are of interest. Terrestrial robotic systems that could be adapted (and how) to space use are of interest. Intelligent systems used to diagnose and disposition the health status of integrated vehicle systems is also of interest.
- Proximity operations sensor systems to be used to facilitate rendezvous and docking of two orbital spacecraft are of interest.
- Guidance, Navigation, and Control systems to be used beyond the Global Positioning System halo are of interest.
- Environmental Control and Life Support Systems for manned spaceflight are of interest.
- Communications systems are of interest.
- Prototype approaches for accomplishing space science and technology objectives supporting advanced spacecraft development are of interest.
- Avionic systems development for manned space flight is of interest.

Also of interest are discussions on:

- Future propulsion science and technologies for space flight beyond the Earth/Lunar system. These should address the fundamental high-impact issues of current and future propulsion systems on the access and utilization of space, or the areas of science and technology requiring basic research breakthroughs for such ideas to be viable.
- Other sciences and technologies required for exploration outward from the Earth/Lunar system.
- Future directions of space utilization within government, industry, academia and private programs to include but not limited to colonization.

Sessions will be developed from the submitted papers and presentations into the following focused areas:

- Scientific and technology foundations,

- Basic research areas originating from government, industry, academia and private research programs, and
- Public education.

The chairs have final authority on what is presented in their conference.

The following are some session topics in work. These will be updated as new sessions are developed.

E01. Enabling Technologies for Lunar/Mars Surface Science

Chair: Pamela E. Clark, NASA – GSFC, Greenbelt, MD 20771, 301-286-7457, pamela.e.clark@nasa.gov
Co-Chair: TBD

Papers and presentations are solicited that examine technologies that will enable lunar surface sciences activities that support the development of a lunar outpost architecture meeting the published goals and objectives of the scientific community. Of interest, but not limited to, are discussions on the:

- Development of surface instrument packages capable of operating autonomously with stand-alone power systems whether delivered robotically or by a human crew, in particular those that could give a) early measurements of the atmosphere, radiation, field, charged particle, and dust interactions on local and global scales, and b) global scale geophysical data.

- Support (e.g., via navigation, communication, robotics) for EVA and IVA science/exploration activities on the Lunar/Mars surface.

- Development of tools and instruments for use by crew during EVA and IVA science/exploration activities.

E02. Nuclear Technologies for Lunar/Mars Missions

Chair: Michael G. Houts, NASA – MSFC, Huntsville, AL, 256-544-8136; Michael.houts@nasa.gov
Co-Chair: TBD

Fission surface power (FSP) could potentially provide abundant, continuous, cost-effective power for any surface location that may be needed to accomplish the more difficult NASA exploration missions on the moon, Mars, and other destinations envisioned in the 2020s and beyond. In addition, nuclear thermal propulsion could potentially enable sustainable exploration throughout the inner solar system.

Papers and presentations are solicited that examine nuclear technologies for both energy and propulsion applications in space.

E03. Advanced Concepts for Lunar/Mars/Beyond Missions

Chair: Mehdi Lali, Department of Physics and Astrophysics at the University of North Dakota, omidmed@hotmail.com
Co-Chair: TBD

Papers and presentations are solicited that examine advanced in-space concepts being considered by the government agencies, industry and academia not address elsewhere.

This is specifically placed for papers or presentations from NASA's centers' advanced concepts groups to discuss their current and planned future concepts programs/studies.

E04. Transformational Technologies to Expedite Space Access and Development

Chair: John Rather, Rather Creative Innovations Group, Inc., 313-549-5034; jrather@RCIGinc.com
Co-Chair: TBD

Throughout history the emergence of new technologies has enabled unforeseen breakthrough capabilities that rapidly transformed the world. Some global examples from the twentieth century include AC electric power, nuclear energy, and turbojet engines. At the systems level, success of both Apollo and the Space Shuttle programs depended upon taming hydrogen propulsion and developing high-temperature atmospheric reentry materials. Human space development is now stymied because of a great need for breakthrough technologies and strategies. We believe that new capabilities exist within the present states-of-the-art that can be implemented to transform the future of human space development.

Papers and presentations are solicited that examine this important opportunity. Proposals of concepts for near-term transformative steps are encouraged.