68th IAC
International Astronautical Congress

ADELAIDE, AUSTRALIA
25 - 29 SEPTEMBER 2017

CALL FOR PAPERS &
REGISTRATION OF INTEREST

www.iac2017.org

UNLOCKING IMAGINATION,
FOSTERING INNOVATION
AND STRENGTHENING SECURITY
Message from the President of the IAF

It is with great pleasure that we invite you to attend the 68th International Astronautical Congress in Adelaide, Australia.

The IAC is returning to Australia for the second time, previously in year 1998 the 49th IAC was held in Melbourne.

Our Australian host, the Space Industry Association of Australia (SIAA) is already working hard to prepare an excellent programme with a variety of events and activities which we are sure will impress you. Adelaide is the capital city of South Australia, which is a region that has a lot to offer. Besides the rich culture and spectacular landscapes, it is growing as an international hub of innovation and Adelaide is proving to be a vibrant city with a strong entrepreneurial spirit.

We are confident that, together with the dedicated work of the Local Organizing Committee and partner organisations, the IISL and the IAA, the 68th IAC will be a great success and one to long remember!

We look forward to seeing you in Australia, the land down under!

Kiyoshi Higuchi
President
Former Senior Vice President,
Japan Space Exploration Agency (JAXA), Japan

Jean-Yves Le Gall
President Elect
President,
Centre National d’Etudes Spatiales (CNES), France

Message from the IPC Co-Chairs

It is with great pleasure that we invite you to submit an abstract for the 68th International Astronautical Congress to be held in Adelaide, Australia.

The IAC brings together the leaders and innovators of the space industry and the technical program is a platform to showcase the latest research. There are few conferences where you will find such diversity and quality, covering space science, engineering, economics, policy, law, education and history. All abstracts are peer reviewed and a limited number of papers will be selected for publication in Acta Astronautica.

Australia has a long involvement in the space industry. In 2017 it will be 50 years since Australia launched its first satellite from Woomera in South Australia. Since then Australia has been active in space research, developed a sophisticated user community for space-derived products and services, launched its own satellites, developed instruments and components that have flown on international missions, and supported international missions through the Canberra Deep Space Communication Complex and other ground stations. The Australian Geoscience Data Cube represents a new paradigm in analysing and providing public access to space-based crucial datasets: for the first time internationally an entire continent’s environmental attributes have been made available through the Australian Space Research Program.

IAC2017 will look to the future of the industry. Under the theme of “Unlocking Imagination, Fostering Innovation and Strengthening Security” the congress will present excellence in research and the translation of this research into commercial products and services through traditional methods and expanding entrepreneurial activity. It will consider the development of a skilled future workforce and the importance of preserving the space environment. Most importantly it will be an opportunity to expand existing international collaboration and explore new opportunities.

We hope that with more than 180 technical sessions to choose from you will find the perfect platform to present your research and network with your peers. We encourage you to use everything the IAC in Adelaide has to offer to develop new collaborative relationships and stimulate future projects that you can then share with the community the following year when the IAC is held in Bremen.

Naomi Mathers
IPC Co-Chair
Advanced Instrumentation and Technology Centre (AITC), Australia

Christiane Schmullius
IPC Co-Chair
Friedrich-Schiller-Universität (FSU), Germany

Message from the Local Organising Committee

IAC2017 in Adelaide Australia is structured around the theme Unlocking Imagination, Fostering Innovation and Strengthening Security. These three ideas capture the essence of human involvement with the space environment in the 21st Century. The space environment is harsh and near earth space is fragile. The interests of all nations and people with respect to access to space can only be met if that access is safe and assured. Technical political and policy challenges must be overcome for this end state to be achieved. Technological innovations, notably the increasing reach of the internet and miniaturization, are combining to reduce barriers of entry to space and to encourage entrepreneurs to develop space-based businesses that could not be contemplated even a decade ago.

Australia has responsibilities for land and ocean areas that account for nearly 15% of the world’s surface. We make extensive use of satellite communications, global timing and navigation systems and earth observation data to meet our sovereign prerogatives and to fulfill our obligations under international law. Space cooperation with regional nations is increasing and we continue to value our long-standing relationships with partners in North America and Europe. Australia is making substantial investments in developing capabilities in space-based communications, space situational awareness, and space-based remote sensing. Industry is expected to play an increasingly important role in these developments. Your hosts, the Space Industry Association of Australia are determined to place further emphasis on B2B interactions at IAC2017 in Adelaide. We also plan to showcase the importance of Science, Technology, Engineering and Mathematics (STEM) education as pathways to careers that are essential to the modern global economy. We invite all members of the space community to attend only the third IAC to be held south of the Equator and only the second to be held in Australia from 25-29 September next year.

Brett Biddington
Chief Executive Officer
Local Organising Committee

Jean-Yves Le Gall
President Elect
President,
Centre National d’Etudes Spatiales (CNES), France
Message from the President of the International Academy of Astronautics

On behalf of the International Institute of Space Law, I am pleased to invite you to attend our 60th Colloquium on the Law of Outer Space in Adelaide. This year’s Colloquium places a special focus on the 50th anniversary of the Outer Space Treaty, and discusses its main principles in the context of each individual dedicated ILSL session. Relevant legal questions raised by current public and private space activities will be addressed and debated by the world’s finest space lawyers as well as students and young professionals.

IISL will also co-host sessions with the IAF and the IAA, and the 32nd IAA-IISL ‘Scientific-Legal Roundtable’ will provide an opportunity for lawyers, scientists and engineers to jointly tackle a subject in an interdisciplinary setting.

The World Finals of the 26th Manfred Lachs Space Law Moot Court Competition will take place in Adelaide, welcoming university students from Africa, the Asia Pacific, Europe and North America, and will as always be judged by sitting members of the International Court of Justice.

The IISL is proud to contribute in a significant way to the success of the IAC, and we are greatly looking forward to welcoming you in Adelaide!

Kai-Uwe Schrogl
President of the International Institute of Space Law

Message from the President of the International Institute of Space Law

On behalf of the International Institute of Space Law, I am pleased to invite you to attend our 60th Colloquium on the Law of Outer Space in Adelaide. This year’s Colloquium places a special focus on the 50th anniversary of the Outer Space Treaty, and discusses its main principles in the context of each individual dedicated ILSL session. Relevant legal questions raised by current public and private space activities will be addressed and debated by the world’s finest space lawyers as well as students and young professionals.

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Kai-Uwe Schrogl
President of the International Institute of Space Law

International Astronautical Federation (IAF)

Founded in 1951, the International Astronautical Federation is the world’s leading space advocacy body. The IAF has over 300 members in over 66 countries, including all leading space agencies, companies, societies, associations and institutes worldwide.

Following its theme - “A space-faring world cooperating for the benefit of humanity” - the Federation advances knowledge about space and fosters the development and application of space assets by advancing global cooperation. As organiser of the annual International Astronautical Congress (IAC), and other meetings on specific subjects, the IAF actively encourages the development of astronautics for peaceful purposes and supports the dissemination of scientific and technical information related to space.

Members of Bureau 2016

President of the International Academy of Astronautics

Peter Jankowitsch

President of the International Institute of Space Law

Valerie Leenhardt
The International Academy of Astronautics (IAA) is a unique non-governmental organization established in 1960 and recognized by the United Nations in 1996. It is an honorary society with an action agenda. With 1200 elected members and corresponding members from 87 nations, it works closely with space agencies, industry, the academic community and the national science and engineering academies to determine needs and objectives and to help shape policy and forge cooperation by means of studies, position papers, conferences and publications.

The IAA has published nearly 60 studies to date and is engaged in the preparation of 40 others. The Academy also publishes the journal Acta Astronautica containing refereed papers.

The Academy now organizes 20 conferences per year and regional meetings focused on the development and promotion of new initiatives. This activity also includes, in cooperation with the International Astronautical Federation and the International Institute of Space Law, the traditional contribution to the International Astronautical Congress (IAC), where the Academy sponsors 13 Symposia. The Academy also continues to enjoy its participation in the COSPAR Assemblies by sponsoring and co-sponsoring symposia and the International Society for Photogrammetry and Remote Sensing (ISPRS) congress this year in Prague. Although the IAA has many connections to these and other similar organizations, it is distinctive as the only International Academy of elected members in the broad area of astronautics and space science.

Address: 6 rue Galilée, 75016 Paris
Mailing address: F.O. Box 1268-16 – 75766 Paris Cedex 16 – France
Phone: 33 (0) 47 23 82 15  Fax: 33 (0) 47 23 82 16
Email: igeneral@iaaweb.org
Website: www.iaaweb.org
IAA Shop: shop.iaaweb.org

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IAA Shop: shop.iaaweb.org
International Institute of Space Law

Founded in 1960, the International Institute of Space Law (IISL) is an independent non-governmental organization dedicated to fostering the development of space law. The membership of the Institute is composed of individuals and institutions from more than forty countries, elected on the basis of their contributions to the field of space law or other social sciences related to space activities. Additionally, prospective membership is open to students and young professionals with a demonstrated interest in space law.

Since 1992, the IISL has organized the annual Manfred Lachs Space Law Moot Court Competition. The competition is based on a hypothetical space law case, and is written by IISL members. Approximately sixty student teams from universities in Africa, the Asia Pacific, Europe, and North America participate. The competition is an important part of the organization’s outreach programme, and is its principal mechanism for engaging future generations of space law experts. The regional champions compete in the World Finals, which take place at the IAC and are judged each year by judges of the International Court of Justice. This unique feature makes the Manfred Lachs Moot Court one of the most prestigious moot court competitions in the world.

The IISL is an officially recognized observer at sessions of the United Nations Committee on the Peaceful Uses of Outer Space, and its Scientific & Technical and Legal Subcommittees. In cooperation with the European Centre for Space Law (ECSL), the IISL organizes an annual space law symposium for the delegates and staff attending the sessions of the UNCOPSOUS Legal Subcommittee. In addition the Institute organizes a variety of conferences on space law throughout the year in locations all over the world. It publishes an annual volume of IISL Proceedings with papers and reports of all these activities during the year.

