



PRAGUE 2010

International Astronautical Federation

TECHNICAL PROGRAMME

IAC 2010 — Prague

A1. Space Life Sciences Symposium

The symposium jointly organized by the International Academy of Astronautics and the International Astronautical Federation addresses all aspects of space life sciences research and practice in human and robotic spaceflight, from Low Earth Orbit (LEO) to the universe beyond, and from the Big Bang to the lives of future explorers on other planets of our solar system.

Coordinator

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Peter Graef

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A1.1. Behaviour, Performance and Psychosocial Issues in Space

This session considers psychosocial, interpersonal, cultural, cognitive, circadian/sleep and human factors issues and countermeasures related to human spaceflight and space exploration.

Chairman

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Rapporteur

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A1.2. Human Physiology in Space

This session focuses on all aspects of spaceflight physiology that relate to human health and to the countermeasures employed to maintain health and performance.

Chairman



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Rapporteur

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A1.3. Medical Care for Humans in Space

The session focuses on medical care for astronauts including operational medicine aspects, countermeasure development and applications as well as needs for future care for astronauts during long term stays in space and missions to and on Moon and Mars. A further focus will lie on medical care for passengers and operators of commercial suborbital and orbital space flights.

Chairman

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Rapporteur

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A1.4. Radiation Fields, Effects and Risks in Human Space Missions

The major topics of this session are the characterisation of the radiation environment by theoretical modelling and experimental data, radiation effects on physical and biological systems, countermeasures to radiation and radiation risk assessment.

Chairman

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A1.5. Astrobiology and Exploration

A new era of space exploration will soon expand into a global endeavour to achieve highly ambitious goals such as establishing human bases on the Moon, journeys to Mars and the construction of new infrastructures in space. Astrobiology plays a key role in the strategic search for organic compounds and life on Mars and other planetary objects in our solar system and can provide support in the preparation of human exploration endeavours. The session invites papers of astrobiological content supporting future robotic and human exploration missions.

Chairman

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Rapporteur

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A1.6. Life Support and EVA Systems

This session will address strategies, solutions and technologies in providing for human requirements during future deep space and planetary/lunar surface exploration.

Chairman

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A1.7. Biology in Space

This session focuses on the molecular and cellular systems in plants and animals to analyse the mechanisms of gravisensitivity in ground-based and space flight experiments.

Chairman



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A1.8. Public Outreach and Education in Space Life Sciences

This session focuses on all aspects of public outreach and education activities related to space life sciences: strategies, best practice examples, future concepts and the integration into the space life sciences program development process.

Chairman

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A2. MICROGRAVITY SCIENCES AND PROCESSES

The objective of this Symposium is to highlight and discuss the state of the art in microgravity physical sciences and processes as well as to prepare the future orbital infrastructure. Session topics cover all microgravity sciences disciplines (materials sciences, fluid sciences, combustion science, fundamental physics, multi-phase flows), current results and research perspectives, together with relevant technology developments.

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Vice-Coordinator

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A2.1. Gravity and Fundamental Physics

This session is devoted to the search of new fields of research in condensed matter physics and gravitational physics including cryogenic fluids, critical fluids, equivalence principle, atomic clock, plasma crystals.

Chairman

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Rapporteur

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A2.2. Fluid and Materials Sciences

The main focus of the session is on perspective research fields in fluid and materials sciences, multi-phase and chemically reacting flows including theoretical modelling, numerical simulations, and results of pathfinder laboratory experiments.

Chairman

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Rapporteur

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A2.3. Microgravity Experiments from Sub-orbital to Orbital Platforms

This session presents recent results of microgravity experiments from all disciplines using different microgravity platforms, including drop towers, parabolic aircrafts, sounding rockets and capsules.

Chairman

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Rapporteur

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A2.4. Science Results from Ground Based Research

This session is focused on the results of ground based preparatory experiments from all disciplines.

Chairman

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A2.5. Facilities and Operations of Microgravity Experiments

This session is devoted to new diagnosis developments, new instruments definition and concepts for the future, ground and flight operation (telescience, robotics, hardware & software).

Chairman

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Rapporteur

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A2.6. Microgravity Sciences onboard the International Space Station and Beyond

Aimed to the presentation of results obtained from large orbital platforms, in particular the ISS, as well as preparation scenarios for further long term flight opportunities. The session includes description and performance of ground and in-orbit infrastructures.

Chairman

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A2.1. Interactive Session on Microgravity Sciences and Processes

Chairman

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A3. SPACE EXPLORATION SYMPOSIUM

This Symposium covers the current and future robotic missions and material plans for initiatives in the exploration of the Universe from Space. The emerging field of Astrobiology or origins of the Universe and Solar Systems are included in all sessions where appropriate.

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A3.1. Space Exploration Overview

This Session covers Space Exploration strategies and architectures, as well as technology roadmaps. Papers of both national and international perspectives are invited, as are papers dealing with the emerging area of commercial space exploration activities.

Chairman

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A3.2A. Moon Exploration – Part 1

This session will address current and future lunar missions. The session will address orbital missions, robotic surface missions, as well as life sciences on the Moon, resource utilisation and preparatory activities for future solar system exploration.

Chairman

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A3.2B. Moon Exploration – Part 2

This session will address current and future lunar missions. The session will address orbital missions, robotic surface missions, as well as life sciences on the Moon, resource utilisation and preparatory activities for future solar system exploration.

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A3.2INT. Moon Exploration – Part 3 (Interactive Session)

This session will address current and future lunar missions. The session will address orbital missions, robotic surface missions, as well as life sciences on the Moon, resource utilisation and preparatory activities for future solar system exploration.

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A3.3A. Mars Exploration – Part 1

The planet Mars is being explored now and in the coming years with multiple robotic missions from a variety of nations. This Session will cover current results from ongoing Mars missions and the designs for proposed Mars missions including expected experiments. Papers on any aspects of the search for evidence of extant or extinct Martian life, and forward and backward contamination are particularly welcome.

Chairman

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A3.3B. Mars Exploration – Part 2

The planet Mars is being explored now and in the coming years with multiple robotic missions from a variety of nations. This Session will cover current results from ongoing Mars missions and the designs for proposed Mars missions including expected experiments. Papers on any aspects of the search for evidence of extant or extinct Martian life, and forward and backward contamination are particularly welcome.

Chairman



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A3.4. Space Based Astronomy

This Session is devoted to innovative new ideas and concepts for current and future missions for observing the Universe from space. This session includes the topic of lunar based astronomy.

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Rapporteur

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A3.5. Small Bodies Missions and Technologies

This Session will present the missions and technological aspects related to the exploration of small bodies including a search for pre-biotic signatures.

Chairman

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Rapporteur

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A3.6. Solar System Exploration

This Session covers robotic missions for Solar System exploration (inner and outer planets and their satellites, and space plasma physics) except the Earth, Moon, Mars, and small bodies covered in other sessions of this symposium. Papers covering both new mission concepts as well as the associated specific technologies are invited.

Chairman

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Rapporteur

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A3.I. Space Exploration Interactive Session on Small Bodies and Mars

Chairman

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Rapporteur

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A4. 39th SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – The Next Steps

This symposium organized by the International Academy of Astronautics deals with the scientific, technical and interdisciplinary aspects of the search for extra-terrestrial Intelligence (SETI) including a discussion of all kinds of contacts. The technical side is not limited to the microwave window, but includes also optical and any kind of radiation. The interdisciplinary aspects include all societal implications, risk communication and philosophical considerations of any kind of discovery or contact.

Coordinator

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Claudio Maccone
International Academy of Astronautics — ITALY
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A4.1. SETI I : SETI Science and Technology

All technical aspects involved in the search for extraterrestrial intelligence, including current and future search strategies.

Chairman

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Rapporteur

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A4.2. SETI II : SETI and Society

All aspects concerning the societal implications of extraterrestrial intelligence are considered, including public reaction to a discovery, risk communication and the possible impacts on society.

Chairman



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Rapporteur

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A5. HUMAN EXPLORATION OF THE MOON AND MARS SYMPOSIUM

This 13th Symposium organized by the International Academy of Astronautics covers the strategic plans, architectural concepts and technology development for future human exploration of the Solar System.

Coordinator

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A5.1. Near Term Strategies for Lunar Surface Infrastructure

This session will look at the study of Lunar Surface infrastructure elements to support human exploration from a lunar outpost or sortie missions. Papers are invited to discuss technology roadmaps as well as interfaces to allow international cooperation and lunar surface activities.

