

Integrate · Educate · Support

SPESIF-2012

Space, Propulsion & Energy Sciences
International Forum

Location: University of Maryland

2012 Theme: Time for a Change

Call for Papers and Presentations

Technical and Publication Chair

Thomas F. Valone
IRI, Beltsville, Maryland

Papers and presentations are invited in all technical areas of the Space, Propulsion and Energy Sciences International Forum (SPESIF-2012), organized by the Integrity Research Institute (IRI), including the Fifth Conference on Future Energy (COFE5).

It is the submitters' responsibility to obtain any clearances, i.e., internal or ITAR reviews, before submitting material to SPESIF for review. Delays due to clearances are expected. So please let us know as soon as possible of such delays.

ABSTRACT SUBMISSION: Interested authors or presenters are invited to submit abstracts for approval by email through the technical chairs listed within the individual descriptions with a copy sent to the editorial chair at IRI@starpower.net for cataloging. The email submission should indicate in the SPESIF forum, number and title of the technical session in which they wish their abstracts to be considered. The general deadline for submission of abstracts for papers and presentation is Nov. 15, 2011. After this date, approval will depend generally on space availability. So please submit early.

Generally, abstracts should include the name(s), phone number(s) and email(s) of all authors, and clearly indicate the **motivation and purpose of the work, important results, significance, applications, and briefly summarize approach or methodology.** Acknowledgment of receipt of submitted abstracts will be sent to the person submitting the abstract. Inquiries can be made by email to IRI@starpower.net or by calling (301) 220-0440.

REVIEW AND ACCEPTANCE OF FULL PAPERS: Authors with accepted abstracts will be asked to provide a draft manuscript for technical review. Draft manuscripts do not need to be complete, but must follow the format instructions for preparing the final manuscript and contain enough information for approval. The manuscript guidelines/template will be sent to the authors after abstract approval.

A minimum fee of \$50 will be required for editorial services rendered after draft approval; regardless of publication in the SPESIF proceedings. SPESIF expects a fully paid author registration to accompany the final camera-ready paper for it to be published in the SPESIF-2012 proceedings. Please let us know at draft manuscript submittal if a payment delay is expected. A full author registration fee will be due, regardless of attendance at SPESIF-2012.

For more information and updates, please consult the SPESIF homepage at: www.futureenergy.org.

DEADLINES	
Initial Abstract Submission	November 15, 2011
Final Abstract Submission	As space is available
Draft Manuscript	December 15, 2011
Final Camera Ready Manuscript	JFebruary 15, 2011

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A. 9th SYMPOSIUM ON NEW FRONTIERS IN THE SPACE PROPULSION SCIENCES

Program Chair

Glen A. Robertson

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R. Clive Woods

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This symposium pertains to the advancement of the space propulsion sciences from current technologies to emerging concepts and theories. The symposium is broken into the following Five Topic Areas that cover contemporary propulsion sciences, technologies and techniques for short-term objectives supporting near-term space initiatives for Earth, in-orbit, Moon and Mars-based propulsion and power systems over the next 30 years; enhancement of the feasibility of future space propulsion systems; new frontiers in the space propulsion sciences comprising ideas, concepts, experiments, theories and models; and approaches that could lead to new directions in space travel, exploration, astrophysics and particle physics with applications to propulsion, power or communication; or to help combine these areas of science with the space propulsion sciences toward new frontiers in science.

A01. Advances in Contemporary Propulsion Sciences

Chair: John Cole, Huntsville, AL, (256) 882-0492, john.cole.hsv@gmail.com.

Co-Chair: TBD

Papers are solicited that examine advances in the diverse arena covering contemporary propulsion sciences. This discipline involves advances in chemical propulsion as well as hybrid rockets, beam energy systems, electric and magnetic thrusters and launchers, magnetic, plasma and solar sails. Other worthwhile concepts of interest that are innovative and alternative space propulsion approaches and those have been tested and shown feasible within currently accepted physical laws are also of interest. This section focuses on: New Advances in Propulsion Technology, Advanced Propulsion Concepts, and Experimental Results.