Dear Colleagues,

It is with great pleasure that I share with you the opening Call for Papers to fill the technical program of the 68th International Astronautical Congress in Adelaide, Australia. Our colleagues “Down Under” are preparing a Congress to match any we have experienced before. I encourage you, your students, and your peers to submit abstracts for consideration by the various technical committees, to build a robust, high-quality, and relevant set of technical papers for our Congress.

We succeed on the basis of our exceptional technical depth, our breadth of subject matter related to space, and our ability to meet and exchange ideas with professionals from all over the globe. Returning to meet again under the beautiful sky of the southern hemisphere, not only do we have a chance to re-acquaint ourselves with some of the most fascinating parts of our local universe - the Southern Cross, the Magellanic Clouds, and more - we also have a chance to re-acquaint ourselves with each other, as we move forward together in the exploration of space, and its use for the benefit of all peoples everywhere.

I look forward to your abstract and participation in the IAC 2017!

John Horack
IAF Vice-President, Technical Activities And IAC Evolution

Technical Programme

**Category A**

**SCIENCE AND EXPLORATION**

- Systems sustaining missions, including life, microgravity, space exploration, space debris and SETI
- **A1 SPACE LIFE SCIENCES SYMPOSIUM**
- **A2 MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM**
- **A3 IAA SPACE EXPLORATION SYMPOSIUM**
- **A4 46TH IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) - THE NEXT STEPS**
- **A5 20TH IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM**
- **A6 13TH IAA SYMPOSIUM ON SPACE DEBRIS**
- **A7 SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS**

Category coordinated by Maria Antonietta Perino, Thales Alenia Space Italy, Italy

**A1 SPACE LIFE SCIENCES SYMPOSIUM**

This symposium is jointly organised by the International Academy of Astronautics (IAA) and the International Astronautical Federation (IAF) and addresses all aspects of space life sciences research and practice in human and robotic spaceflight, from low Earth orbit (LEO) to the universe itself, and from the Big Bang to the lives of future explorers on other planets of our solar system.

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

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

**Chairmen**

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**A1.2 Human Physiology in Space**

This session focuses on physiological effects of short and long-duration spaceflight, and how these effects affect general health. Research into inflammation (countermeasures) of space exposure is also included.

**Chairmen**

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**A1.3 Medical Care for Humans in Space**

This session focuses on medical care for astronauts including operational medicine aspects, countermeasures development and applications as well as needs for future care. It addresses medicine during space missions, on the Moon and Mars, and in the future. It will also focus on medical care for passengers and operators of commercial suborbital and orbital space flights.
Science Results from Ground Based Research

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

**A2.4**

**Co-Chairs**
- Antik Udvardi
- Valentina Shvirenova

**Rapporteurs**
- Nestor N. Sinyov
- Maxim Serov

**Facilities and Operations of Microgravity Experiments**

This session is devoted to new developments, new instruments definition and concepts for the future, ground and flight operations (balloons, rockets, satellites, hardware & software).

**A2.5**

**Co-Chairs**
- Global Panel
- Toshihiko Matsuoka

**Rapporteurs**
- Satoshi Matsumoto

**Microgravity Sciences Onboard the International Space Station and Beyond - Part 1**

Anomalies at the presentation of results from large orbital platforms, in particular the ISS, as well as preparatory scenarios for further long-term flight opportunities, this session includes descriptions and performance of ground and in-orbit infrastructures.

**A2.6**

**Co-Chairs**
- Bernard Zappei

**Rapporteurs**
- Angelika Stiefke

**Microgravity Sciences Onboard the International Space Station and Beyond - Part 2**

Anomalies at the presentation of results from large orbital platforms, in particular the ISS, as well as preparatory scenarios for further long-term flight opportunities, this session includes descriptions and performance of ground and in-orbit infrastructures.

**A2.7**

**Co-Chairs**
- Angelo Zeffirelli

**Rapporteurs**
- Gabriele Pettinari

**Interactive Presentations**

Authors with an abstract accepted for an interactive presentation will be asked to prepare slides and display them for the duration of the congress on plasma screens. Authors will be assigned to interactive sessions in which they must be near the plasma screens to engage in interactive discussions with other congress attendees.

**A2.1P**

**Co-Chairs**
- Global Panel
- Centre National d’Études Spatiales (CNES) — FRANCE

**Rapporteurs**
- Cyril Huchon

**SPACE EXPLORATION SYMPOSIUM**

This symposium covers the current and future robotic missions and material plans for initiatives in the exploration of the Solar System.

**A3.1**

**Co-Chairs**
- Christian Schallenger

**Rapporteurs**
- Nils Breloer

**Moon Exploration - Part 1**

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

**A3.2A**

**Co-Chairs**
- Bernard Naging

**Rapporteurs**
- Nils Breloer

**Fluid and Materials Sciences**

The main focus of the session is on the performance of research facilities and materials science, microgravity and microgravity-related tests and also microgravity and microgravity-related experiments, including experimental design, numerical simulations, and results of microgravity laboratory and space experiments.

**A2.2**

**Co-Chairs**
- Norbert Frischauf

**Rapporteurs**
- Robert Schiemenz

**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 aircraft, sounding rockets and capsules.

**A2.3**

**Co-Chairs**
- Peter Hämmerle

**Rapporteurs**
- Michel Scepi
A3.2C  
**Moon Exploration – Part 3**  
This session will address recent and future lunar missions. The session will address orbital missions, robotic surface missions, as well as its link to the Moon, resource utilization and preparatory activities for future solar system exploration.

**Chair**  
Rohit Prasad

**Rapporteur**  
Sahar A. Asad

A3.3A  
**Mars Exploration – missions current and future**  
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.

**Chair**  
Pierro W. Beausport

**Rapporteur**  
Vincenzino Gaggi

A3.3B  
**Mars Exploration – Science, Instruments and Technologies**  
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 science, instruments and technologies for Mars missions including expected experiments. Papers on any aspects of the search for evidence or extinct Martian life, and forward and backward contamination are particularly welcome.

**Chair**  
Pierro W. Beausport

**Rapporteur**  
Vincenzino Gaggi

A3.4  
**Small Bodies Missions and Technologies**  
This session will present the scientific and technological aspects related to the exploration of small bodies including a search for life-like signatures.

**Chair**  
Yoshiki Uesugi

**Rapporteur**  
Nobuyuki Okada

A3.5  
**Solar System Exploration**  
This session covers robotic missions for Solar system exploration (minor and outer planets and their moons, and space plasma physics) except the Earth, Moon, Mars, and small bodies discussed in other sessions of this symposium. Papers covering both new mission concepts as well as the associated specific technologies are invited.

**Chair**  
Junichi Kogauchi

**Rapporteur**  
Stephan GIORDANO

A3.6  
**Interactive Presentations**  
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**Chair**  
Christian Sallabarger

**Rapporteur**  
Hempsell Astronautics Limited

A4  
**SETI: SETI Science and Technology**  
All technical aspects involved in the search for extraterrestrial intelligence, including current and future search strategies.