Chairman

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A5.2. Long Term Scenarios for Human Lunar Presence

Many studies of human lunar return have been conducted in the 35 years since the first Apollo Moon landing. Utilization and colonization of the Moon will require that a long term, sustainable strategy be developed - and followed. In addition, future lunar enterprise must be considered as part of an evolving space infrastructure that can utilize the goods and services stemming from a lunar colony to enhance or enable ever more ambitious human and robotic space exploration goals. This session will address strategic aspects of political, philosophical, legal and commercial “enablers”, including technological road maps and benefits to humanity that might result from human exploration and ultimately colonization. A goal of the session is the advancement of a strategy leading toward self-supporting colonies.

Chairman

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Rapporteur

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A5.3.-B3.6. Joint session on Human and Robotic Partnerships to Realize Space Exploration Goals

This session seeks papers on new systems and technologies for future human missions to the Moon and Mars, and the role of human and robotic partnerships in areas such as human surface mobility systems (rovers); habitat/infrastructure construction; robotic assistants; and, precursor activities such as sample returns, in-situ plant growth and food and fuel production demonstrations. This session also welcomes papers considering how the roles of humans, machines and intelligent systems are likely to evolve in the coming years and the corresponding impact on complex missions.

Chairman

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Rapporteur

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A5.4. Going Beyond the Earth-Moon system: Human Missions to Mars, Libration points, and NEO's

This session will explore human missions to destinations beyond the Earth-Moon system. Papers are invited to discuss program architectures and technology roadmaps as well as the issues of scientific and political motivations and international cooperation.

Chairman

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Rapporteur

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A6. SPACE DEBRIS SYMPOSIUM

The 8th Symposium organized by the International Academy of Astronautics will address the complete spectrum of technical issues of space debris: measurements, modelling, risk assessment in space and on the ground, reentry, hypervelocity impacts and protection, mitigation and standards, and Space Surveillance.

Coordinator

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A6.1. Measurements

This session will address advanced ground and space-based measurement techniques, relating processing methods, and results on the derived spatial and temporal distribution of debris and meteoroids.

Chairman



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Rapporteur

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A6.2. Modelling and Risk Analysis

This session will address the characterization of the current and future debris population and methods for in-orbit and on-ground risk assessments. The in-orbit analysis will cover collision risk estimates based on statistical population models and deterministic catalogs and active avoidance, including evasive manoeuvres.

Chairman

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Rapporteur

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A6.3. Hypervelocity Impacts and Protection

The session will address passive protection, shielding and damage predictions. Shielding aspects will be supported by experimental and computational results of HVI tests.

Chairman

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Rapporteur



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A6.4. Mitigation, Standards and Legal Issues

This session will focus on the definition and implementation of debris prevention and reduction measures and vehicle passive protection and shielding. The session will also address space debris mitigation guidelines and standards that exist already or are in preparation at the national or international level, including associated legal issues.

Chairman

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A6.5. Space Surveillance and Space Situational Awareness

This session will address space surveillance concepts, their implementation and operation, and the establishment and maintenance of space object catalogs.

Chairman

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B1. EARTH OBSERVATION SYMPOSIUM

This Symposium focuses on space missions which deal with collecting information about the Earth and its environment. Session topics deal with all aspects of Earth Observation missions including the policy and infrastructure of international cooperation and coordination, the emergence of commercial systems to satisfy market needs, the technical descriptions of new missions and sensors to be used, data processing and GIS, environmental applications and global change studies and the use of space-based technologies.

Coordinator

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B1.1. International Cooperation in Earth Observation Missions

Focus is on efforts being made by governments, agencies and society to achieve coordination, cooperation and compatibility in the development of space-based Earth observation systems. Presentations are encouraged which involve cooperative efforts with developing countries. Papers on current and ongoing missions involving coordination among commercial, government and other entities are especially encouraged.

Chairman

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Rapporteur

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B1.2. Future Earth Observation Systems

Emphasis is on technical descriptions of planned and new space systems and missions for experimental and operational Earth observation. Descriptions of new concepts and innovative Earth observation systems are encouraged.

Chairman

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Rapporteur

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B1.3. Earth Observation Sensors & Technology

Focus is on sensors now being developed or tested for all aspects of Earth observation. Particular emphasis is on new sensors for meeting the growing demand of user markets.

Chairman

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Rapporteur

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B1.4. Earth Observation Data Management Systems

Earth Observation Data Acquisition, Communication, Processing, Dissemination and Archiving.

Chairman

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Rapporteur

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B1.5. Earth Observation Applications and Economic Benefits

Earth Observation value-added products.



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Rapporteur

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B1.6. GEOS and Carbon Monitoring from Space

Focus is on early results from JAXA's Greenhouse Gases Observing Satellite (GOSAT) and NASA's plans for a carbon observing mission and on the status of carbon monitoring and related climate and energy issues being addressed within the Global Earth Observation System of Systems (GEOS)

Chairman

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Rapporteur

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B1.I. Interactive Session on Earth Observation

Chairman

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B2. SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM

This Symposium on space communications and navigation examines developments in technology, applications and systems as they relate to fixed and mobile communications services, satellite broadcasting, position determination, navigation and timing, and interactive multimedia provisions.

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B2.1. Advanced Systems

Advanced satellite communications and system will be presented.

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Rapporteur

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B2.2. Fixed and Broadcast Communications

Advances in fixed and broadcast systems will be presented, including Ka frequency band systems, television and radio direct-to-user systems and related satellite technology improvements.

Chairman

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Rapporteur



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B2.3. Mobile Satellite Communications and Navigation Technology

New and emerging technologies for mobile and personal satellite communications and navigation will be presented.

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Rapporteur

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B2.4. Space Navigation Systems and Services

New and emerging systems for satellite-based position, navigation and timing will be presented, including end user applications.

Chairman

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Rapporteur

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B2.5. Near-Earth and Interplanetary Communications

This session addresses systems with relative motion between space and ground segments operating in both near-earth and interplanetary environments, with particular regard to their unique concepts, techniques and technologies.

Chairman



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Rapporteur

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B2.6. Advanced Technologies

New and promising space communication and navigation technologies will be presented, as applied to existing and developing systems.

Chairman

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Rapporteur

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B3. HUMAN SPACE ENDEAVOURS SYMPOSIUM

This symposium addresses all aspects of human space endeavours including the design, development, operations, utilization and future plans of space missions involving humans. The scope covers past, present and future space endeavours.

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B3.1. Overview Session (Present and Near-Term Human Space Flight Programs)

This session provides the forum for "Overview" papers and presentations on present and evolving Human Space programs in Low Earth Orbit and on the Moon. It is anticipated that this Session will include the current status of the International Space Station, the future plans of those nations with an autonomous, or evolving, human space flight program and the spacecraft being developed to support them, and other human space flight programs including those under development as commercial ventures. Technical papers to be presented are expected to portray the latest development of these programs.

Chairman

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Rapporteur

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B3.2. How Can We Best Apply Our Experience to Future Human Missions?

This session shall provide a forum for the exchange of the experience of previous human spaceflight missions like Apollo, Soyuz, Mir, Space Shuttle and ISS, and provide insight how this information can be best used for designing future missions. Technical papers to be presented are expected to show the direct relationship between past missions and their potential influence on newly designed missions. Special attention will be given to cost reduction efforts with enhanced crew and vehicle safety.

Chairman

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Rapporteur

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B3.3. ISS Operations and Utilization

This session provides the opportunity for papers to address operational, utilization and logistics issues currently experienced on the International Space Station.



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B3.4.-B6.6. Sustainable Utilization of the ISS Beyond 2015 - Joint session of the Human Space Endeavours and Space Operations Symposia

This session will address key challenges related to extending the life of the International Space Station beyond the year 2015. Topics to be discussed include cost reduction for affordability, high-value scientific and industrial utilization, exploration test bed applications, and geopolitical value as a tool for promoting international cooperation.

Chairman

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Rapporteur

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B3.5. Astronauts: Those Who Make it Happen

This session is designed to review and discuss issues related to a key element of Human missions; the Astronauts. Papers are solicited covering topics such as how to select astronauts, astronaut safety, decision-making process during spaceflight, actions at contingency situations on board, functional roles and responsibilities of crewmembers and Mission Control Center, physical and cognitive impacts of long duration spaceflight, extravehicular activity and space vehicle maintenance, astronaut as a researcher and test-pilot in space, design and utilization of suits and tools, recreation and entertainment in weightlessness, astronaut's roles and challenges in surface operations (Moon, Mars and other planets), astronaut's involvement in space program development (DDT&E), and considerations for the international nature of the crews.