A02. Advanced Technologies, Concepts, and Techniques for Space Application

Chair: : TBD

Co-Chair: TBD

Papers are solicited that examine advances in technologies and techniques for enhancing contemporary propulsion systems as well as other technologies required for space travel and exploration. This discipline involves advances in power, communication and other technologies or other innovative and alternative approaches that are testable within engineering accepted limits as well as those concepts that may be on the edge of current engineering realities. This section focuses on but is not limited to: Advanced Power Concepts, Advanced Communication Concepts, Other Technological Concepts and Techniques for Space Application, and Experimental Results.

A03. Frontiers in Propulsion Science

A03.1. Theories, Models and Concepts

Chair: Martin Tajmar, KAIST, Republic of Korea, martin.tajmar@kaist.ac.kr

Co-Chair: Ben Solomon, Interstellar Space Exploration Technology Initiative, P.O. Box 831, Evergreen, CO 80437, 303-618-2800;
benjamin.t.solomon@iSETI.us

Papers are solicited that examine models and theories that could provide new insights or extend theoretical concepts and models toward the advancement of the gravitational and inertia sciences with some focus on new propulsive methods. These theoretical concepts and models should be governed by known physical laws (although perhaps in embryonic form or not yet formally well-

established) and should be testable by current or foreseeable scientific and/or engineering techniques. Examples of technologies to be examined in these sessions include (but are not limited to): interaction of gravitation and superconductors, propulsion using novel means such as zero-point fields, quantum entanglement, novel propellantless propulsion techniques and other concepts of interest.

Papers should provide the theoretical groundwork for future space travel and/or exploration beyond the bounds possible using the current propulsion sciences, pushing their development towards new frontiers in the propulsion sciences, and so should stress the practical consequences of the work or concentrate on determining the limitations of contemporary scientific and technological approaches and explaining how such limitations may be overcome by using new, embryonic, evolving, disruptive, and enabling, technologies. Concepts can be either mathematical or speculative and should include rigorous, logical, scientific support and plausible assumptions to validate the fundamental aspects.

A03.2. Experimental Results

Chair: James Woodward, California State University, Fullerton, CA, 714-278-3596, jwoodward@fullerton.edu

Co-Chair: TBD

Papers are solicited that report on the experimental results or possible experimental techniques related to theoretical concepts and models in the basic research realm of the propulsion sciences, to include experiments related (but are not necessarily limited) to interaction of gravitation and superconductors, quantum entanglement, propulsion using novel means such as zero-point fields, and novel propellantless propulsion techniques. The experiments discussed should provide a better understanding of these concepts, either pro or con, and must provide suggestions for further work indicating clearly the likely future direction of the work.

A04. Toward New Directions in Astrophysics/Particle Physics with application to Propulsion, Power or Communications

A04.1. New Directions in Astrophysics/Particle Physics

Chair: Bernd Binder, Quanics, Salem, BW, Germany, ++497553827390, binder@quanics.com

Co-Chair: TBD

Papers are solicited that examine areas in Astrophysics and Particle Physics that could provide new directions in propulsion, power or communication for space application, and focus on Astrophysics or Particle Physics Concepts, New Cosmological or Matter Models, Experimental Standards, and Experimental Results. These papers should not be general physics papers, but should instead address problems and resolutions thereof in propulsion, power or communication in terms readable by practicing professional engineers. Astrophysics/Particle Physics papers written with an engineering focus and application are particularly encouraged.

In papers covering a concept/theory/model, authors must indicate how these could enhance the area of propulsion, power or communication and if a new concept/theory/model authors must discuss experimental application(s). If necessary, the experimental discussion may be presented as a separate paper to allow for adequate discussion and description of the proposed experiment.

A04.2. Unconventional Physical Principles and Science Fiction

Chair: Glen A. Robertson, IASSPES, Madison, AL, 256-694-7941, gar@ias-spes.org

Co-Chair: TBD

This session is a place holder for theories and models that do not fit within the other sessions, specifically for theories and models outside traditional physics teachings, but provide new forward thinking in the understanding of the space, propulsion and energy sciences. This session is provided as “One hundred years from now, space, propulsion and energy concepts will exist that even the greatest science fiction authors today cannot conceive.” Whereby, this session provides a place to capture that “what might be.”

Papers in this session can be either professional scientific papers or science fiction articles. Author of professional scientific papers are responsible for establishing precedence to their theories and models. Science fiction papers must describe a technology based on the abstract understanding of latent theories and models.