**Chair**  
Ian Morrison

**Rapporteur**  
University of California / ASTRON / Radboud University — THE NETHERLANDS
A6.1 Measurements
This session will address advanced ground and space-based measurement techniques, related processing methods, and results characterization of orbital and physical properties of space debris.
Co-Chairs
Frank De Benton
Intelligence Operations Incorporated [HAP] — UNITED STATES
Rapporteur
Thomas Schleicher
Astrophysical Institute, University of Heidelberg [D] / Max-Planck Institute for Astronomy [D] — GERMANY
A6.2 Modelling and Risk Analysis
This session will address the characterisation of the current and future debris population and methods for in-situ and ex-situ assessments. The aim of this analysis will cover collision risk estimates based on statistical population models and determines catalogues, and active avoidance strategies.
Co-Chairs
Carmina Paudel
STI-ON — ITALY
Rapporteur
Daniel Brugues
Analytical Graphics, Inc. — UNITED STATES
Marianne Barge
— UNITED STATES
A6.3 Hypervelocity Impacts and Protection
This session will address passive protections, shielding and damage predictions. Shielding aspects will be supported by experimental and computational results of HW tests, use of HW techniques for debris mitigation.
Co-Chairs
Frank Schaffer
HarvardSmithsonian Center for Astrophysics, Earth and Atmosphere (D) — GERMANY
Rapporteur
Norman Fitz-Goy
University of Toronto — UNITED STATES
Alexandre Neuvouard
University of Pennsylvania — UNITED STATES
— ITALY
A6.4 Mitigation and Standards
This session will address proactive actions such as prevention and reduction measures and vehicle passive protection. The session will also address space debris mitigation guidelines and standards that exist already or are in preparation at the national or international level.
Co-Chairs
Christian Carau
Center National d'Etudes Spatiales (CNES) — FRANCE
Rapporteur
David Feldkraun
International Academy of Astronautics — UNITED STATES
Holger Börg
Planetary Space Agency (ESA) — GERMANY
A6.5 Space Debris Removal Issues
This session will address active retrieval techniques “ground and space based” and identify implementation difficulties and maturity of proposed technologies.
Co-Chairs
Fabio Santini
University of Rome “la Sapienza” — ITALY
Rapporteur
Fabrizio Bregolin
University of Rome “la Sapienza” — ITALY
Benjamin Barbo-Vega
National Aeronautics and Space Administration (NASA) — GERMANY
A6.6 Space Debris Removal Concepts
This session will address active retrieval techniques “ground and space based”, review potential solutions and identify implementation difficulties.
Co-Chairs
Luisa Invernizzi
European Space Agency (ESA) — ITALY
Rapporteur
Nicolas Brinon
Office National d’Etudes et de Recherches Aérospatiales (ONERA) — FRANCE
Gerth Hauksson
GMS-Aerospace AG — GERMANY
A6.7 Operations in Space Debris Environment, Situational Awareness
This session will address the multiple aspects associated to safe operations in space dealing with space debris, including operational assessment from observations, catalogue build-up and maintenance, data aggregation from different sources, relevant data exchange standards and cooperation analysis.
Co-Chairs
Jean Carlos Codieche Perez
Center National d’Etudes Spatiales (CNES) — FRANCE
Rapporteur
T.L. Kelly
Center for Space Standards and Innovation — UNITED STATES
Caroline Wendenauer
Technische Universität Braunschweig — GERMANY
A6.8 (Joint session with Space Security Committee) Mitigation and Removal
This session will deal with the non-technical aspects of space debris detection, mitigation and removal. Policy, legal and institutional bodies, economic issues including insurance, financial incentives and funding for space debris mitigation and removal. The role of international cooperation in these issues will be considered.
Co-Chairs
Sege Plantard
European Space Policy Institute (EUI) — AUSTRIA
Rapporteur
Alexander Saurau
Austrian Space Forum — AUSTRIA
Dennis Mühlhager
International Atomic Energy Agency [IAEA] — UNITED STATES
A6.9 Orbit Determination and Propagation
This session will address aspects of space debris orbit determination related to assessment of raw and derived data accuracy, operational measurements processing and modelling and risk analyses of space debris.
Co-Chairs
Hervé Monnet
European Space Agency (ESA) — GERMANY
Rapporteur
Moritz Livi
de Urquhart Laboratory (S) — UNITED STATES
Rogier Leus
University of Strathclyde — UNITED KINGDOM
A6.1P Interactive Presentations
Audience with an audience environment for an interactive session will be invited to present slides and display their work for the discussion on the issues on space mission on plasma screens. Audience will be assigned to interactive sessions in which they will be near the plasma screens to engage in interactive discussions with other congress attendees.
Co-Chairs
Christopher Rowan
Centre National d’Etudes Spatiales (CNES) — FRANCE
Rapporteur
Davide Minghetti
International Atomic Energy Agency [IAEA] — UNITED STATES
Tetsuo Yasaka
QPS institute — JAPAN
A7 SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS
This symposium will cover advances from the space-based science, industry and space agencies community and share information, insights, and planning for future space missions in exoplanets, astrometry, space physics, fundamentals physics, and outer solar-system planetary science. The symposium will comprise both invited talks and contributed papers in these areas of intense interest, linked to the Symposium’s dedication of advancing the field with new and relevant technologies, including significant progress made by industry and research laboratories; mission concepts to implement such investigations, and corporate and space agency strategies to prioritise and leverage them into reality.
Co-Chairs
Jakob van Elt
National Aeronautics and Space Administration (NASA) — UNITED STATES
Rapporteur
A7.1 Space Agency Strategies and Plans
This first session includes invited talks by international space-agency division directors about their long-term views, priorities, and plans to implement developments and missions for the next five decades, and beyond. The presentation will focus on the science case for the new missions and the science goals and drivers of the space agencies to implement them.
Co-Chairs
Rajab van Elt
National Aeronautics and Space Administration (NASA) — UNITED STATES
Rapporteur
A7.2 Science Goals and Drivers for Future Exoplanet, Space Astronomy, Physics, and Outer Solar System Science Missions
This second session includes invited contributions on the science case for the new missions and the science goals and drivers of the space agencies to implement them.
Co-Chairs
Eric West
ESA — THE NETHERLANDS
Rapporteur
A7.3 Technology Needs for Future Missions, Systems, and Instruments
This third session includes invited talks about the technology challenges and plans required to realize breakthrough science objectives in exoplanet detection and characterization, astrometry through the electromagnetic spectrum and using gravitational waves, space physics including terrestrial gravity regimes and heliophysics, fundamentals physics including relativity, and outer solar system planetary science including gas giants, ice giants, complex planetary systems, primordial body populations, and even worlds. Topics focus includes measurement techniques, data types, performance requirements, instrument designs, mission concepts and systems, and associated technology developments.
Co-Chairs
Eric West
ESA — THE NETHERLANDS
Rapporteur
Brent Sherwood
NASA — UNITED STATES
A8 SYMPOSIUM ON INTEGRATED APPLICATIONS
The Symposium invites leaders from the science, space industry, and space-agencies community to share information, insights, and planning for future space missions in exoplanets, astrometry, space physics, fundamentals physics, and outer solar-system planetary science. The symposium will comprise both invited talks and contributed papers in these areas of intense interest, linked to the Symposium’s dedication of advancing the field with new and relevant technologies, including significant progress made by industry and research laboratories; mission concepts to implement such investigations, and corporate and space agency strategies to prioritise and leverage them into reality.
A8.1 OPERATIONS AND APPLICATIONS
Ongoing and future operational applications, including Earth observation, communication, navigation, human space endeavours and small satellites
B1 EARTH OBSERVATION SYMPOSIUM
This symposium will cover advances from the space-based science, industry and space agencies community and share information, insights, and planning for future space missions in exoplanets, astrometry, space physics, fundamentals physics, and outer solar-system planetary science. The symposium will comprise both invited talks and contributed papers in these areas of intense interest, linked to the Symposium’s dedication of advancing the field with new and relevant technologies, including significant progress made by industry and research laboratories; mission concepts to implement such investigations, and corporate and space agency strategies to prioritise and leverage them into reality.
Co-Chairs
Andrew Court
German Aerospace Center (DLR) — GERMANY
Günther Gernsbacher
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — GERMANY
B1.1 International Cooperation in Earth Observation Missions
Focusing on efforts made by different space agencies and societies to identify new and emerging opportunities, participating countries are encouraged to present their efforts and experiences on how they engage in international cooperation in space-based earth observation. Missions are encouraged which involve active engagement with developing countries. Reports on current and ongoing missions involving participation, cooperation and coordination are also encouraged.
Co-Chairs
John Hummel
European Union — UNITED STATES
Piero Ranell
ESA — GERMANY
Bruce Seidel
National Oceanic and Atmospheric Administration (NOAA) — UNITED STATES
B1.2 Future Earth Observation Systems
Earth observation systems are increasingly elaborating new concepts and operational approaches to implement them. These new concepts and operational approaches are encouraged.
Co-Chairs
Jason Davis
Center for Space Policy and international Relations (CSPI) — GERMANY
Rapporteur
Mike Smith
Integrity Applications Incorporated (IAI) — GERMANY
Gunter Schreier
European Space Agency (ESA) — GERMANY
**B1.3 Earth Observation Sensors and Technology**
Focus on sensors now being developed for in-situ and remote sensing of Earth observation. Particular emphasis is on new sensors, technologies, instruments or techniques that can provide either new measurements or improved data for science, operational or commercial applications.

**Chair**
- Andreia Court
- Thijs van der Holst
- Ralf Gierull
- Fusheng Ou

**Co-Chairs**
- John Salter
- Aaron Samarin
- Guenter Schreier
- James G. Goforth
- Nooy
- Michael McLaughlin
- Paul German
- Giovanni B. Palmerini
- B.1.6 Big Data, Data Cubes and new platforms to exploit large-scale, multi-temporal EO Data

**Chair**
- Ralf Gierull

**Co-Chairs**
- Lennart Bossert
- Brian A. Muehlmann
- Marko Wiesmann
- Ralf Harder

**B2 SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM**
This symposium examines development in technology, applications and systems as they relate to fixed and mobile communication services, satellite broadcasting, position determination, navigation and timing, and interactive multimedia provisioning.

**Chair**
- Dietrich Otto

**Co-Chairs**
- Djamal Ben Romdhane
- A. Palma
- Ralf Kopp
- Ralf Harder

**B2.1 Advanced Space Communications and Navigation Systems**
Advanced transfer, broadcast and navigation systems, including their architectures, infrastructure and applications are presented.

**Chair**
- Andreia Court

**Co-Chairs**
- Robert Baldwin
- Michael McLaughlin
- S. Schvartz
- Peter Bich

**B2.2 Fixed and Broadcast Communications**
Advances in fixed and broadcast satellite systems will be presented including its use in advanced multi-band high-throughput systems, VSATs and video/broadband direct users applications.

**Chair**
- Andrew Sheats

**Co-Chairs**
- Avinash Srinivasan
- Gary L. Witbeck
- Robert Edelstein
- Carlo Mirra

**B2.3 Mobile Satellite Communications and Navigation Technology**
New and emerging technologies for land mobile, aeronautical and maritime applications (covering different frequency bands), for personal satellite communications and for navigation will be presented.

**Chair**
- Ahmad I..removeAttribute()

**Co-Chairs**
- P. A. Aboul Enein
- Laura Farnes

**B2.4 Satellite Services**
The communication, broadcast and navigation services from satellites are used to provide services to users. Advanced services and applications will be presented including global internet, datacom, autonomous navigation and aeronautical as well as inter-satellite.

**Chair**
- Ettore Maria Pizzi

**Co-Chairs**
- H. Brugger-Martens
- R. A. Wrulich
- O. P. Vezzani

**B2.5 Space-Based Navigation Systems and Services**
New and emerging systems for satellite-based position, navigation and timing will be presented, including new user applications.

**Chair**
- Kristian Pauli

**Co-Chairs**
- M. Lickish
- N. P. De Paula
- D. Sokolich
- M. N. Smith

**B2.6 Near-Earth and Interplanetary Communications**
Systems with relative motion between space and ground systems, or both near-earth and interplanetary environments, will be discussed with particular emphasis on unique characteristics, technologies and techniques.

**Chair**
- Jianliang Wu

**Co-Chairs**
- J. Anderson
- X. Qian
- E. Deuker
- R. Amekrane

**B2.7 Advanced Technologies for Space Communications and Navigation**
Proposed and built technologies for space communications, navigation and data relay systems will be presented, as applied to both meshing and future systems. The technologies discussed in this session cover the entire scope of topics applicable to micro- and nano-structures and constellation, all up to the threshold for high throughput satellites.