Chairman



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Rapporteur

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B3.6.-A5.3 Joint session on Human and Robotic Partnerships to Realize Space Exploration Goals

This session seeks papers on new systems and technologies for future human missions to the Moon and Mars, and the role of human and robotic partnerships in areas such as human surface mobility systems (rovers); habitat/infrastructure construction; robotic assistants; and, precursor activities such as sample returns, in-situ plant growth and food and fuel production demonstrations. This session also welcomes papers considering how the roles of humans, machines and intelligent systems are likely to evolve in the coming years and the corresponding impact on complex missions.

Chairman

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B3.7. Enablers for the Future Human Missions

This session is designed to examine the potential evolution of key elements of future Human missions, especially those driven by affordability and sustainability requirements. Papers are solicited that address how to shape the future of technologies, logistics, processes, procedures, etc. to enable future human space mission objectives that will include exploration, commercial initiatives, tourism, and industrial processes.

Chairman



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B3.8. Joint IAF-IISL session on Legal Framework for Collaborative Human Space Missions

This session invites discussions around topics related to the legal aspects of international collaboration in future human space missions and programmes such as the ISS lifetime extension, post ISS activities in LEO, or the Lunar Exploration. The scope encompasses both inter-agency as well as industrial collaboration.

The session shall provide a forum to discuss the regulatory framework to establish and effectively run these programmes through development and operation phases especially, but not exclusively, from an industrial point of view.

In addition, the session will address current tendencies to extend the duration and partnership of the ISS programme and lessons learned in the legal domain from collaborative programmes such as the built-up phase of the ISS, Interkosmos, or the Shuttle-Spacelab programme.

Chairman

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Rapporteur

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B4. SMALL SATELLITE MISSIONS SYMPOSIUM

This Symposium, organised by the International Academy of Astronautics (IAA), addresses Small Satellite programmes for Commerce and Science & Technology, encompassing space science, earth observation, and exploration missions; and focusing on results achieved, as well as plans for new missions. The Symposium also addresses five areas across the entire spectrum of small satellite missions – design and technology, cross-platform compatibility, planning for and executing cost-effective operations, affordable and reliable space access, and implementing small satellite programmes in developing countries.

Coordinator

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B4.1. 11th UN/IAA Workshop on Small Satellite Programmes at the Service of Developing Countries

This workshop is organized jointly by the United Nations Office for Outer Space Affairs (UN/OOSA) and the International Academy of Astronautics (IAA). It shall review the needs that could be satisfied and results achieved by developing nations through using small satellites. National space plans and examples of application results and benefits shall be included. The workshop shall also review benefits of international cooperation and transferring technology and lessons learned from space developed countries.

Chairman

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Rapporteur

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B4.2. Small Space Science Missions

This session will address the current and near-term approved small missions whose objective is to achieve scientific returns in the fields of Earth science, solar, interplanetary, planetary, astronomy/astrophysics observations, and fundamental physics. Emphasis will be given to results achieved, new technologies and concepts, and novel management techniques.

Chairman

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B4.3. Small Satellite Operations

This session covers the planning for, and execution of, cost-effective approaches for Small Satellite Operations, with emphasis on new missions with new models of operation. Papers addressing innovation, an entrepreneurial approach to new business opportunities, novel finance and business models, management techniques, and international cooperation in support of Small Satellite Operations are particularly encouraged. Papers that discuss the application of novel technology to mission operations, such as automation and autonomy, constraint resolution, and timeline planning, as well as reports on missions recently accomplished and lessons learned, are also welcome.

Chairman

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B4.4. Small Satellites Potential for Future Integrated Applications and Services

This session seeks contributions that address new satellite missions, instruments, lessons learned, or plans for future small satellites, instruments, or missions. Small satellite missions are found in an ever widening range of disciplines – these missions cover the gamut from astronomy to earth sciences. Data from space missions are collected and distributed through space and ground-based systems. The goal of an integrated system is to provide the right information at the right place and at the right time in a cost-effective manner. Including a space-based element in an integrated application may enable that application, or even provide a unique and powerful enhancement to the services provided. Contributions that address the need to go beyond the traditional mission oriented (or vertical) organization and provide a service that integrates information from ground and space-based sources (the horizontal or distributed domain) are particularly encouraged.

Chairman



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Rapporteur

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B4.5. Access to Space for Small Satellite Missions

A key challenge facing the viability and growth of the small satellite community is affordable and reliable space access. This is achieved through dedicated launches, ride-shares, piggyback launches, and spacecraft propulsion technologies to reach final operational orbit. Topics of interest for this session include utilization of dedicated launches, ride-share systems, auxiliary payload systems, separation and dispenser systems, and small spacecraft sub-system development that will enable efficient small satellite access to space and orbit change (e.g., propulsion systems). Includes lessons learned from users on technical and programmatic approaches. For a discussion of small launchers concepts and operations, please refer to session D2.7.

Chairman

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B4.6A. Design and Technology for Small Satellites

This session covers the design and technology required and developed for Small Satellites (typical mass 10-100 kg) and small satellite systems. Real-life examples are particularly encouraged, both recently launched and shortly to be launched (next 3 years).

Chairman

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B4.6B. Design and Technology for Nano-Sats and Cube-Sats

This session covers the design and technology required and developed for Nano/Cube Satellites (typical mass less than 10 kg) and nano/cube satellite systems. Real-life examples are particularly encouraged, both recently and shortly to be launched (next 3 years).

Chairman

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B4.7. Space Systems and Architectures Featuring Cross-Platform Compatibility

Ideas are solicited for Modular, Reconfigurable, Adaptable systems (spacecraft, ground systems and networks) that feature cross-platform compatibility. Applications are sought in Science, Exploration, Commerce, and other areas requiring fast system design, build, integration, test and flight. System-enabling plug-and-play interface definitions (mechanical, electrical, software and fluids) are particularly desirable.

Chairman

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B4.8. Hitchhiking to the Moon

The next few decades involve a dramatically increased interest in lunar exploration for the purpose of developing a permanent human and robotic presence on the Moon, both for science and space exploration objectives. This renewed interest is broad and international, involving space agencies from the USA, Europe, China, India, Japan, Russia, Germany, UK, and others. Recently, ISRO's Chandrayaan spacecraft offered its platform as an opportunity to fly international instruments to the Moon; NASA's Lunar Reconnaissance Orbiter (LRO) spacecraft provided an opportunity for a secondary payload to the Moon, in the form of the LCROSS lunar impactor mission. In the future, it is expected that there will be more opportunities for ride-sharing or secondary or tertiary payload opportunities to be flown to the Moon. This session provides a forum for the exchange of ideas for such small payloads to be demonstrated at the Moon, by 'Hitch-hiking a ride' to the Moon. Examples of such payloads or missions include: micro-spacecraft orbiters, CubeSats, small probes, penetrators, micro-landers, hard-landers, micro-rovers, secondary payload surface science instruments, distributed network landers, and many more. The focus of this session is on mission concepts, technology readiness and ride-sharing requirements.

Chairman

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Rapporteur

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— UNITED KINGDOM

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B5. SYMPOSIUM ON INTEGRATED APPLICATIONS

This symposium will address various aspects of integrated applications. Integrated applications combine different space systems (Earth observation, navigation, telecommunication, etc) with airborne and ground-based systems to deliver solutions to local, national and global needs. They exploit the synergies between different data sources to provide the right information at the right time to the right user in a cost-effective manner and deliver the data to users in a readily usable form. The goal of the symposium is to enable the development of end-to-end solutions by connecting the communities that are driving toward end-to-end solutions with those that are developing enabling technologies for integrated applications. For the purposes related to the small satellites, please refer also to the session B4.4.

Coordinator

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B5.1. Integrated Applications End-to-End Solutions

The session will be a forum for end-to-end solutions, including case studies, proof-of-concept missions, and current projects that provide, or could provide, innovative user-driven solutions. Applications that combine ground- and space-based data sources with models to address specific user requirements will be presented. These examples can cover a variety of domains, like disaster management, food security, space situational awareness, transportation, health, disaster monitoring, etc. The user needs, the structure of the user communities, the value chain, the business case, the sustainability of the solutions are among the many aspects that can be considered.

Chairman

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B5.2. Tools and Technology in Support of Integrated Applications

The session will focus on specific tools and technology in support of integrated applications and address the various issues associated with the design of systems, the kind of data they collect, how they collect data, and how the data are integrated and distributed to address key user needs. Possible topics include: ground-truthing of data; innovative, low-cost tools for data distribution and access; new ways of distributing integrated data products; data visualization tools especially those using COTS systems; managing integrated applications programs; education and outreach for integrated programs; etc.