Paper are also sought that discuss (but do not criticize) unconventional theories and models, specifically the pros and cons.

A05. Far Term Space Transport/Environment Models and Theories

A05.1. Far Term Space Transport and Environment Models & Theories

Chair: Glen A. Robertson, IASSPES, Madison, AL, 256-694-7941, gar@ias-spes.org

Co-Chair: Ray Lewis, Pennsylvania State University, Boalsburg, PA, 814-466-6187, r3l@psu.edu

Papers are solicited that provide new models and theories or additional information covering older models and theories in the area of space transport, power production systems, including environmental effects. Papers should generally be related to faster than light-speeds, warp-drives, wormholes and other areas that could provide a better understanding of space transport mechanisms beyond our current knowledge and understanding. Concepts can be either mathematical or speculative as well as include rigorous, logical, scientific support and plausible assumptions to validate the fundamental aspects.

A05.2 Conceptual Models and Theories Promoting Alternative Space-times

Chair: Gregory V. Meholic, The Aerospace Corporation, El Segundo, CA, 310 336-2919, Greg.V.Meholic@aero.org

Co-Chair: TBD

Papers are solicited that explore conceptual models and theories regarding the existence of an alternative space-time or space-like realm necessary for faster-than-light (FTL) travel or manipulation of the space-time metric. Concepts can be either mathematical or speculative and should include rigorous, logical, scientific support and plausible assumptions to validate the fundamental aspects. This arena also examines the characteristics of alternate dimensions and hyperspace as well as exploring the application of these ideas to gravitation theory, cosmology or quantum physics.

B. 4th SYMPOSIUM ON ASTROSOCIOLOGY

Program Chair
Jim Pass

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Program Co-Chair
TBD

The astrosociology symposium focuses on topics common to the space community, though from a social-scientific perspective. That is, a strong consideration of how each topic relates to society, culture, and the individual – the traditional purview of the social and behavioral sciences, humanities, and the arts (hereafter referred to as the “social sciences” for brevity) -- defines astrosociology. A major theme of the symposium focuses on how traditional knowledge and findings of the social sciences, which normally focus on terrestrial matters, actually possess important applications for space exploration and related issues. Moreover, the direct application of social science research and theory-building in contemporary and future timeframes receive attention as vital components in the understanding of humanity’s efforts in space environments in terms of exploration, settlement, work, and recreation. Examination of the impact of space exploration on terrestrial societies and cultures receives attention in addition to that of humans in space.

Papers and presentations are solicited that address astrosociology themes, focusing on the topics described below.

B01. Astrosociology: Definition, Scope, and Relevance/Astrosociology in the Classroom

Chair: Jim Pass, Astrosociology Research Institute, Huntington Beach, CA, (714) 317-6169; jpass@astrosociology.org
Co-Chair: TBD

Papers are solicited that examine the definition, scope of coverage, and relevance of a relatively new social science field called astrosociology that focuses on the intersection between space and society. The purpose of this session is to introduce astrosociology to the audience in the context of (1) the general absence of the social sciences in space exploration and research and (2) the vital need for a coherent social science field as humanity moves to increase its presence in space in terms of its permanence, numbers of spacefarers, and distance from Earth. The scope of astrosociology represents a wide-ranging number of issues, but these issues have received little attention in the past even while their relevance to mainstream social life continues to increase. Additionally, papers are solicited that examine the issues related to the need for establishing astrosociology in existing programs and departments within both the social sciences and physical/natural sciences. It relates to a formal collaboration between the two major branches of science.

B02. Science Fiction and Scientific Actuality

Chair: TBD
Co-Chair: TBD

Papers are solicited that examine the relationship between science fiction and science. The astrosociological perspective looks at the two-way exchange between these fields, specifically at 1) the way science fiction absorbs current scientific discourse and casts it in a predictive model that tries to anticipate the human consequences of its potential fallout, and 2) the usefulness this speculative procedure can have for astrosociology, space exploration, and contributions toward the formation of spacefaring societies.