**Chair**
- Edward W. Arthur

**Co-Chairs**
- Robert D. Briskman
- Desaraju Venugopal
- G. B. Bacsardi

**B3 HUMAN SPACEFLIGHT SYMPOSIUM**
The presentation addresses all practical aspects of human spaceflight including the design, development, operation, utilisation and future plans of space missions involving humans. The scope covers actual past, present and future space missions and programmes in all and beyond both governmental and private.

**Chair**
- Panagiotis G. Farmakis

**Co-Chairs**
- Elena Velkina
- K. K. Sayre

**B3.1 Commercial Human Spaceflight Programs (Overview)**
The session provides the forum for "the business" presentations on present and evolving governmental human spaceflight programmes. This session will include the latest status of projects, including the status of the Spaceport America project in New Mexico, including the Chinese National space station programme, including the status of emerging nations' manned spaceflight programmes, including concepts (i.e. ISSP), commercial and governmental space missions and programs are also the sessions.

**Chair**
- Michela Mola

**Co-Chairs**
- K. Shoup
- E. G. Makri

**B3.2 Commercial Human Spaceflight Programs**
The session provides a forum for papers describing commercial human orbital and sub-orbital spacecraft and stations in development, as well as human rated launch vehicles and human-rated payloads. Topics include the status of development, testing, and operations, the architecture and performance of human space stations, launch infrastructure development, and other pertinent areas of commercial human spaceflight development. Participating organisations such as Airis, Ave, B-Flight, ESTSL, Egeco, Echasse Charig, Targex, Finalon, Luns, New Space, Legislators, Specialists, Spacelines, Whitespace, etc., are eligible to present.

**Chair**
- Michael H. White

**Co-Chairs**
- R. C. W. Leishman
- J. H. Cameron

**B3.3 Utilization & Exploitation of Human Spaceflight Systems**
This session addresses key challenges and their solutions related to the human spaceflight systems, and the areas where human flight and robotic systems and other topics include operational problems and solutions, cost reduction, new and proposed ground facilities or infrastructure, and ground segment operations and planning. Also included are logistics and mission planning, ground transportation, and control.

**Chair**
- Christian Koenig

**Co-Chairs**
- A. P. Lin
- R. A. Wieczorek

**B3.4 Flight & Ground Operations of HSPSs – Joint Session of the Human Spaceflight and Space Operations**
This session addresses key challenges and their solutions related to flight and ground operations. Topics include operational problems and solutions, cost reduction, new and proposed ground facilities or infrastructure, and ground segment operations and planning. Also included are logistics and mission planning, ground transportation, and control.

**Chair**
- vegetables

**Co-Chairs**
- D. Sokolich
- M. N. Smith

**B3.5 Space-Based Navigation Systems and Services**
New and emerging systems for satellite-based position, navigation and timing will be presented, including new user applications.

**Chair**
- Kristian Pauli

**Co-Chairs**
- M. Lickish
- N. P. De Paula
- D. Sokolich
- M. N. Smith
**B3.5** 
**Astronaut Training, Accommodation, and Operations in Space** 
This session concentrates on all aspects of spaceflight that are unique to the presence of astronauts. It encompasses astronaut activities such as selection, training, workblock management, and task division between flight and ground segments. It includes spacecraft and robotic interfaces; international command, control and communications, propulsion, medical, and utilization. It addresses the unique spaceflight systems required to support affordable astronaut missions during interplanetary and interstellar activities. The session includes astronaut performance, missions, and past mission support of technical and scientific based research and evaluation of human space complexes and the space environment.

**Co-Chairs**
- Alex S. McLean
- STEVE WILKINS (UNITED STATES)

**Rapporteur**
- Thomas Pischinger
  - Japan Aerospace Exploration Agency
  - JAXA (JAPAN — EUROPEAN SPACE AGENCY)

**B3.6** 
**Human and Robotic Partnerships in Exploration - Joint session of the Human Spaceflight and Exploration Symposia** 
This session seeks papers on new systems and technologies for current human spaceflight and exploration programs, and the role of humans and robotic partners in areas such as robotic technology development, habitat infrastructure support, human safety support systems (i.e. mobility, safety, space suits, and robotic pre-assigned activities) and robotic pre-assigned activities for human spaceflight to test, validate, and demonstrate systems. This session also welcomes papers considering how the role of humans, robotic and intelligent systems are likely to evolve in the coming years and the corresponding impact on complex mission design, implementation, and operations.

**Co-Chairs**
- Christian Kalb
  - Canadarm Space Corporation
  - CANADA
- M. Merc不多
  - innovative technologies Ltd
  - AUSTRALIA

**Rapporteur**
- Jürgen Schütz
  - Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) (GERMANY)

**B3.7** 
**Advanced Systems, Technologies, and Innovations for Human Spaceflight** 
This session is designed to examine and identify the potential evolution of key elements of human spaceflight missions, especially those driven by advanced technologies and innovations. Papers are solicited addressing how to shape the future of human, robotic and intelligent systems through cross-disciplinary technological development and implementation. The objective is to improve human space missions that involves the collaboration of government, commercial, scientific, industrial, and educational bodies. The session seeks to engage the presentation and discussion of human spaceflight to future missions.

**Co-Chairs**
- César Sekula
  - Centre National d’Études Spatiales (CNES) (FRANCE)
- Marco Bonaldi
  - European Space Agency (ESA)

**Rapporteur**
- Gilles Chatelet
  - Canadian Space Research Institute – KENYA

**B3.8** 
**Joint IAF-ISSL Session on the Legal Framework for Collaborative Space Activities**

**GT.2**

**Human Spaceflight Global Technical Session**

**B3.1**

**Interactive Presentations**

**B4.2**

**Small Space Science Missions**

This session will address the current and near-term approved small/micro/nano missions whose objective is to achieve returns in the fields of Earth science, solar, interplanetary, planetary, astrophysics/telescopes, and fundamentals physical. Emphasis will be given to new technologies and concepts, and novel management techniques.

**Co-Chairs**
- Larry Pender
  - JPL/Caltech
  - Radiance Technologies, Inc.
- Sharman Kenigs
  - The Johns Hopkins University Applied Physics Laboratory

**B4.3**

**Small Satellite Operations**

This session covers the planning, building, and execution of cost-effective approaches for small satellite operations, with emphasis on new missions with new models of operations to reduce launch costs and enhance the cost impact of mission extensions. Papers addressing innovation, an enterprise/entrepreneurial approach to new business opportunities, novel finance and business models, management techniques, and international cooperation in support of small satellite missions are particularly encouraged. Satellite technology development efforts that make use of innovative launch opportunities, such as the developing space tourism market and commercial launch capability, hold potential for low-cost access to space for mission operators. This is an important consideration to ensure that space technology research and development is not limited to sovereign governments but can be considered as a valid and essential area for space exploration and development.

**Co-Chairs**
- António Harring
  - University of Technology — GERMANY
- Helge Möller
  - DST — UNITED KINGDOM

**Nectarios Gavrielides**

**B4.4**

**Small Earth Observation Missions**

We solicit papers that present information to decision-makers, scientists, engineers, and managers about cost-effective small satellites missions, technologies, and designs of current and planned future and near-earth missions. This session addresses the technologies, applications and missions achieved through the use of small, cost-effective satellites to access and near-earth and space. Innovative cost-effective solutions to the needs of the science and applications communities are sought. Technologies suitable for use on small satellites including those in the space environment are particularly encouraged. Satellite technology development efforts that make use of innovative launch opportunities, such as the developing space tourism market and commercial launch capability, hold potential for low-cost access to space for small satellite mission operators. Also considered are small satellite and nano-satellite missions to be launched (next 3 years).

**Co-Chairs**
- Anna Ferré
  - European Space Agency (ESA)
- Lionel Suchet
  - CNES

**B4.5**

**Access to Space for Small Satellites**

A key challenge facing the viability and growth of the small satellite community is affordable and reliable space access. Topics of interest for this session include utilization of dedicated launches, development of rideshare systems, auxiliary payload systems, and expansion integration opportunities that will enable efficient small satellite access. Authors from companies and organizations that have small satellite operations will be welcomed. For papers with a focus on small satellite propulsion systems, please refer to session B4.6. For a discussion of small launchers concepts and operations, please refer to session B4.7.

**Co-Chairs**
- Alex de silva Corton
  - Surrey Satellite Technology Ltd (SSTL) — UK
- Philippe Dassais
  - Avenue Space

**Rapporteur**
- Bob Heywood
  - The Aerospace Corporation

**B4.5A**

**Joint Session between IAA and IAF for Small Satellite Propulsion Systems**

This session will cover small propulsion technologies and systems and their application to future missions. The session will be held jointly with IAA and will feature state-of-the-art developments in small satellite propulsion systems, including a focus on new propulsion system designs and technologies, and the challenges and opportunities for the development of these propulsive systems.

**Chair**
- Jian Liu
  - University of Science and Technology of China

**Rapporteur**
- Ichiro Tsuda
  - Tokyo Institute of Technology (TIT) (JAPAN)

**B4.6**

**Generic Technologies for Nano/Micro Platforms**

This session aims to encourage and promote generic technologies for small and micro platforms. Real-life examples are particularly encouraged, both recently launched and shortly to be launched (next 3 years).

**Co-Chairs**
- Kenji Komoro
  - Arakawa Advanced Technology Co., Ltd
- Dean Neikirk
  - The Aerospace Corporation

**Rapporteur**
- Yi-Fu Jia
  - The Aerospace Corporation

**B4.6A**

**Generic Technologies for Nano/Pluto Platforms**

This session encourages and promotes generic technologies for new and existing platforms. Real-life examples are particularly encouraged, both recently launched and shortly to be launched (next 3 years).