Chairman

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B6. SPACE OPERATIONS SYMPOSIUM

The Space Operations Symposium addresses operations concepts and cost reductions, and training. The topics address all aspects of manned and un-manned space operations from low-earth and geosynchronous orbit, to lunar and planetary missions as well as supporting ground systems and new space initiatives. For the papers dedicated to the small satellites, please refer also to the session B4.3.

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B6.1. Human Spaceflight Operations Concepts

This session focuses on the operations concepts which are unique to human spaceflight. Papers may address any phase in the entire mission lifecycle from concept development, to ground operations, to in flight (vehicle and ground segments), to recovery and post mission analysis.

Chairman



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Rapporteur

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B6.2. New Operations Concepts

Operations costs often become the constraining factor for a mission – especially long duration missions. This session addresses concepts for operating new types of missions, improving mission output in quality and quantity, as well as reducing costs in the commercial, governmental, and academic, market segments space enterprises.

Chairman

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B6.3. Training Relevant for Operations, including Human Spaceflight

This session addresses the broad topic of training. It includes training of ground operations, flight control, and flight personnel. It also includes training requirements and plans for newcomers in the operations domain.

Chairman

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Rapporteur



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B6.4. Operations Practices in the Commercial Space Sector

Business necessities, market forces, and risk acceptance all drive operations concepts and practices in the commercial space sector. This session explores operations practices related to commercial ground systems, launch vehicles, and spacecraft. It targets both mature commercial (such as satellite operations) and emerging commercial space providers, including space tourism.

Chairman

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Rapporteur

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B6.5. Flight Control Operations Virtual Forum

This session is a virtual forum (not a paper session) co-sponsored by the Space Operations Committee and the Workforce Development/Young Professionals Program Committee. The forum targets hands-on flight control/operations personnel from multiple international organizations with objectives of sharing best practices, lessons learned, and issues.

Chairman

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Tom Uhlig
DLR — GERMANY
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B6.6. Sustainable Utilization of the ISS Beyond 2015 - Joint Session of the Human Space Endeavors and Space Operations Symposia

This session will address key challenges related to extending the life of the International Space Station beyond the year 2015. Topics to be discussed include cost reduction for affordability, high-value scientific and industrial utilization, exploration test bed applications, and geopolitical value as a tool for promoting international cooperation.

Chairman



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Rapporteur

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C1. ASTRODYNAMICS SYMPOSIUM

This symposium addresses advances in orbital mechanics, attitude dynamics, guidance, navigation, and control of single or multi-spacecraft systems as well as space robotics.

Coordinator

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C1.1.-2.-3. Orbital Dynamics

This theme discusses advances in orbital dynamics, orbit determination, and orbit control. It includes orbital dynamics associated with constellations and formation flying.

Chairman

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C1.4.-5.-6. Attitude Dynamics

This theme discusses advances in spacecraft attitude dynamics and control, as well as attitude sensors and actuators. The theme also covers dynamics and control of multiple interconnected rigid and flexible bodies including tethered systems and space robots.

Chairman

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C1.7.-8. Guidance, Navigation, and Control

The emphasis of this theme is on the studies and application related to the guidance, navigation and control of earth-orbiting and interplanetary spacecraft and rockets, including rendezvous and docking.

Chairman

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C1.9.-10. Mission Design, Operations and Optimization

This theme covers design, operations and optimization of earth-orbiting and interplanetary missions, with emphasis on studies and experiences related to current and future missions.

Chairman

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C2. MATERIALS AND STRUCTURES SYMPOSIUM

This Symposium provides an international forum for recent advancements in assessment of the latest technology achievements on space structures, structural dynamics, and materials. The Symposium addresses the design and development of space vehicle structures and mechanical/thermal/fluidic systems. Future advances in a number of space systems applications for space power, space transportation, astrodynamics, space exploration, space propulsion, and space station will depend increasingly on the successful application of innovative materials and the development of structural concepts - particularly those relating to very large deployable (and assembled) space structures. For these applications to occur, increased interaction between these technology communities, and collaboration among technologists and mission planners needs to be pursued. Substantial improvements are essential in a wide range of current technologies, including nanotechnologies, to reduce projected costs and increase potential scientific returns from respective mission system applications. Papers in this symposium will review the projected advances in materials and space structures in this domain for advanced space systems applications.

Coordinator

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C2.1. Space Structures I - Development and Verification (Space Vehicles and Components)

The topics to be addressed include evaluation of analysis versus test results, spacecraft and launch vehicles system and subsystems e.g. pressurized structures, tanks, loads introduction, primary structures, fluidic equipment, control surfaces; examination of both on-ground and in-orbit testing, launch dynamic environment as related to structural design, space vehicles development and launch verification such as sine, random and acoustic vibration testing, and lessons learned.

Chairman

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Rapporteur

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C2.2. Space Structures II - Development and Verification (Deployable and Dimensionally Stable Structures)

The topics to be addressed include evaluation of analysis versus test results for deployable and dimensionally stable structures e.g. reflectors, telescopes, antennas; examination of both on-ground and in-orbit testing, thermal distortion and shape control, structural design, development and verification; lessons learned.

Chairman

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Rapporteur

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C2.3. Space Structures - Dynamics and Microdynamics

The topics to be addressed include dynamics analysis and testing, modal identification, landing and impact dynamics, pyroshock, test facilities, vibration suppression techniques, damping, micro-dynamics, in-orbit dynamic environment, wave structural propagation, excitation sources and in-orbit dynamic testing.

Chairman

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Rapporteur

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C2.4. New Materials and Structural Concepts

The topics to be addressed include advanced materials and structural concepts of space vehicles of expendable and future reusable transportation systems. Space vehicle structural applications of high temperature and cryogenic materials, nano-materials, advanced composites, ceramics, and high temperature superconducting materials are areas of particular interest.

Chairman



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Rapporteur

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C2.5. Smart Materials and Adaptive Structures

The focus of the session will be on application of smart materials to spacecraft and launch vehicle systems, novel sensor and actuator concepts and new concepts for multi-functional and intelligent structural systems. Also included in the session will be new control methods for vibration suppression and shape control using adaptive structures as well as comparisons of predicted performance with data from ground and in-orbit testing.

Chairman

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Rapporteur

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C2.6. Space Environmental Effects and Spacecraft Protection

The focus of the session will be on space environmental effects and spacecraft protection. The effects of vacuum, radiation, atomic oxygen, spacecraft charging, thermal cycling, dissociation, meteoroids and space debris impact on space systems, materials and structures, and microelectronics will be addressed. Protective and shielding technologies, including analysis simulation and testing of debris impact, and susceptibility of Commercial-Off-The-Shelf (COTS) micro-electronics to space radiation will be covered.

Chairman

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Rapporteur

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C2.7. Space Vehicles – Mechanical/Thermal/Fluidic Systems

The topics to be addressed include novel technical concepts for mechanical/thermal/fluidic systems and subsystems of launchers, manned and unmanned spacecraft, re-entry vehicles and small satellites. Advanced subsystems and design of future exploration missions will be covered considering issues arising from material selection, cost efficiency and reliability, and advancements in space vehicle development with respect to engineering analysis, manufacturing, and test verification.

Chairman

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Rapporteur

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C2.8. Specialized Technologies, including Nanotechnology

Specialized material and structures technologies are explored in a large variety of space applications both to enable advanced exploration, and science/observation mission scenarios to perform test verifications relying on utmost miniaturization of devices and highest capabilities in structural, thermal, electrical, electromechanical/ optical performances offered by the progress in Nanotechnology. Examples are the exceptional performances at nano-scale in strength, electrical, thermal conduction of Carbon nanotubes which are experiencing first applications at macro-scale such as nano-composite structures, high efficiency energy storage wheels, MEMS and MOEMS devices. Molecular nanotechnology and advances in manipulation at nano-scale offer the road to molecular machines, ultracompact sensors for science applications and mass storage devices. The Session encourages presentations of specialized technologies, in particular of nanomaterial related techniques and their application in devices offering unprecedented performances for space applications.

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Rapporteur

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C2.I. Interactive Session on Materials and Structures

Chairman

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C3. SPACE POWER SYMPOSIUM

The successful future exploration and development of space depends on the research into and deployment of new, more affordable and more reliable energy sources of diverse types ranging from

the very small to the extraordinarily large. Moreover, the continuing support of government-sponsored space activities by the public will require that these activities serve human needs in obvious ways. One visionary way to achieve the latter goal is to provide non-polluting, economical

power to the Earth from space. The Space Power Symposium will thus address space power systems for use in space and on Earth. It will include topics such as nuclear systems for spacecraft power and propulsion; systems using solar energy; and matters of storage, energy management, conversion, transmission and distribution. The Symposium will also examine the prospects for using space-based energy on the Earth and the use of key enabling technologies such as wireless power transmission for both space and terrestrial applications. The preliminary results of the IAA study on solar energy from space will be presented.