B03. Space Policy and Space Law in a Societal Context

Chair: Christopher M. Hearsey, University of North Dakota, (818) 209-7029; outer.space.analysis@gmail.com
Co-Chair: TBD

Papers are solicited that focus on issues that relate societal concerns concerning how space policy and law are developed and carried out from perspective oriented toward historical analysis, contemporary issues, and future possibilities. The astrosociological approach places space policy and law in a societal context that includes issues such as the cultural perspectives of different nations, cooperation

among nations to reach a consensus on space issues, and cooperative ventures in space. Conflict among nations and the militarization of space fall under the scope of this session as well.

B04. Astrosociology and Astrobiology (and SETI)

Chair: TBD

Co-Chair: TBD

Papers are solicited that examine the relationship between astrosociology and astrobiology (as well as the Search for Extraterrestrial Intelligence, or SETI). Issues include the benefits of astrobiology and SETI to societies based solely on their very pursuit, philosophical issues about the possibility of life in the universe (including why we should seek out such life), how we should construct messages meant for an intelligent extraterrestrial species, and the impact of discovering extraterrestrial life (of any sort) on societies, their cultures, and social groups (such as religious groups). How does an astrosociological perspective enhance our understanding of humanity's quest to find extraterrestrial life?

B05. Planetary Defense and Societal Protection

Chair: TBD

Co-Chair: TBD

Papers are solicited that address planetary defense in terms of its traditional approach (i.e., its focus on detection of threatening objects and defense of Earth), but the approach here is to place such traditional issues in the context of protecting societies and their cultures (in addition to individuals) should the detection or defense components fail. How much effort and resources should societies devote to ensuring that their traditional ways of life can continue with minimized disruption? How much preparation is prudent, how much is wasteful? What plans should politicians make to evacuate and protect their citizens? What types of cooperative relationships between nations should receive consideration? Such questions require attention by experts in the planetary defense field.

B06. Space Societies/The Settlement of Space Environments

Chair: TBD

Co-Chair: TBD

Papers are solicited that examine the social environment in addition to the traditional attention to the physical environment (i.e., the habitat) based on an engineering and architectural approach provides the focus for this session. Why the social environment is largely ignored? Can the physical environment function properly while the social environment fails? A space settlement or colony should be thought of as a "space society," an astrosociological concept that acknowledges the reality that any settlement will function like a society with subcultures and social groups, and will become an increasingly social structure as additional individuals join it. Participants focus on what it will take for the social environment to function properly and how the two environments must successfully survive together.

B07. Technology Transfers and Spinoffs: How Space Technologies Improve Life on Earth

Chair: Douglas A. Comstock, Director, Innovative Partnerships Program (NASA HQ),
1 202 358-2221, doug.comstock@nasa.gov

Co-Chair: Daniel P. Lockney, Spinoff Editor, NASA Center for AeroSpace Information (CASI),
301-621-0224, Daniel.P.Lockney@nasa.gov

Papers are solicited that examine technology transfers and spinoffs from the nation's space program. The perspectives addressed could include technical, historical, social, economic, and legal. The session also seeks to frame the topic within the larger context of the space program by addressing the degree of importance and relevance of spinoffs relative to other space issues. To what degree can or should spinoffs be used to justify the space program? Can similar technologies develop without a space program? What is the public perception and/or importance of spinoffs? How are space technologies currently being used to assist developing countries and in what other ways might they be used? Examples of technology transfer and spinoffs will accompany discussions.

B08. Spacefaring Societies

Chair: TBD

Co-Chair: TBD

Papers are solicited that examine the future of social change in terrestrial societies, which can be addressed in terms of the very real possibility of moving from post-industrial social structures to spacefaring societal structures. Current nations that possess spaceflight abilities are considered “space-capable” societies. The term “spacefaring society” is reserved for an ideal type of social system in which space becomes a central aspect of everyday life and infused into its various social institutions and larger cultures of societies. Issues include the steps societies may take in moving toward the spacefaring society ideal type as well as what characteristics spacefaring societies may possess. How far along is the United States, for example, on the continuum toward a spacefaring society?

B09. Medical Astrosociology

Chair: TBD

Co-Chair: TBD

Papers are solicited that expand the traditional approach associated with space biomedicine by focusing on social-scientific issues consistent with disciplines such as psychology, social psychology, sociology, and anthropology. Behavioral health, operational psychology, medical sociology, and medical anthropology serve as common analogous models on Earth. In space environments, issues related to medical astrosociology capture larger issues as well. Ethical dilemmas may include compromises between providing the best healthcare for one person and ensuring the welfare of the rest of the crew/population. How do the various space agencies handle the relationship between biomedical operational and social scientific issues in the context of contemporary missions within nations and across nations? What is the evolution of the relationship between biomedical operations and social scientific issues over time, from the beginning of spaceflight and into the future?