**Co-Chairs**
- Janet Kleck
  - Arakis Aviation and Space Netherlands
- Jérôme Segré
  - Thales Alenia Space (FRANCE)

**Rapporteur**
- Andy York
  - University of St Andrews (UK)

**Highly Integrated Distributed Systems**

Small satellites offer important advantages for creating "new opportunities for integrated sensor systems. In this session we focus on the new, emerging, enabling technologies that can be used in order to be used in a wide variety of space applications and to provide a wide range of benefits to the human population. This session will bring together experts from both the space and terrestrial communities to discuss the latest advances in highly integrated distributed systems. The session will focus on the development of new technologies that enable the integration of multiple sensor systems into a single, highly integrated system. This will include the development of hardware and software architectures that enable the seamless integration of multiple sensor systems into a single, highly integrated system. The session will also focus on the development of new technologies that enable the integration of multiple sensor systems into a single, highly integrated system. This will include the development of hardware and software architectures that enable the seamless integration of multiple sensor systems into a single, highly integrated system. This will include the development of hardware and software architectures that enable the seamless integration of multiple sensor systems into a single, highly integrated system. This will include the development of hardware and software architectures that enable the seamless integration of multiple sensor systems into a single, highly integrated system. This will include the development of hardware and software architectures that enable the seamless integration of multiple sensor systems into a single, highly integrated system. This will include the development of hardware and software architectures that enable the seamless integration of multiple sensor systems into a single, highly integrated system. This session will be held jointly with IAA and will cover a wide range of topics, including the development of highly integrated distributed systems for space and terrestrial applications. This session will also include a focus on the latest advances in highly integrated distributed systems for space and terrestrial applications. This session will cover a wide range of topics, including the development of highly integrated distributed systems for space and terrestrial applications. This session will also include a focus on the latest advances in highly integrated distributed systems for space and terrestrial applications.

**Co-Chairs**
- Michele Scala
  - Università Cattolica del Sacro Cuore
- Reiner Sandau
  - International Academy of Astronautics (IAG)

**Rapporteur**
- Doug Smith

This session includes commercial and new space operators, and informed advanced concepts and tools for operating new types of missions in quality and quantity, and reducing costs in both commercial and governmental space enterprises.

Co-Chairs

Piero Isola
Centre National d’Études Spatiales (CNES) — FRANCE

Johann Dittmann
Airbus Defence and Space — GERMANY

Rapporteurs

Lars Frohm
European Space Agency (ESA) — GERMANY

B6.2.1 Mission Operations, Validation, Simulation and Training

This session controls and monitors types of operations, from preparation through validation, simulation and training, including operations execution and lessons learned. It included concepts, methods and tools, as well as experience gained.

Co-Chairs

Paula Reis
European Space Agency (ESA) — GERMANY

Zina Monner
Teleports (London) Deutschland GmbH — GERMANY

Rapporteurs

Theresa Ettlich
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — GERMANY

B6.6 Spaceflight Operations Global Technical Session

This session focuses on thematic issues connected with its Space Operations Committee and the Workforce Development/Young Professionals Program Committee. The focus targets for flight control operations centered on multiple international organizations with objectives of sharing best practices, lessons learned, and issues.

Co-Chairs

Ahmed Farid
Canadian Space Agency — CANADA

Rapporteurs

Katharina Brandin
Japanese Space Exploration Agency (JAXA) — JAPAN


This session addresses key strategies and their evaluation related to flight and ground operations in governmental and commercial human spaceflight, their systems and elements. Topics include operational problems and solutions, cost reduction, new and improved ground facilities or infrastructure, and ground segment operations and planning. Also included are logistics and mission planning, ground transportation, and containment.

Co-Chairs

Dorte Skals
Universitet for Luft- og Raumfart (UoL) –v. (DLR) — GERMANY

Helmut Lotterbusch
Airbus Defence and Space – Space Systems — GERMANY

Rapporteurs

Robert Asher
University of Alberta — CANADA

B6.6.1.1 Interactive Presentations

Each and every abstract accepted for an interactive presentation will be asked to prepare slides and display them for the duration of the congress on plasma screens. Authors will be expected to introduce their session in which they must be near the plasma screen to engage in interactive discussions with other congress attendees.

Co-Chairs

John Auburn
Conference Chair – IAC

Piero Isola
Canadian Space Agency – CANADA

B6.8 Small Satellite Missions Global Technical Session

This session focuses on small satellite missions (SST) is a collaboration between the International Academy of Astronautics (IAA) Small Satellite Missions Symposium and the International Astronautical Federation (IAF) WorldSpace Development Young Professionals Programme Committee. This session is unique in that it allows for sharing of information on a global scale with preciousness and audience both at SST vision and online at their headquarters/academic locations. Authors are welcome regarding operation missions or innovative proposals for small satellite missions and related topics. Those have not a certain relevance on an international scale or as a business level, and must also provide young professionals of what the space sector has to offer. Where possible, abstracts should have a wide relevance in the community and should include transformative knowledge or lessons learned. Abstracts highlighting ingenuity or innovation are preferred. Examples include space missions utilizing small satellites that address specific, scientific or commercial challenges, or novel technologies that have the potential to revolutionize space missions and/or advance access to space. Papers are to describe the specific need, the small spacecraft approach that addresses the need, the benefits of this approach and the use of the technology, and demonstrate how other innovation approaches provide inferior solutions. Papers from or delivered by young professional communities are preferred. The session will be accepting submissions for oral presentations only.

Co-Chairs

Thales Alenia Space France — ITALY

Rene Laufer
Airbus Defence and Space – Space Systems — GERMANY

Rapporteurs

Thierry Mercolini
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — GERMANY

B8 SYMPOSIUM ON INTEGRATED APPLICATIONS

Space systems are more and more involved in the delivery of global utilitarian services to end-users. The concept of Integrated Applications encompasses the simultaneous use of many different space systems to provide a wide range of services. This session brings together various aspects of integrated applications. Integrated applications combine different space systems (Earth observation, navigation, telecommunications, etc.) with on-board and ground-based systems to deliver solutions to local, national and global needs. It explores the synergies between different data sources to provide the right information at the right time for the right user on an effective manner and deliver the data to users in a ready-to-use format. 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 to the session B6.4. If such issues related to the integrated sensor systems featuring for instance cross-platform compatibility please direct contributions to session B7.1.

Co-Chairs

Annemarie Gómez
European Space Agency (ESA) — THE NETHERLANDS

Larry Paikos
The Johns Hopkins University Applied Physics Laboratory – USA

Rapporteurs

C4 SPACE PROPULSION SYMPOSIUM

C3 SPACE POWER SYMPOSIUM

C2 MATERIALS AND STRUCTURES SYMPOSIUM

C1 ASTRODYNAMICS SYMPOSIUM

C4 SPACE PROPULSION SYMPOSIUM

Category coordinated by Li Ming, China Academy of Space Technology (CAST), China

85.1 Tools and Technology in Support of Integrated Applications

The session will focus on specific topics and technology in support of integrated applications and address the various issues associated with the design of space and ground systems, the kind of data they collect, how they collectively see, and how the data are integrated and distributed to address key user needs. Possible topics include: ground-based data distribution and access, new ways of distributing integrated information, tools for visualization and simulation tools, especially those that support integrated applications, reorientation and autonomy for integrated systems, etc.

Co-Chairs

Carsten Tolkens
European Space Agency (ESA) — THE NETHERLANDS

Larry Paikos
The Johns Hopkins University Applied Physics Laboratory – USA

Rapporteurs

David E. Kaulukukuk
The Johns Hopkins University Applied Physics Laboratory – USA

B6 SPACE OPERATIONS SYMPOSIUM

This session focuses on all aspects of spaceflight operations unique to human spaceflight. Papers may address any phase in the mission lifecycle including concept development, mission planning, ground operations, ascent, arrival, on-orbit and distress operations, and mission post-exercise.

Co-Chairs

John Auburn
Conference Chair – IAC

Piero Isola
Canadian Space Agency – CANADA

Rapporteurs

Maria Corradini
Thales Alenia Space France — ITALY

Michael Malkey
European Space Agency (ESA) — GERMANY

B6.1.1 Human Spaceflight Operations

This session focuses on all aspects of operations unique to human spaceflight. Papers may address any phase in the mission lifecycle including concept development, mission planning, ground operations, ascent, arrival, on-orbit and distress operations, and mission post-exercise.

Co-Chairs

Michelle Ogilvie
University of Texas — United States

Hao-Chi Chang
National Aeronautics and Space Administration (NASA)/Goddard Space Flight Center — UNITED STATES

Rapporteurs

Shinji Hokamoto
Keldysh Institute of Applied Mathematics, RAS

Anna Guerman
University of Rome “La Sapienza” — ITALY

Paolo Teofilatto
University of Rome “La Sapienza” — ITALY

John Auburn
Centre for Mechanical and Aerospace Science and Engineering (UMIST) — UNITED Kingdom

Gianmarco Radice
University of Rome “La Sapienza” — ITALY

Andrea Boyd
Australian National University — AUSTRALIA

Hao-Chi Chang
National Aeronautics and Space Administration (NASA)/Goddard Space Flight Center — UNITED STATES

Josef Skals
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — GERMANY

Ahmed Farid
Canadian Space Agency — CANADA

15th IAC Satellite Missions Symposium

Category coordinated by GTS.5

B6.4.1 Spaceflight Operations Global Technical Session

This session is a technical session co-sponsored by the Space Operations Committee and the Workforce Development/Young Professionals Program Committee. The focus targets for flight control operations centered on multiple international organizations with objectives of sharing best practices, lessons learned, and issues.

Co-Chairs

Dorte Skals
Universitet for Luft- og Raumfart (UoL) –v. (DLR) — GERMANY

Rapporteurs

Helmut Lotterbusch
Airbus Defence and Space – Space Systems — GERMANY

Rapporteurs

Rene Laufer
Airbus Defence and Space – Space Systems — GERMANY

Rapporteurs

Thierry Mercolini
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — GERMANY


This session addresses key strategies and their evaluation related to flight and ground operations in governmental and commercial human spaceflight, their systems and elements. Topics include operational problems and solutions, cost reduction, new and improved ground facilities or infrastructure, and ground segment operations and planning. Also included are logistics and mission planning, ground transportation, and containment.