Coordinator

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C3.1. Joint Session with IAA Commission 3 (Space Technology & System Development) on "Solar Energy From Space"

This session will introduce the major study of the International Academy of Astronautics on "Solar energy from space" - its goals, study areas, organization and planned output. It will report on progress in the various study areas and seek discussion and comments that could be helpful in reaching The most useful conclusions and recommendations.

Chairman



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Rapporteur

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C3.2. Space Power Technologies and Techniques

This session will describe components and systems technologies that may meet the needs of future space missions. These may include solar, nuclear and thermal energy conversion, thermal management, energy storage and power management opportunities.

Chairman

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Rapporteur

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C3.3. Architectures, concepts and systems for space power

As power levels for satellites, space exploration systems and power for the Earth from space continue to increase, innovative architectures, concepts and system approaches are needed. This session will discuss needs and benefits of this wide range of applications with a focus on affordability, environmental and societal aspects and step-wise developments.

Chairman



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Rapporteur

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C3.4. Space Power Experiments Applications and Benefits

Diverse new power technologies must be developed and validated to meet emerging high power spacecraft needs. This session will discuss new demonstration results, flight experiments and the benefits of spin-off technologies.

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C3.5.-C4.7. Joint session on Nuclear Propulsion and Power

This session includes papers addressing all issues related to nuclear power and propulsion in space applications.

Chairman

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C4. SPACE PROPULSION SYMPOSIUM

Propose, report on and include all propulsion systems, including those for Earth-to-orbit, orbital control and interplanetary missions.

Coordinator

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C4.1. Propulsion Systems I

This session is dedicated to all aspects of Liquid Rocket Engines.

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Rapporteur

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C4.2. Propulsion Systems II

This session is dedicated to all aspects of Solid and Hybrid Propulsion.



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Rapporteur

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C4.3. Propulsion Technology

This session includes all science and technology supporting all aspects of space propulsion.

Chairman

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Rapporteur

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C4.4. Electric Propulsion

This session is dedicated to all aspects of electric propulsion technologies, systems and applications.

Chairman

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Rapporteur



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C4.5. Hypersonic and Combined Cycle Propulsion

This session includes papers dealing with use of air in earth-to-orbit propulsion. It is a joint ISOABE/IAF session.

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Rapporteur

Shigeru Aso
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C4.6. Special Session on "Missions Enabled by New Propulsion Technologies and Systems"

Many missions are precluded today by limitations on current propulsion. This session will explore concepts for new missions that can be enabled by specific advancements in propulsion and/or integration of various propulsion and systems.

Chairman

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Rapporteur

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C4.7.-C3.5. Joint session on Nuclear Propulsion and Power

This session includes papers addressing all issues of nuclear power and propulsion in space applications.

Chairman



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C4.8. Interactive Session on Space Propulsion

Chairman

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Rapporteur

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D1. SPACE SYSTEMS SYMPOSIUM

Innovative Space Systems for Future and Current Missions and Applications.

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D1.1. Innovative and Visionary Space Systems Concepts

Dreams of yesterday are a reality today. Dreams of tomorrow need to be looked at today to make them real in the future. With emerging new technologies, it is now possible to conceptualise new and innovative space systems and new potential applications for the future. This session will explore innovative technologies, services, software and concepts for space systems for the future.

Chairman

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Rapporteur

Peter Dieleman
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D1.2. Enabling Technologies for Space Systems

This session will focus on innovative, technological developments that are usually high risk, but which have the potential to significantly enhance the performance of existing and new space systems. Enabling innovative technologies for space applications often result from “spin-ins” which will be discussed during the session, together with potential spin-offs. Examples include instrumentation, biotechnology, components, micro- and nano-technology, MEMS, advanced new structures and software techniques.

Chairman

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D1.3. System Engineering Tools, Processes & Training (I)

This session will focus on state-of-the-art system engineering methodologies, design techniques, tools, processes, and training that reduce the time and cost, and improve the quality of space system design. Of special interest are multi-disciplinary methods, tools, and processes including modelling and simulation used to define system architectures to improve risk management, safety, reliability, testability, quality of life cycle cost estimates, and to improve the training of system engineers.

Chairman

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Rapporteur

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D1.4. Space Systems Architectures

The subject of this session is current and future space system architectures to increase performance, efficiency, reliability, and flexibility of application. Topics of interest include the design of flight and ground system (hardware & software) architectures and the partitioning of functions between them, small satellite constellations and formations (swarms), and the use of on-board autonomy and autonomous ground operations.

Chairman

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Rapporteur

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D1.5. Lessons Learned in Space Systems

Experiences, both positive and negative, that have been encountered in space systems (hardware & software) design, development and operation. End-to-end lessons learned and impacts on cost, schedule and performance, in the areas of (among others): international cooperation, the use of COTS products, partitioning of functions between flight and ground systems, the extent and fidelity of simulations, integration, test and operations.

Chairman

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Rapporteur

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D1.6. System Engineering Tools, Processes and Training (2)

This session will focus on state-of-the-art system engineering methodologies, design techniques, tools, processes, and training that reduce the time and cost, and improve the quality of space system design. Of special interest are multi-disciplinary methods, tools, and processes including modelling and simulation used to define system architectures to improve risk management, safety, reliability, testability, quality of life cycle cost estimates, and to improve the training of system engineers.

Chairman

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D2. SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS

Topics should address worldwide space transportation solutions and innovations. The goal is to foster understanding and cooperation amongst the world's space-faring organizations.

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D2.1. Launch Vehicles in Service or in Development

Review of up to date status of launch vehicle currently in use in the world or under short term development

Chairman

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Ray F. Johnson

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Rapporteur

Christian Dujarric

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D2.2. Launch services, Missions, Operations and Facilities

Review of the current and planned launch services and support, including economics of Space Transportation Systems, financing, insurance, licensing. Advancements in ground infrastructure, ground operations, mission planning and mission control for both expendable and reusable launch services

Chairman

Yves Gerard

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Rapporteur

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D2.3. Upper Stages, Space Transfer, Entry and Landing Systems

Discussion of existing, planned or new advanced concepts for cargo and human orbital transfer. Includes current and near term transfer, entry and landing systems, sub-systems and technologies for accommodating crew and cargo transfer in space

Chairman

Luigi Bussolino

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David E. Glass

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Rapporteur

Harry Cikanek

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D2.4. Future Space Transportation Systems

Discussion of future system designs and operational concepts for both expendable and reusable systems for Earth-to orbit transportation and exploration missions

Chairman

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Walter Faulconer

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Rapporteur

Lawrence Huebner

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D2.5. Future Space Transportation Systems Technologies

Discussion of technologies enabling new reusable or expendable launch vehicles and in-space transportation systems. Emphasis is on hardware development and verification before flight



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Chairman

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Rapporteur

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D2.6. Future Space Transportation Systems Verification and In-Flight Experimentation

Discussion of system, subsystems and technologies flight testing for Future Space Transportation Systems. Emphasis is on flight experimentation/verification and test experience

Chairman

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Rapporteur

Michael L. Burris
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D2.7. Small Launchers: Concepts and Operations

Discussion of existing, planned and future Small Launchers for payloads ranging from 500 kg to as low as 1 kg into Low Earth Orbit. Includes innovative solutions such as airborne systems, evolutions from sub-orbital concepts and flexible, highly reactive concepts. Includes mission operations, associated operations and specific constraints. For a discussion of access to space for small satellite missions, please refer to session B4.5.

Chairman

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Rapporteur

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D2.8. New missions enabled by Extra-large launchers

The session will address new science and human exploration missions enabled by new extra-large vehicles already planned (e.g. Ares V) or under study. The session will also deal with worldwide needs and requirements for extra-large launchers

Chairman

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Rapporteur

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D2.9. Commercial Human Spaceflight Safety

Discussion of human safety issues related to planned commercial orbital and suborbital space transportation endeavors, including regulatory frameworks, international harmonization, designing for safety, human rating, case studies, and lessons learned. Papers are welcome from government agencies and commercial providers. Selected presenters will be asked to serve on a discussion panel at the end of the session.