B10. Overview Effect

Chair: Frank White, The Overview Institute

Co-Chair: TBD

The papers solicited in this session should explore the idea of the overview effect (simplicistically, the effect an image of Earth from outside has on our perception of humanity’s role within a cosmic context) as the first true astrosociological experience in mankind’s history. Coffee-table books of HST pictures of the universe; newsreels featuring footage of the ISS, the space shuttles, and astronauts on a spacewalk; movies and TV series; multimedia educational packages for children; software planetariums; all these packets of information bring home to our overwhelmingly planet-bound, barely planet-wide civilization the sense of a larger context, as well as a certain awareness of the presence of a much wider territory than the one we are used to considering. To some extent, this awareness shapes public perception of the human adventure into space – how and why we should go out, what the consequences might be, and what this endeavor might entail in terms of shaping our existential perspectives. How does the real view from space differ from Earthbound perspectives? From an astrosociological viewpoint, what role has the overview effect played in shaping space-related social dynamics? Is it possible to guide such a role, and steer it so it can help us deliver the first true astrosociological message to the human collective?

B11. Space and Society: a Cultural History of the Space Age, 1900-2009

Chair: Theodore Swanson, NASA Goddard Space Flight Center, Greenbelt, MD 20771, (301) 286-7854;

Ted.Swanson@nasa.gov

Co-Chair: Bob Zimmerman, 301-937-0394; zimmerman@nasw.org

The papers in this session should focus on mapping out the social relevance of the history of the first space age. So far, we have largely perceived this history as a very contained phenomenon, the almost exclusive province of the astronauts, technicians and administrators who more or less directly brought it about. But the world at large watched the rockets fly, looked at Neil Armstrong and others walk on the Moon, and gazed at the first pictures of Earth seen from outside. The history of the space age is everybody’s history, and astrosociology should examine it to identify its shape and characteristics. What were the dreams of its fathers, and how

were these dreams fulfilled – or denied? What meaning did the exploration of space have, not for the astronaut or the rocket scientist, but for the taxpayer and the man on the street? How will the experience gathered from studying this meaning help us shape a new meaning for a new space age?

B12. Cosmic Political Economy

Chair: Christopher M. Hearsey, Astrosociology Research Institute, (818) 209-7029; outer.space.analysis@gmail.com

Co-Chair: TBD

Papers for this session should address issues related to the political economy of space environments as described here. Cosmic political economy projects the academic study of production, buying and selling, and their relations with law, custom, and government, into the environment of outer space. As an interdisciplinary field, it draws on many distinct academic schools, including political science and economics, as well as international relations, sociology, and history, and also considers the enabling and constraining effects of aerospace technology.

We welcome ideas for additional session topics.

C. 3rd SYMPOSIUM ON HIGH-FREQUENCY GRAVITATIONAL WAVES

Program Chair

Bob Baker

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Program Co-Chair

Andrew Beckwith

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The Symposium on High-Frequency Gravitational Waves (HFGWs) provides a forum for discussions pertaining to the means of detecting and generating HFGWs and their practical application. Papers on HFGWs may encompass the high-frequency (100 kHz to 100 MHz), very high frequency (100 MHz to 100 GHz), and ultra high frequency (greater than 100 GHz) bands all referred to as HFGWs and should concentrate on the means for evolving this technology. Fourteen laboratory High-Frequency Gravitational Wave (HFGW) generators (or transmitters) have been proposed in the past 45 years in peer-reviewed journal articles. Ten different HFGW detectors (or receivers) have been proposed since 1978, as reported in peer-reviewed journal articles, and three of them actually built. Thus HFGW generation and detection are paramount interest areas for the Symposium. Specific interests also include (but are not limited to) the description of HFGWs in conventional space-time, applications to astrophysics, communication, nuclear effects, surveillance and remote movement of massive objects. Concepts may be either theoretical or based upon actual experiments or fabricated devices and should include rigorous, logical, scientific support and plausible assumptions and/or data to validate the fundamental aspects of the presented papers. Examples of appropriate papers from the literature concerning High-Frequency Gravitational Waves can be found at: <http://www.gravwave.com/docs/HFGW%20References.pdf>.