Co-Chairs

Dorte Skals
Universitet for Luft- og Raumfart (UoL) –v. (DLR) — GERMANY

Rapporteurs

B6.1 Integrated Applications End-to-End Solutions

The session will be a forum for multidisciplinary solutions, including case studies, proof of concept missions, and current projects that provide, or will 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 risk monitoring and management, energy, food security, space situation awareness, transportation, health, etc. The user needs, the structure of the user communities, the value chain, the business case and the sustainability of the solutions are among the many aspects that can be considered. Examples of projects with established partnerships and firm working relationships between space and non-space stakeholders.

Co-Chairs

Annemarie Gómez
European Space Agency (ESA) — THE NETHERLANDS

Nick Price
Ohio State University – UNITED STATES

Rapporteur

Vito Nicholls
Ohio State University – UNITED STATES

B6.2.1 Interactive Presentations

Each and every abstract accepted for an interactive presentation will be asked to prepare slides and display them for the duration of the congress on plasma screens. Authors will be expected to introduce their session in which they must be near the plasma screen to engage in interactive discussions with other congress attendees.

Co-Chairs
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 structures, including formation flying, rendezvous and docking.

**Co-Chairs**

**Richard Epenoy**, European Space Operations Centre — CANADA

**Kathleen Howell**, National University of Defense Technology — SPAIN

**Anton de Ruiter**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — NETHERLANDS

**Michèle Lavagna**, Institut National de Recherche en Informatique et Automatique (INRIA) — ITALY

**Co-Chairs**

**Anton de Ruiter**, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — NETHERLANDS

**Vincent Martinet**, European Space Operations Centre — CANADA

**Richard Spence**, Centre National d’Etudes Spatiales (CNES) — FRANCE

**Kian-Qin Chen**, National University of Defense Technology — CHINA

**C1.8 Orbital Dynamics (2)**

This theme presents advances in the knowledge of natural motions of objects in orbit around the Earth, planets, minor bodies, Lagrange points and more generally natural orbital dynamics of spacecraft in the solar system. It also covers advances in solar alignment.

**Co-Chairs**

**Laurence Cognie**, National Aeronautics and Space Administration (NASA) — UNITED STATES

**Sven J. Kjeldsberg**, Norwegian University of Science and Technology (NTNU) — NORWAY

**Rüdiger Gräsel**, Gürzenich-AG e. V. — GERMANY

**Joseph J. Mustard**, University of California, Davis — UNITED STATES

**C1.9 Orbital Dynamics (3)**

This theme presents advances in the knowledge of natural motions of objects in orbit around the Earth, planets, minor bodies, Lagrange points and more generally natural orbital dynamics of spacecraft in the solar system. It also covers advances in solar alignment.

**Co-Chairs**

**Richard Spence**, Centre National d’Etudes Spatiales (CNES) — FRANCE

**Kian-Qin Chen**, National University of Defense Technology — CHINA

**C1.10 Interdisciplinary Presentations**

Authors with an abstract accepted for an interactive presentation will be asked to prepare slides and display them for the duration of the congress on plasma screens. Authors will

**Co-Chairs**

**Atul Joshi**, Reliability and Mission Assurance, Orbital Sciences Corporation — UNITED STATES

**Vincent Martinet**, European Space Operations Centre — CANADA

**Kian-Qin Chen**, National University of Defense Technology — CHINA

**C1.11 68th IAC Programme Brochure**

**68th IAC International Astronautical Congress**

25 - 29 September 2017, Adelaide, Australia

**C1.12 C2.1 Space Structures I - Development and Verification (Space Vehicles and Components)**

The topic is addressed in the context of advanced materials and structures for high temperature applications in space related domains. This includes ceramic matrix composites, high efficiency energy storage wheels, MEMS and MOEMS devices.

**Co-Chairs**

**Mario Marchetti**, CNIM (Centre Nationale d’Etudes Spatiales) — FRANCE

**Maxi Echegaray**, Universidad Autónoma de Madrid — SPAIN

**Paola Gaudenzi**, University of Heidelberg — GERMANY

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

The topic is addressed in the context of advanced materials and structures for high temperature applications in space related domains. This includes ceramic matrix composites, high efficiency energy storage wheels, MEMS and MOEMS devices.

**Co-Chairs**

**Moris Morin**, University of California, Berkeley — UNITED STATES

**Oleg Afanassiev**, Universidade de São Paulo — BRAZIL

**Zijun Hu**, Tsinghua University — CHINA

**C2.3 Space Structures - Dynamics and Microdynamics**

The topic is addressed in the context of advanced materials and structures for high temperature applications in space related domains. This includes ceramic matrix composites, high efficiency energy storage wheels, MEMS and MOEMS devices.

**Co-Chairs**

**C2.4 Advanced Materials and Structures for High Temperature Applications**

The topic is addressed in the context of advanced materials and structures for high temperature applications in space related domains. This includes ceramic matrix composites, high efficiency energy storage wheels, MEMS and MOEMS devices.

**Co-Chairs**

**C2.5 Smart Materials and Adaptive Structures**

The topic is addressed in the context of advanced materials and structures for high temperature applications in space related domains. This includes ceramic matrix composites, high efficiency energy storage wheels, MEMS and MOEMS devices.

**Co-Chairs**

**C2.6 Space Vehicles – Mechanical/Thermal/Fuidic Systems**

The topic is addressed in the context of advanced materials and structures for high temperature applications in space related domains. This includes ceramic matrix composites, high efficiency energy storage wheels, MEMS and MOEMS devices.

**Co-Chairs**

**C2.7 Specialised Technologies, Including Nanotechnology**

Sponsored by the European Space Agency (ESA), the theme addresses the development and application of advanced materials and structures for high temperature applications in space related domains. This includes ceramic matrix composites, high efficiency energy storage wheels, MEMS and MOEMS devices.

**Co-Chairs**

**C2.8 Advancements in Materials Applications and Rapid Prototyping**

The topic is addressed in the context of advanced materials and structures for high temperature applications in space related domains. This includes ceramic matrix composites, high efficiency energy storage wheels, MEMS and MOEMS devices.

**Co-Chairs**
C3.1 Space-Based Solar Power Architectures / Space & Energy Concepts
This session deals with all aspects of architectures and concepts for space-based solar power plants and concepts integrating space and terrestrial energy activities. It will be structured into two half-sessions, one focusing on advances in the field of space solar power plants architectures and one on activities in the field of space & energy. Including this session within the symposium intends to create a platform for open discussions, technical and methodological exchanges on this topic and thus provides a unique common platform for discussions. Typically it will include all system-level, architectural, organizational and commercial aspects, including modeling and optimisation as well as related non-technical aspects.

Co-Chairs
John C. Mankins
ASTRIUM Information Management Solutions, LLC — UNITED STATES

Leopold Summerer
European Space Agency (ESA) — THE NETHERLANDS

Koji Tanaka
JAXA, JAPAN

Ming Li
China Academy of Space Technology (CAST) — CHINA

Rapporteur
Ming Li
China Academy of Space Technology (CAST) — CHINA

C3.2 Wireless Power Transmission Technologies, Experiments and Demonstrations
This session focuses on all aspects of wireless power transmission technologies. It covers wireless power transmission technologies, including laser, microwave-based as well as novel wireless power transmission technologies from the short-range up to very long distances over sea, surface or space as well as surface to surface. The session covers all types of conceptual, technical and organizational progress to better integrate space and terrestrial energy activities. It is the primary international forum for scientific structured in two half-sessions, one focusing on advances in the field of space solar power plant architectures and one on activities in the field of space & energy. Including this session within the symposium intends to create a platform for open discussions, technical and methodological exchanges on this topic and thus provides a unique common platform for discussions. Typically it will include all system-level, architectural, organizational and commercial aspects, including modeling and optimisation as well as related non-technical aspects.

Co-Chairs
Leopold Summerer
European Space Agency (ESA) — THE NETHERLANDS

Koji Tanaka
JAXA, JAPAN

Ming Li
China Academy of Space Technology (CAST) — CHINA

Rapporteur
Ming Li
China Academy of Space Technology (CAST) — CHINA

C3.3 Advanced Space Power Technologies and Concepts
This session covers all types of advanced space power technologies and concepts. These include technologies and concepts related to power generation (solar, nuclear, other) and power conversion systems. This session focuses on the power systems in the hundreds of watts and above, including large power systems for telecommunication and new power architectures for planetary, asteroidal and solar sample return missions up to MW-class nuclear reactor systems.

Co-Chairs
Gary Primeau Barnard
National Space Society — UNITED STATES

Lee Moses
National Aeronautics and Space Administration (NASA) Glenn Research Center — UNITED STATES

Koji Tanaka
JAXA, JAPAN

Takao Kato
Japan Space Systems (J-spacesystems) — JAPAN

Rapporteur
Rapporteur

C3.4 Small and Very Small Advanced Space Power Systems
This session is devoted to emerging energy systems for both small-class spacecraft and proposes to discuss advanced technologies for power generation. This includes various types of power electronics and power conversion systems. This session will address all aspects related to power generation technologies for small-class spacecrafts and proposes to discuss advanced technologies for power generation. This includes various types of power electronics and power conversion systems. This session will address all aspects related to power generation technologies for small-class spacecrafts. It will cover topics such as solar, nuclear, and other advanced technologies.

Co-Chairs
Mitsunori Mito
University of Tokyo — JAPAN

Shinya Mihara
Japan Space Systems (J-spacesystems) — JAPAN

Takao Kato
Japan Space Systems (J-spacesystems) — JAPAN

Rapporteur
Rapporteur

C3.5 Joint Session on Advanced and Nuclear Power and Propulsion Systems
This session is organised jointly by the Space Power and the Space Propulsion Symposium, and includes papers addressing all aspects related to nuclear power and propulsion for space applications.