Chairman

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D3. SYMPOSIUM ON STEPPING STONES TO THE FUTURE: STRATEGIES, ARCHITECTURES, CONCEPTS AND TECHNOLOGIES

This 8th Symposium is organized by the International Academy of Astronautics. The international discussion of future directions for space exploration and utilization is fully underway, including activities involving all major space-faring nations. Decisions are now being made that will set the course for space activities for many years to come. New approaches are needed that establish strategies, architectures, concepts and technologies that will lead to sustainable human and robotic space exploration and utilization during the coming decades. This Symposium will examine the possible paths, beginning with current capabilities such as the International Space Station, which may lead to ambitious future opportunities for space exploration, discovery and benefits.

Coordinator

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Alain Pradier
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D3.1. Strategies and Architectures to Establish a “Stepping Stone” Approach to our Future in Space

Future scenarios for sustainable space exploration and utilization will unfold in the context of global conditions that vary greatly from those of the 1950s-1970s. It is likely that space-faring countries will pursue their goals and objectives in a step-wise fashion, rather than through massive, geo-politically driven programs (such as those that typified the Moon race of the 1960s). As a result, it is important that the international community engage in an ongoing discussion of strategies to establish a “stepping stone” approach to our future in space. Such a strategy should involve sustainable budget levels and multiple-purpose system-of-systems capabilities that lead to a diverse range of future activities of broad benefit to humanity and would represent a substantial departure from past models for major space programs. Moreover, nearer term developments, such as those in the Earth’s neighborhood (e.g., in support of the 2004 U.S. Vision for Space Exploration) should be structured to best support later evolution and reconfiguration to pursue still more ambitious missions—such as continuing robotic exploration Mars and targets beyond, and the search for Earth-like planetar around nearby stars. This session will address strategies and approaches that may allow a new paradigm—a “stepping stone” approach— to be established among the space-faring countries. Papers are solicited in these and related areas.

Chairman



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Rapporteur

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D3.2. Novel Concepts and Technologies for the Exploration and Utilization of Space

In order to realize future, sustainable programs of space exploration and utilization, a focused suite of transformational new systems concepts and supporting technologies must be advanced during the coming decade. The technical objectives to be pursued should be drawn from a broad, forward looking view of the technologies and systems needed, but must be sufficiently well focused to allow tangible progression—and dramatic improvements over current capabilities—to be realized in the foreseeable future. This session will address cross cutting considerations in which a number of discipline research topics and/or technologies may be successfully synthesized to enable a transformation new systems concept to be achieved. Papers are solicited in these and related areas.

Chairman

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Rapporteur

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D3.3. Infrastructures and Systems to Enable Ambitious Future Exploration and Utilization of Space

Although innovation systems concepts and technologies are critical to future space activities, these systems cannot succeed if they are used in “one-at-a-time” mission approaches. Instead, the emergence of novel “system-of-systems” infrastructures will also be needed to enable ambitious scenarios for sustainable future space exploration and utilization. New, reusable space infrastructures must emerge in various areas include the following: (1) infrastructures that enable affordable and reliable access to space for both exploration systems and logistics; (2) infrastructures for affordable and reliable transportation in space, including access to/from lunar and planetary surfaces for crews, robotic and supporting systems and logistics; (3) infrastructures that allow sustained, affordable and highly effective operations on the Moon, Mars and other destinations; and, (4) supporting in space infrastructures that provide key services (such as communications, navigation, etc.). Papers are solicited in these and related areas.

Chairman

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Rapporteur

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D3.4. Joint Session on Space Technology and Systems Management Practices and Tools” – Part I

The effective management on space technology and systems development is critical to our future success in space exploration and utilization. This joint session (new in 2007) in two parts provides a unique international forum to further the development of a family of ‘best practices’ in this important field. Specific areas of potential interest include: (1) Technology Management Methodologies and Best Practices; (2) R&D Management Software Tools and Databases; (3) Systems Analysis Methods and Tools; and, (4) Particular Topics could include: Technology Readiness Levels (TRLs), Technology Readiness Assessments, Technology R&D Risk Management, etc. Either more theoretical discussions, or examples of applications of R&D management tools to specific R&D programs and projects are of interest for the session.

Chairman

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Rapporteur

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D3.5. Joint Session on Space Technology and Systems Management Practices and Tools – Part II

The effective management on space technology and systems development is critical to our future success in space exploration and utilization. This joint session in two parts (new in 2007) provides a unique international forum to further the development of a family of 'best practices' in this important field. Specific areas of potential interest include: (1) Technology Management Methodologies and Best Practices; (2) R&D Management Software Tools and Databases; (3) Systems Analysis Methods and Tools; and, (4) Particular Topics could include: Technology Readiness Levels (TRLs), Technology Readiness Assessments, Technology R&D Risk Management, etc. Either more theoretical discussions, or examples of applications of R&D management tools to specific R&D programs and projects are of interest for the session.

Chairman

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D4. SYMPOSIUM ON VISIONS AND STRATEGIES FOR FAR FUTURES

This 7th Symposium organized by the International Academy of Astronautics deals with concepts for the far future exploration of outer space.

Coordinator

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Hans E.W. Hoffmann
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D4.1. Human exploration beyond Mars

This session will cover concept, strategies and technology to make possible the human exploration beyond Mars.

Chairman

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Rapporteur

Olivier de Weck
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D4.2. Interstellar Precursor Missions

This session will focus on interstellar missions that significantly expand science - using existing and emerging power and propulsion technologies.

Chairman

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Claudio Bruno
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Rapporteur



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D4.3. Access to Space in the Far Future

This session will cover advanced concepts to dramatically reduce the cost of space launch, and to significantly reduce the cost and time required for transportation in space.

Chairman

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Rapporteur

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D4.4. Space Elevators and Tethers

This session will cover the identification of key technologies readiness and possible development strategies for space elevators and tethers.

Chairman

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Robert E Penny
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Rapporteur

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D5. SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES

This 43rd Symposium organized by the International Academy of Astronautics addresses management approaches, methods, design solutions and regulations to improve the quality, efficiency and collaborative ability of space programs. All aspects are considered: risk management, complexity of systems and operations, knowledge management, human factors, economical constraints, international cooperation, norms and standards.

Coordinator

Jeanne Holm

Jet Propulsion Laboratory — UNITED STATES

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D5.1. Safety of Vehicules and Ground Segment for Aerospace Missions

Safety is a crucial issue for all steps of an aerospace mission. Risks associated with development, launch, in flight operation and landing vary with the nature of the mission from the use of nuclear devices for interplanetary exploration to the suborbital flight of "space tourists". This session deals with the methods tests, lessons learned, standards for analysis and mitigation of such risks.

Chairman

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Rapporteur

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D5.2. Knowledge Management and Collaboration in Space Activities

Working on complex space missions requires virtual teaming, learning lessons from the past, transferring knowledge from experts to younger generations, and developing deep expertise within an organization.

- How are aerospace organizations managing the ability to control quality and share knowledge?
- What solutions are in place to work across corporate and international boundaries?
- How is knowledge captured, shared, and used to drive innovation?

This session focuses on the processes and technologies that organizations are using to sustain, energize and invigorate their ability to learn, innovate and share knowledge within and amongst organizations for sustainable, peaceful exploration of space.

Case studies and defined approaches will discuss:

- Analysis of successful projects and innovations in the application of knowledge management
- Approaches to risk and opportunity management
- Capture of technical expertise and lessons learned from previous successful projects that are applicable to new programs and focus on driving innovation
- Methods that allow data, information or knowledge exchange within or amongst organizations

Chairman

Jeanne Holm

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Roberta Mugellesi-Dow

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D5.3. Space Weather Prediction and Effects on Space Missions

Space missions are affected by solar activity and new exploration programs, especially manned programs, that stress the need for real "space weather".

This session will deal with:

- Space environment and affects on modeling and ground testing
- Lessons learned from space mission failures due to the space environment
- Space solar activity measurement
- Space weather prediction
- Standardization and data policy for space weather

Chairman

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E1. SPACE EDUCATION AND OUTREACH SYMPOSIUM

This symposium deals with activities, methods and techniques for formal and informal space education at different educational levels, space outreach to the general public, space workforce development, etc. Each of the sessions in the symposium features an invited key note speaker followed by presentation of selected papers. Symposium sessions may also include panel discussions.

When submitting abstracts for consideration, please note that:

- Papers should have clear education or outreach content – technical details of projects, even if carried out in an educational context, will not usually qualify.
- Papers reporting on programmes/activities that have already taken place will usually be received more favourably than those dealing with concepts and plans for the future.
- More weight will usually be given to papers that clearly identify target groups, benefits, lessons-learned, good practice and that include measures of critical assessment.