Papers and presentations are solicited that address HFGW themes, focusing on the following topics:

C01. Detectors/Receivers

Chair: TBD

Co-chair: Andrew Beckwith, Menlo Park, California, (650) 322-6768, rwill9955b@yahoo.com

Papers are solicited that involve the detection of HFGWs having frequencies above 100 kHz. Research results concerning either HFGW detectors in operation or theoretical ones in the development or planning stage are welcome. Application of superconductors, back-action analyses, new detection theories, relic HFGW detectors, etc.. would also be valuable contributions to be presented.

C02. Generators/Transmitters

Chair: Robert M L Baker, Jr., Playa del Rey, CA, (310) 823-4143; drrobertbaker@gravwave.com

Co-chair: TBD

Papers are solicited that involve the laboratory generation of HFGWs having frequencies above 100 kHz. Research results concerning theoretical HFGW generators and transmitters are welcome. Application of superconductors to high-gain HFGW transmitter antennas utilizing HFGW optics, nuclear generation and transmitter/receiver systems would also be valuable contributions to be presented.

C03. Applications to Cosmology/Astrophysics

Chair: Andrew Beckwith, Menlo Park, California, (650) 322-6768, rwill9955b@yahoo.com

Co-chair: Giorgio Fontana, University of Trento, Trento, Italy, +390461883906; giorgio.fontana@unitn.it.

Since observation of high-frequency relic gravitational waves (HFRGWs) will provide vital information about the birth of the Universe and its early dynamical evolution as well as enable significant direct inferences to be drawn about the value of the Hubble parameter of the early universe and the cosmological scale factor, papers concerning these applications are solicited. Other astrophysical applications involve the entropy growth of the early Universe, an ability to rule out alternatives to inflation theories, to

pinpoint the energy scale at which inflation took place and to provide clues about the symmetries underlying new physics at the highest energies, would also be most valuable contributions to be presented.

C04. Applications to the Global Anti-Terrorism

Chair: Robert M L Baker, Jr., Playa del Rey, CA, (310) 823-4143; drrobertbaker@gravwave.com

Co-chair: R. Clive Woods, Louisiana State University, Electrical & Computer Engineering Department, Baton Rouge, La, (225) 578-8961; cwoods@lsu.edu

Papers are solicited that apply HFGW technology to defeat global terrorism. Examples include, but are not limited to: secure (low probability of intercept or LPI) communications to and among our anti-terrorism assets including deeply submerged submarines; surveillance through and into various structures, underground and underwater installations to observe weapons of mass destruction or WMDs, caches of weapons and ammunition, terrorist command and control centers, etc. ; remote HFGW force-field generators to displace missile warheads, defeat anti-satellite systems, interfere with weapon systems of all varieties, etc. Also papers dealing with potential WMDs that include remote nuclear-event generation in order to anticipate and defend against them would be valuable contributions.

C05. Commercial Applications of HFGWs

Chair: R. Clive Woods, Louisiana State University, Electrical & Computer Engineering Department, Baton Rouge, La, (225) 578-8961; cwoods@lsu.edu.

Co-chair: Robert M L Baker, Jr., Playa del Rey, CA, (310) 823-4143; drrobertbaker@gravwave.com

Papers are solicited that describe potential applications of HFGWs to the commercial market place. These applications may be theoretical but should be practical and commercially realizable given suitable likely advances in technology. Possible subjects include, but are not limited to: radioactive waste-free nuclear energy production, propulsion, and HFGW optics and communication systems.

C06. Theoretical HFGW Research

Chair: Giorgio Fontana, University of Trento, Trento, Italy, +390461883906; giorgio.fontana@unitn.it

Co-chair: R. Clive Woods, Louisiana State University, Electrical & Computer Engineering Department, Baton Rouge, La, (225) 578-8961; cwoods@lsu.edu.