Co-Chairs
Leopold Summerer
European Space Agency (ESA) — THE NETHERLANDS

Koji Tanaka
JAXA, JAPAN

Rapporteur
Rapporteur

C3.6 Interactive Presentations
Authors will have an abstract accepted for an interactive presentation will be asked to prepare slides and display them for the duration of the congress on plasma screens. Authors will be assigned to interactive sessions in which they will be near the plasma screens to engage in interactive discussions with other congress attendees.

Co-Chairs
Koji Tanaka
JAXA, JAPAN

Ming Li
China Academy of Space Technology (CAST) — CHINA

Rapporteurs
Rapporteurs

C4 SPACE PROPULSION SYMPOSIUM
This Space Propulsion Symposium addresses sub-orbital, Earth to orbit, and in-space propulsion. The general areas considered include both chemical and non-chemical rocket propulsion, air-breathing propulsion, and combined or interating and rocket systems. Specific topics include new concepts of interest in chemical, solid and hybrid rocket systems, new propellants, and various combinations of interbreathing and rocket systems and nuclear, electric, solar and other advanced rocket systems. Perspectives and trends are encompassed with component technologies, the operation and application to missions of various propulsion systems and unique propulsion test facilities.

Co-Chairs
Constantinos P. Stavrinidis
ISAS, JAXA — JAPAN

Leopold Summerer
European Space Agency (ESA) — THE NETHERLANDS

Ming Li
China Academy of Space Technology (CAST) — CHINA

Rapporteurs
Norbert Puettmann
Deutsches Zentrum für Luft- und Raumfahrt e.V. — GERMANY

Toru Shimada
Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency — JAPAN

C4.1 Propulsion System (1)
This session is dedicated to all aspects of rocket engines.

Co-Chairs
Constantinos P. Stavrinidis
ISAS, JAXA — JAPAN

Patrick Davaux
France − FRANCE

Rapporteurs
M. Badran/Debnath Mortley
NICT, JAPAN

Toru Shimada
Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency — JAPAN

C4.2 Propulsion System (2)
This session is dedicated to all aspects of electric and hybrid Propulsion.

Co-Chairs
Valerie Henry
Aerantis (Dynagen group) − FRANCE

Yoshihiro Takahashi
Japan Aerospace Exploration Agency (JAXA) − JAPAN

Rapporteurs
Yoshihiro Takahashi
Japan Aerospace Exploration Agency (JAXA) − JAPAN

C4.3 Electric Propulsion
This session is dedicated to all aspects of electric propulsion technologies, systems and applications.

Co-Chairs
Gautam M. Pande
INIA− INIA

Vanessa Vidal
Southwest Research Institute − FRANCE

Rapporteurs
Nicolaus Wigger
Norton Laboratory

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) − GERMANY

C4.5 Propulsion Technology (2)
This session includes all science and technologies supporting all aspects of space propulsion. The emphasis in this session is placed in particular on components for propulsion.

Co-Chairs
Michal Bobrowski
Aerojet Rocketdyne − UNITED STATES

Stéphane Henry
France − FRANCE

Rapporteurs
Stéphane Henry
France − FRANCE

Christophe Bonhomme
Centre National d’Etudes Spatiales (CNES) − FRANCE

C4.6 New Missions Enabled by New Propulsion Technology and Systems
This session is dedicated to recent advances in propulsion technology and systems and their applications.

Co-Chairs
Giorgio Saccoccia
European Space Agency (ESA) − THE NETHERLANDS

Jari LHeureux
Agencie Nationale de l’Espace (AN) − FRANCE

Rapporteurs
Jari LHeureux
Agencie Nationale de l’Espace (AN) − FRANCE

Mariano Andrenucci
University of Strathclyde − UNITED KINGDOM

Marta Benvenuti
RMIT University, Australia
Innovative and Visionary Space Systems Concepts

The session, sponsored jointly between the Space Power and the Space Propulsion Symposiums, includes papers addressing all aspects related to advanced and nuclear power and propulsion systems for space applications.

D1.2 Enabling Technologies for Space Systems

The session addresses current and future space systems architectures designed to make promising concepts for further orbiting or exploration missions, both manned and unmanned. These architectures and their elements and building blocks should aim at an increase in functionality, performance, efficiency and reliability of operations, while building on state-of-the-art, accepted or on-disruption technologies. The scope of the session is innovations for small satellites, micro-satellites, multiple satellite systems, such as constellations, formations, flotillas, distributed systems, and system of systems (including synergism with terrestrial systems). Ground-based space communication of kinetobility and aspects of autonomy in protected-board and on-ground, may be addressed along the session. Tentative topics include instrumentation, telecommunication, control, and sensor technologies, mission validation technologies, and ARCHITECTURE.

D1.3 Technologies to Enable Space Systems

The session will focus on the deliberate, technological developments that are necessarily high risk, but which have the potential to significantly enhance the performance and reach into new space systems. Enabling innovative technology for space applications often results from spin-offs which will be discussed during the session, together with potential spin-offs, instrumentation, telecommunication, bioscience, nanotechnology, microgravity, advanced new structures and software techniques.

D1.4 Space Systems Engineering - Methods, Processes and Tools (1)

This session will focus on state-of-the-system engineering methodologies that reduce the time and cost, and improve the quality of the space system. Of special interest are multi-disciplinary methods, processes, and tools used for system design, system technology, management, and systems engineering of space systems to improve risk management, safety, reliability, and quality of life cycle cost estimates; state of organizational structures, practice methods, processes, tools, training that benefit space system design, development and operations; state of the art systems engineering methodologies for space systems, including space system(s) of systems (SoS)

D1.4.4 Space Systems Engineering - Methods, Processes and Tools (2)

This session will focus on state-of-the-system engineering methodologies that reduce the time and cost, and improve the quality of the space system. Of special interest are multi-disciplinary methods, processes, and tools used for system design, system technology, management, and systems engineering of space systems to improve risk management, safety, reliability, and quality of life cycle cost estimates; state of organizational structures, practice methods, processes, tools, training that benefit space system design, development and operations; state of the art systems engineering methodologies for space systems, including space system(s) of systems (SoS)

D1.4.5 SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM

This session will focus on state-of-the-system engineering methodologies that reduce the time and cost, and improve the quality of the space system. Of special interest are multi-disciplinary methods, processes, and tools used for system design, system technology, management, and systems engineering of space systems to improve risk management, safety, reliability, and quality of life cycle cost estimates; state of organizational structures, practice methods, processes, tools, training that benefit space system design, development and operations; state of the art systems engineering methodologies for space systems, including space system(s) of systems (SoS)

D1.4.6 SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM

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Interactive Presentations
Authors with an abstract accepted for an interactive presentation will be asked to prepare slides and display them for the duration of the Congress on plasma screens. Authors will be assigned appropriate interactive sessions in which they must be near the plasma screens to engage in interactive discussions with other congress attendees.

Coordinators
Christos Arnaoutoglou
Centre National d’Études Spatiales (CNES) — FRANCE
Daniel L. Danko
Kettering University — UNITED STATES

Interactive Presentations D2.1P

Launch Vehicles in Service or in Development
Review of up to date status of launch vehicles currently in use or under test or under short term development.

Co-Chairs
Giorgio Tumino
European Space Agency (ESA) — ITALY
Pierrick Jagniaux
Airbus Defence & Space — UNITED STATES

D2.2 Launch Services, Missions, Operations and Facilities
Overview of launch services, co-operative mission and support facilities, including economics of space transportation systems, financing, insurance, licensing, advancements in ground infrastructure, ground operation, mission planning and mission control for both expendable and reusable launch services.

Co-Chairs
Giorgio Tumino
European Space Agency (ESA) — ITALY
Piero Gamba
Airbus Defence & Space — UNITED STATES

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.

Co-Chairs
Olivier Kacz
Airbus Defence & Space — UNITED STATES
Ugo Menniti
Airbus Defence & Space — ITALY

D2.4 Future Space Transportation Systems
Discussion of future system designs and operational concepts for both expendable and reusable vehicles for Earth to orbit transportation and exploration missions.

Co-Chairs
Clément A. Garcin
European Space Agency (ESA) — THE NETHERLANDS
Jean-François Héron
European Space Agency (ESA) — THE NETHERLANDS

D2.5 Technologies for Future Space Transportation Systems
Discussion of technologies enabling new reusable or expendable launch vehicle and in-space transportation systems. Emphasis on TRL healthcare development and verification, including ground testing and prototype testing demonstration so as to arrive at flight qualification.

Co-Chairs
Patrick W. McAllister
University of Stuttgart — GERMANY
Sybille Gantner
Observatoire de Paris — FRANCE

D2.6 Future Space Transportation Systems Verification and In-Flight Experimentation
Discussion of atmospheric, and in-space flight testing and qualification of system, sub-systems, and advanced technologies for future launch vehicles and in-space transportation systems. Emphasis is on higher TRLs in flight experiments, demonstration, qualification, and including tests and innovative technology prototype demonstrations involving or leading to flight as well as new and unique test platforms and capabilities.

Co-Chairs
David A. Wise
National Aeronautics and Space Administration (NASA) — UNITED STATES
S. KennethLow
Airbus Defence & Space — UNITED STATES

D2.7 Small Launchers: Concepts and Operations
Discussion of existing, planned and future concepts for small payloads ranging from 1 kg to as low as 1 kg into Low Earth Orbit. Includes innovative solutions such as all-up concepts, evolved from sub-orbit concepts, combinations of meeting/existing elements and new elements, modularly scalable reusable expendable and expendable concepts, and flexible, highly reconfigurable concepts. Includes mission operations, designs, development, and specific constraints. For discussion on small vehicle missions not based on launchers, their operations, please refer to section L5.