Coordinator

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Lyn Wigbels
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E1.1. LIFT OFF - PRIMARY AND SECONDARY SPACE EDUCATION

This session will focus on all aspects of primary and secondary (K-12) space education.

Chairman

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Rapporteur

Claudia Kessler
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E1.2. ON TRACK - UNDERGRADUATE AND POSTGRADUATE SPACE EDUCATION

This session will focus on all aspects of undergraduate and (post)graduate space education.

Chairman



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Rapporteur

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E1.3. CALLING PLANET EARTH - SPACE OUTREACH TO THE GENERAL PUBLIC

This session will focus on activities that aim to promote awareness and understanding of space in the general public.

Chairman

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Rapporteur

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E1.4. NEW WORLDS - INNOVATIVE SPACE EDUCATION AND OUTREACH

This session will focus on novel and non-standard methods of space education and outreach in non-traditional areas and to non-traditional target groups.

Chairman

Jean-Daniel Dessimoz
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Rapporteur



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E1.5. TO BOLDLY GO - SPACE STATION EDUCATION AND OUTREACH

This cross-cutting session will focus on education and outreach activities that specifically leverage the inspirational value of the International Space Station and which aim to prepare today's students and future generations to be actively involved in turning space exploration visions into a sustainable endeavour.

Chairman

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Rapporteur

Rachid Amekrane
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E1.6.-E5.4 WATER IN SPACE: SOCIETAL, EDUCATIONAL AND CULTURAL ASPECTS

This is a joint session between the IAF Space Education and Outreach Committee and the IAA Commission VI and co-sponsored by ITACCUS. This joint inter-disciplinary session will explore the societal and cultural contexts of water as they are related to space. Possible topics include: political and economic issues; how the crises affecting oceans impact society; how the discoveries of water on the Moon and Mars impact both the human condition on Earth and human space exploration; the way the arts, popular culture and entertainment engage with cultural issues related to water, remote sensing co-ordination and public access; educational programmes relating to water from space and water in space, etc.

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E1.7. SPACE WORKFORCE DEVELOPEMENT – CHALLENGES AND OPPORTUNITIES

This session will focus on challenges, opportunities and innovative solutions for attracting, improving and retaining the future and current global space workforce.

Chairman

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Rapporteur

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E2. 40th STUDENT CONFERENCE

Presentation of space-related papers by undergraduate and graduate students who participate in an international student competition.

Coordinator

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E2.1. Student Conference I

Undergraduate and graduate level students (no more than 28 years of age) present papers on any subject related to space sciences, industry or technology. These papers will represent the work of the author(s) (no more than two students). The students presenting in this session will compete in the 38th International Student Competition.

French, German, US, and British students submitting abstracts for the sessions E2.1 and E2.2 shall apply via the national coordinators:

for France: Benedicte Escudier at: benedicte.escudier@supaero.fr

for Germany: Marco Schmidt at: schmidt.marco@informatik.uni-wuerzburg.de

for USA: Stephen Brock at: stephenb@aiaa.org

for Great Britain: Chris Welch at: c.s.welch@kingston.ac.uk

Guidelines for competition available on www.iafastro.org as from 15 November 2008.

Chairman

Marco Schmidt

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Rapporteur

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E2.2. Student Conference II

Undergraduate and graduate level students (no more than 28 years of age) present papers on any subject related to space sciences, industry or technology. These papers will represent the work of the author(s) (no more than two students). The students presenting in this session will compete in the 38th International Student Competition.

French, German, US, and British students submitting abstracts for the sessions E2.1 and E2.2 shall apply via the national coordinators:

for France: Benedicte Escudier at: benedicte.escudier@supaero.fr

for Germany: Marco Schmidt at: schmidt.marco@informatik.uni-wuerzburg.de

for USA: Stephen Brock at: stephenb@aiaa.org

for Great Britain: Chris Welch at: c.s.welch@kingston.ac.uk

Guidelines for competition available on www.iafastro.org as from 15 November 2008.

Chairman

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Rapporteur

Thomas Snitch

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E2.3. Student Conference III

Undergraduate and graduate level students (no more than 28 years of age) present papers on any subject related to space sciences, industry or technology. These papers will represent the work of the authors (three or more students). Students presenting in this session will compete for the Hans von Muldau Team Award. For further guidelines, please refer to www.iafastro.org as from December 2008.

Chairman

Stephen Brock

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Rapporteur

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E3. 23rd SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS

This symposium, organized by the International Academy of Astronautics, will provide a systematic overview of the current trends in space policy, regulation and economics by covering national as well as multilateral space policies and plans. In addition its focuses on two specific issues: Near Earth Objects and Planetary Protection, which is currently being researched under an IAA Cosmic Study project. The symposium also integrates findings of the 25th IAA/IISL Scientific-Legal Roundtable, which deals with an inter-disciplinary assessment of small satellite missions.

Coordinator

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E3.1. New Developments in National and International Space Policies and Programmes

This symposium, organized by the International Academy of Astronautics, will provide a systematic overview of the current trends in space policy, regulation and economics by covering national as well as multilateral space policies and plans. In addition its focuses on two specific issues: Near Earth Objects and Planetary Protection, which is currently being researched under an IAA Cosmic Study project. The symposium also integrates findings of the IAA/IISL Scientific-Legal Roundtable, which deals with an inter-disciplinary assessment of small satellite missions.

Chairman

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Rapporteur

Catherine Doldirina
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E3.2. Policy and economic aspects of space weather

Space weather slowly emerges as a policy item. While it has long been only a scientific question, its economic relevance is steadily growing due to its effects on commercial space activities in particular in the field of telecommunications. In addition, space weather is expected to become an element of new Space Situational Awareness projects so that international coordination should be foreseen. This session reflects on such questions of impact and coordination.



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Chairman

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Rapporteur

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E3.3. The Space Economy in Figures

For policy-makers, the 'space economy' has become an interesting concept covering not only the economic dimensions of the space sector, but also of its applications. What is the economic size of the international space sector? What are the socio-economic impacts of space applications? This session aims to present the state of the art in measuring the space economy. In addition to selected papers, it will include a number of invited papers by experts.

Chairman

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E3.4. Protecting the Environment of celestial Bodies

This session will have at its centre the presentation of the finalized IAA Cosmic Study on that topic. Further views from the scientific as well as policy and regulative perspective are invited to bring this issue forward and to the attention of decision-makers.

Chairman

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Rapporteur



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E3.5. 25th IAA/IISL Scientific-Legal Roundtable: The new age of small satellite missions (Invited Papers only)

With small satellite missions on the rise, this session will look into the issue from the policy, economic and regulatory perspectives in order to shape a comprehensive picture of the state and the prospects of this area. The Roundtable, organized by the IAA/IISL Scientific-Legal Liaison Committee, will comprise invited papers by the leading experts only and is aimed at conducting an inter-disciplinary debate. It will be opened by the Presidents of IAA and IISL stressing the outstanding character of this event.

Chairman

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E4. 44th HISTORY OF ASTRONAUTICS SYMPOSIUM

This Symposium is organized by the International Academy of Astronautics. History of space science, technology and development, rocketry and personal memoirs. The history of rocketry and astronautics of Korea. The entire spectrum of space history, at least 25 years old, is covered.

Coordinator

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Kerrie Dougherty
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E4.1. IAA 50th Anniversary

The history of the International Academy of Astronautics. The foundation of the Academy in 1959-60, its presidents and members. Memoirs of academicians. The political, scientific and technical achievements of the IAA.

Chairman

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Rapporteur

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E4.2. Memoirs and Organisational Histories

Autobiographical and biographical memoirs of individuals who have made significant original contributions to the development and application of astronautics and rocketry. History of government, industrial, academic & professional societies & organisations long engaged in astronautical endeavours.



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Chairman

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Rapporteur

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E4.3. Scientific and Technical History

Historical summaries of space programs, satellite and rocket projects, and technical and scientific achievements in the field of astronautics and rocketry.

Chairman

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Rapporteur

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E4.4. History of Czech Republic contributions of Astronautics

Special session with invited and proposed speakers. This session will cover rocketry and the origin (technical and political aspects) of the space programmes of the Czechoslovakia and the Czech Republic.

Chairman

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Rapporteur



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E5. 21st SYMPOSIUM ON SPACE ACTIVITY AND SOCIETY

This 21st symposium organized by the International Academy of Astronautics will review the impact and benefits of space activities on the various segments and aspects of society, including arts and culture, society's expectations from space, human life in space, space exploration and tourism, as well as knowledge transfer.