One of the revolutionary concepts introduced by the theory of Special Relativity is recognizing that time is a full-featured dimension on a par with space. We solicit papers on theories for modeling gravitational waves in the full four-dimensional manifold of General Relativity and in a multidimensional universe. Generation and detection by physical transducers and propagation in space-time and Euclidean space (Hyperspace) should be the main topics of the contributions. In addition, the analysis of non-linear propagation effects would be of great interest for applications. Lorentzian or Euclidean approaches to space-time are of interest, including comparisons between the two formalisms. Gravitational waves in Gravitoelectromagnetic models of gravity are also accepted, including 3+1 formulations derived from General Relativity, 4+1 formulations derived from Euclidean Relativity and Dark Matter.

D. 5th CONFERENCE ON FUTURE ENERGY

(Previously held elsewhere)

Thomas Valone, Chair
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The push for future sources of new energy is a long-term program. However, much of these new ideas, technologies, and concepts have already been developed. Therefore this forum has the objective of being a venue to expose these worthwhile ideas while maintaining a flow of innovative theories and concepts; and keeping the doors open for advances in more non-conventional approaches that could yield tremendous technological and economic dividends in both investment dollars and potential applications for future generations. The future energy umbrella includes energy, force production and bioenergetics.

Papers presented at this conference should deal with experiments, theories, and approaches that will help man achieve both a short-term and long-term solutions to fuelless energy for electricity generation and travel, as well as drugless energy medicine. Short-term objectives support the near-term environmental initiative for humankind to live on the earth without burning fossil fuels and off the earth, to the Moon and Mars. Long-term objectives will lay down the scientific foundation necessary for future generations to extend mankind's ability to survive in other parts of our solar system. These long-term objectives are more pronounced and designed to stretch the intellectual capabilities and imagination of mankind in advanced technical disciplines. This will broaden our understanding and usage of the space environment for communications, power generation/storage, and propulsion.

Many of this conference participants are from the engineering and bioengineering community. Therefore, submitted papers should be clearly written in a contemporary language to nurture the current new and future generations of scientists and engineers. When possible, papers should provide a balance between observations, ideas, theories, and experiments. Ideas need to be stated in a meaningful scientific format; theoretical papers need to address identifying supporting experiment(s) since a theory may be useless without experimental verification. Papers addressing credible experiments need not support a specific theory but provide evidentiary data that may support some theoretical approach that is either known or yet to be discovered.

Abstracts and papers should be concise, clear, and original according to the supporting information; theoretical analysis, references provided, and presentations, which should be logical and based upon sound scientific principles. *If a departure from the conventional science is claimed*, it is the author's responsibility to persuade and clarify this point in a balanced but scientifically convincing manner supported by adequate and acceptable evidence as well as identify experiments for testing their claims.

Authors should submit an abstract (200 words or more) that would be used with the paper per standard SPESIF procedure. Papers/Presentations will be divided into related sessions. General Sessions are:

D01. New Energy and Bioenergy Developments

D02. Hydrogen and Hydroxy Generators

D03. Alternative Electricity Generation

D04. Solar and Space Solar Power

D05. Advanced Nuclear Energy

D06. Bioelectromagnetics Developments

D07. Others Not Defined Above

E. MEETING ON FUTURE DIRECTIONS IN SPACE SCIENCE AND TECHNOLOGY

Program Chair

Program Co-Chair

TBD

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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 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 that examine technologies that will enable planetary surface science activities are solicited. Such technologies would support the variety of options in the 'flexible' version of exploration (with focus on the Moon, small bodies, or Mars) and meet published goals and objectives of science constituencies (as expressed in various roadmaps and decadal surveys). Discussions of interest would include (but not be limited to):

- Development of enhanced capability/performance components and subsystems (power, thermal/mechanical, C&DH, electronics, sensors, lasers) to support surface instrument packages (network) capable of operating autonomously in stand-alone mode whether delivered robotically or by a human crew, to provide 1) the nature of a target's environment (radiation/field/particle/dust/regolith), 2) the nature of a target's interior (gravity/magneticfield/composition/seismicity/heat flow) on local and global scales, or 3) an observatory (stellar, solar, terrestrial).
- Development of enhanced components and subsystems for portable tools and instruments for use robotically or by crew during EVA and IVA activities, including the development of measurement and containment techniques requiring minimal sample handling and minimizing contamination.
- Support (e.g., via new navigation, communication, documentation, robotics capabilities) for mobile assets engaged in exploration.

E02. Nuclear Power and Propulsion for Flexible 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 Flexible Missions

Chair: TBD

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.