Coordinator

Peter A. Swan
Teaching Science and Technology, Inc. — UNITED STATES
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Geoffrey Languedoc
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E5.1. Future and current space missions: including and expanding all aspects of human life on-board and in other worlds

This session will address present day intentions and tendencies in sustainability and survivability in design based on minimizing and optimizing all resources. That will include but will not be limited to:

- new approaches to understanding mission goals as they evolve and change as new technologies and developments become available, and how this affects design and humans on-board
- humans vs. robotic missions – working together or against
- reality of achieving sustainability in space design (Moon, Mars...etc.)
- reflecting all qualities of life in space design

Papers are invited from professionals and students in areas of technology, structures, human factors, medicine, psychology, philosophy, the arts, system engineering and other fields that can support broad aspects of space research, design and development

Chairman

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Rapporteur

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E5.2. Space Expectations: Involving the Public in Space Activities

Space activities have historically been based upon technological successes with science and exploration leading space activities toward major projects throughout the solar system. However, periodic disconnects have occurred as the public used to seeing major successes suddenly sees failures and begins to question the value and cost of space initiatives. An IAA-sponsored study to determine the depth of understanding and backing of space activities by the general public (in particularly young people) was recently completed. Following on from sessions at previous IACs, papers are invited which review and describe society's expectations from space programmes, ascertain how society – particularly youth - could become more involved in space exploration, and indicate how space activities could maintain the interest and excitement of tomorrow's youth and thus be supported (both financially and intellectually) by the public.

Chairman

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Rapporteur

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E5.3. SPACE ARCHITECTURE: EXPLORATION and TOURISM

Space exploration, as we know it, used to be the forte of government space agencies. But that is set to change forever, in part because of the changing economic reality and in part due to the entry of new private players vying to provide both private tourists and a paying government customer, rides on their spaceships.

Take Bigelow, or Space-X, or Virgin Galactic, or any of those new companies out there that have injected new life, even enthusiasm into the words EXPLORATION and TOURISM. These companies are developing a whole new generation of rockets, habitable modules, cargo ferries and suborbital space planes. As the Shuttle gets ready to retire, it will see a new genre of human and cargo crafts that will take over and steer the world into a new era in space exploration.

It is in this context that the role of Space Architecture and Design assumes greater meaning and significance. More than anybody else, it will be the private space tourists that will force the tourism companies to hire the brightest and the best in the business of architecture and design. Unlike the astronauts, they have every right to be fussy and can and will complain if the ride is a bad one. This will put habitability and human factors, even style, on top of the design agenda, on par with safety and survivability.

Even human planetary exploration will be changed forever by this transition. Many of the products and services required by government missions and crews on the surface of the Moon - and for testing activities in Earth orbit - need not be developed by traditional government aerospace contracts. Re-supply of fuel, food, and other consumables, equipment maintenance, and other services could well be provided by companies or other nations whose offerings cross over to commercial customers as well.

This session aims to provide a platform to present designs that will shape the look of future spacecraft that will lead us into a new age in exploration and tourism.

Chairman

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Rapporteur

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E5.4.-E1.6. Water from Space: Societal, Educational and Cultural Aspects

This is a joint session between the IAF Space Education and Outreach Committee and the IAA Commission VI. Inter-disciplinary in nature, it will explore the societal and cultural contexts of water as they are related to space. Possible topics include: political and economic issues; how the crises affecting oceans impact on society; the way the arts, popular culture and entertainment engage with cultural issues related to water, remote sensing co-ordination and public access; educational programmes relating to water from space, etc.



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Rapporteur

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E6. BUSINESS INNOVATION SYMPOSIUM

The Symposium will address creative business approaches to serving government and private sector customers, as well as government options for encouraging this activity. Both existing markets (e.g. satellite-based services involving Earth Observation, navigation and communication) and new markets (e.g. space tourism, space-industrialization, space resource utilization) will be considered.

Coordinator

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E6.1. Encouragement of Government Purchasing from Commercial Providers Models and Examples

This session will address public-private collaboration to promote commercial provision of services to governments, exploring models (e.g. Private Financing Initiative - PFI, public-private purchasing - PPP, etc.) as well as specific examples (e.g. British Paradigm Initiative, NASA COTS program, etc.)

Chairman

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Douglas Comstock
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E6.2. Space-related Commercial Applications and Markets

This session will address downstream applications, including satellite-based value added services involving Earth Observation, position/navigation/timing, and communications. The following topics should be addressed: market potential, business models, commercialization mechanisms, etc.

Chairman

Max Grimard
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E6.3. New Space Markets + Investment Opportunities

This session will discuss new markets involving space, such as space tourism, space industrialization, space resource utilization, etc. Specific examples of business ventures will be highlighted, addressing private investment as well as entrepreneur business plan development.

Chairman

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Ramin Khadem
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E7. 53rd COLLOQUIUM ON THE LAW OF OUTER SPACE

This Symposium organized by the INTERNATIONAL INSTITUTE OF SPACE LAW (IISL) addresses various aspects of the law of outer space and is structured in 5 sessions.

Coordinator

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E7.1. Nandasiri Jasentuliyana Keynote Lecture on Space Law & Young Scholars Session

In the first part of this session, the IISL will invite a prominent speaker to address the members of the Institute and other congress attendants on a highly topical issue of broad interest.

The second part of this session will be especially dedicated to the space lawyers of the future, in that young scholars (under 35 years old) are invited to present a paper on "Space Law – Future Challenges and Potential Solutions" but the IISL is also open to other topics.

Note : All young scholars are requested to submit their paper to THIS session ONLY.

Chairman

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E7.2. 30 Years of the Moon Agreement: Perspectives

For this session, papers are invited to analytically address the future perspectives of the Moon Agreement, which celebrated its 30th anniversary in 2009. Papers may thus critically analyse (a) recent developments in COPUOS, such as the 2008 'joint statement' by several states parties on the benefits of adhering to the Agreement, (b) the future design, adoption and implementation of an international regime to govern the exploitation of the natural resources of the celestial bodies 'as such exploitation is about to become feasible', (c) the reasons for the timid support for the Agreement from the international community, and (d) issues concerning the protection of the Moon environment and of other celestial bodies. The question of how exploitation of moon resources relates to the non-appropriation principle as well as the Common Heritage of Mankind principle may also be critically scrutinized.

Chairman

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E7.3. Legal Aspects of Space Security

Recent anti-satellite tests and the EU Proposal for a Code of Conduct for Outer Space Activities of December 2008 as well as other initiatives like the Russian-Chinese proposal for a treaty demilitarizing outer space ('Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use Of Force Against Outer Space Objects'), together with the collision of a Russian defunct satellite with an operational US Satellite in early 2009, sparked broad international debate amongst experts and decision-makers alike. Papers in this session are invited to analyze the legal aspects related to the need for keeping space safe for civilian as well as military operations avoiding the weaponization of space at the same time. Papers are also encouraged to address the most recent proposals in this context and to present ideas for the further development of space law addressed to the relevant international forums.

Chairman

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Rapporteur

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E7.4. The Current Status of the Rule of Law with Regard to Space Activities

Since the adoption of the Moon Agreement in 1979, no other international treaties have been adopted in the United Nations. Rather, first a number of United Nations General Assembly Resolutions on Direct Broadcasting Satellites, Remote Sensing, Nuclear Power Sources were adopted concerning certain areas of uses in outer space. Thereafter, other United Nations General Assembly Resolutions served the purpose of making more concrete certain aspects of international space legislation, such as Article I paragraph 1 of the Outer Space Treaty with the Space Benefits Declaration, or the notion of Launching State in the Liability Convention and the Registration Convention, etc. Against this background, in light of the most recent development of the UN Space Debris Mitigation Guidelines, papers are invited to discuss the current status of the rule of law with regard to outer space activities. (Generally, the "rule of law" means that the law must be prospective, well-known, and have characteristics of generality, equality, and certainty).

Chairman

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E7.5. Recent Developments in Space Law

In this session, papers are invited to address legal aspects of the most recent developments in space activities that have taken place since the other session topics have been determined, i.e. since March 2009 only. In addition, papers are invited to address two special issues. Firstly, this concerns the legal aspects of Solar Power Satellites. In this field several high-level technical studies are currently conducted to assess whether such satellites can operate within the existing international regulatory regime and whether such regime is conducive to this newest space application. Secondly, papers are invited to address the ongoing developments and progress in the context of international Intergovernmental agreements on space cooperation and space activities, such as the Agreement on the International Space Station or agreements pertaining to international satellite organizations like ITSO, IMSO, EUTELSAT IGO or ARABSAT.

Chairman

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