Co-Chairs
Henry G. Gilchrist
National Aeronautics and Space Administration (NASA) — UNITED STATES
Massimo Biondi
Office National d’Études et de Recherches Aérospatiales (ONERA) — FRANCE

D2.8 Space Transportation Solutions for Deep Space Missions
The joint session will explore space transportation capabilities, meeting or under study, for human space exploration missions, new science, programme architecture, technology, as well as the issues of scientific and political motivations and interational cooperation. The session will also deal with world leading requirements, requirements and potential missions enabled by deep space transportation system.

Co-Chairs
Charles S. Gehrckens
National Aeronautics and Space Administration (NASA) — UNITED STATES
Dimitri Mustard
University of Birmingham — UNITED STATES

D2.9 Joint-Session Creating Safe Transportation Systems for Sustainable Commercial Human Spaceflight
Economic/safety human space transportation systems must account for microgravity, economic and policy factors in order to be sustainable. This session will explore both the technical design solutions for reliability and safety criteria with regard to the issues of sustainable, policy and regulations involved with delivering human space transportation systems that is sustainable for the future. The discussion can include both sustainable and sustainable transportation systems, as well as opportunities and infrastructure.

Co-Chairs
Markus Sigler
Airbus Defence & Space — GERMANY
Martin Sigill
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — GERMANY
D4.4 Strategies for Rapid Realization of Interstellar Missions: Precedents and Progress

Knowledge about space beyond our solar system and the stars that is interstellar space — is limited. Even as we seek interstellar travel, studies and exploration of this region, a comprehensive overview of the best research efforts cannot be provided. Such a broad overview of the space environment beyond our solar system is necessary to understand the needs of future generations of space missions. The space environment beyond our solar system is critical to consider the development of future space missions. The paper presents an overview of the current research efforts in the space environment beyond our solar system. The overview is divided into the following sections: the space environment beyond our solar system, the challenges of space missions, and the potential solutions for overcoming the challenges. The paper concludes with a summary of the current research efforts in the space environment beyond our solar system and the potential solutions for overcoming the challenges. The paper is expected to be of interest to researchers and scientists in the field of space science and space exploration.

Co-Chairs

John C. Mankins
LPS — THE NETHERLANDS

Jeanne Holm
Centre National d’Etudes Spatiales (CNES) — FRANCE

D4.5 Space Mineral Resources, Asteroid Mining and Lunar/Mars instu

Exploitation of space mineral resources is a critical component of the future of space exploration and utilization. This session will review the current state of the science of space mineral resources and the potential benefits of their exploitation. The session will focus on the following topics: Space mineral resources — current state of the science; Asteroid mining — current state of the science; Lunar/Mars mining — current state of the science. The session will be of interest to scientists, engineers, and policymakers who are involved in the development of space exploration and utilization.

Co-Chairs

Luisa Paolini
Earth and Space Foundation (IAA) — JAPAN

Peter Swin
International Space Elevator Consortium — UNITED STATES

D4.6 Interactive Presentations

Authors with an abstract accepted for an interactive presentation will be asked to prepare slides and display them for the duration of the congress on plasmas screens. Authors will be assigned to interactive sessions in which they must be near the plasma screens to engage in interactive discussions with other congress attendees.

Co-Chairs

Georgios Perbola
International Academy of Astronautics (IAA) — FRANCE

D5 50th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES

Quality and safety in space activities are critical to achieving successful and sustainable space missions. This symposium will focus on the importance of quality and safety in space activities and will bring together experts from various fields to discuss the latest advancements in this area. The symposium will cover a wide range of topics, including the development and implementation of quality and safety management systems, the role of risk management in space activities, and the challenges of ensuring the safety and reliability of space systems. The symposium will provide a valuable opportunity for attendees to exchange ideas and best practices and to learn from the experiences of others in the field.

Co-Chairs

Georgios Perbola
International Academy of Astronautics (IAA) — FRANCE

D1.5 Safety and Quality for “Low Cost” Space Programs

A low-cost approach in space exploration is desirable for several reasons. First, it allows for the exploration of new and interesting targets in the solar system. Second, it reduces the cost of space exploration, which can be prohibitive for many countries. Third, it allows for the exploration of multiple targets, increasing the scientific return. The symposium will focus on the challenges and opportunities of low-cost space programs. It will cover topics such as mission planning, launch vehicle design, and mission operations. The symposium will be of interest to scientists, engineers, and policymakers who are involved in the development of space exploration and utilization.

Co-Chairs

Alexandre S. Flesn
COSPAR (The Committee on Space Research) — GERMANY

Antonio M. Nunez
RPI — FRANCE

D1.6 Commercial Space Flight Safety and Emerging Issues

The space industry is expanding rapidly, and new commercial space activities are becoming more prevalent. This symposium will focus on the safety and regulatory issues associated with commercial space activities. The symposium will cover topics such as the development of new safety standards for commercial space activities, the role of regulatory agencies in ensuring the safety of commercial space activities, and the challenges of ensuring the safety of new and emerging space activities. The symposium will be of interest to scientists, engineers, and policymakers who are involved in the development of space exploration and utilization.

Co-Chairs

Christian Foucheppe
Airbus Defence and Space SAS — FRANCE

Christian Foucheppe
Airbus Defence and Space SAS — FRANCE

D2.5 Joint-Session Creating Safe Transportation Systems for Sustainable Commercial Human Missions

Commercial human space transportation systems must account for technical, economic and policy factors in order to be sustainable. This session will explore the technical design solutions for sustainable human space transportation systems, as well as the related economic, policy and regulatory issues involved in achieving the goal of sustainable human space transportation. The symposium will bring together experts from various fields to discuss the latest advancements in this area. The symposium will cover a wide range of topics, including the development and implementation of sustainable human space transportation systems, the role of policy and economics in sustainable human space transportation, and the challenges of ensuring the sustainability of human space transportation systems. The symposium will provide a valuable opportunity for attendees to exchange ideas and best practices and to learn from the experiences of others in the field.

Co-Chairs

Christian Foucheppe
Airbus Defence and Space SAS — FRANCE

Christian Foucheppe
Airbus Defence and Space SAS — FRANCE

D3.5 Prediction, Measurement and Effects of space environment on space missions

Space environment characteristics vary from various factors such as radiation, plasma, atomic oxygen, planetary dusts, extreme temperature, vacuum, microgravity and more, and their fluctuations strongly affect the quality of space missions. Environmental conditions must be considered during the development of space missions, and the impact of environmental factors must be assessed during the mission planning phase. This symposium will focus on the prediction, measurement, and effects of the space environment on space missions. The symposium will cover topics such as the prediction of space environment conditions, the measurement of space environment conditions, and the effects of space environment conditions on space missions. The symposium will be of interest to scientists, engineers, and policymakers who are involved in the development of space exploration and utilization.
This session will explore innovative programs for postgraduate students. This can include the development and delivery of innovative courses, project-based work, and work placements. These learning outcomes were achieved and evaluated. • Authors are encouraged to clearly identify target groups, benefits, lessons learned, good practice and include measures of interaction of space with society, including education, policy and economics, history and law

This symposium explores best practice and innovative approaches to space education at all levels. It also considers activities, methods and techniques for informal education, outreach to the general public and workplace development. Each year the symposium will conclude with a keynote address by a member of the IAF's Future Space and Society Committee.

The symposium explores best practice and innovative approaches to space education at all levels. It also considers activities, methods and techniques for informal education, outreach to the general public and workplace development. Each year the symposium will conclude with a keynote address by a member of the IAF’s Future Space and Society Committee.

This session is addresses new and existing spaceports and factors that launch vehicle and spaceplane operators may use in evaluating the selection of a launch and/or landing site. Topics include, safety, weather and spaceflight facilities, roads, geology, air and space traffic, weather, population density, proximity to workforce and technical support.

This session is addresses new and existing spaceports and factors that launch vehicle and spaceplane operators may use in evaluating the selection of a launch and/or landing site. Topics include, safety, weather and spaceflight facilities, roads, geology, air and space traffic, weather, population density, proximity to workforce and technical support.

This session will explore innovative programs for students aged 11 to 18, conducted within the formal education system. Emphasis will be placed on programs that effectively engage primary school students in STEM, develop key skills, and foster a long-term passion for space. This session will also consider programs and activities that develop effective and inspirational primary school teachers.

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. This session does not include programs that are conducted within the formal education system.

This session will focus on new and non-traditional methods of space education and outreach in non-traditional areas and to non-traditional target groups. This session does not include programs that are conducted within the formal education system.

This session will focus on the challenges, opportunities and innovative approaches to developing the current and future global space workforce.

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E2.2 Student Conference – Part 2
Undoubtedly, global and public events have a large impact on space activities. This session will provide a platform for students to present papers on any topic related to space science, industry, or technology. The papers will represent the specific work of the authors (from more than two students). Students presenting in this session will compete for the Maxvon Wallis award (jointly awarded). The guidelines for the student competition will be distributed from the session chairs to the authors after abstract acceptance.

Co-Chairs
Josephine Lee
Academy for Aerospace Innovation — ISASIA
Republic of the Philippines

Rapporteurs

E2.3 Student Team Competition
This session is a comprehensive student team presentation paper on any subject related to space sciences, industry, or technology. The papers will represent the work of the authors (from more than two students). Students presenting in this session will compete for the Maxvon Wallis award (jointly awarded). The guidelines for the student competition will be distributed from the session chairs to the authors after abstract acceptance.

Co-Chairs

Elena Iona
University of Rome “Tor Vergata” — ITALY

Rapporteurs

E2.4 Educational Pico and Nano Satellites
Proposed session with ISAC.

Co-Chair

Rafael Nuñez
Northwestern Polytechnical University — CHINA

Rapporteur

E3 30th IAA Symposium on Space Policy, Regulations and Economics
This symposium, organized by the International Academy of Astronautics (IAA), will provide a systematic examination of the current trends in space policy, regulation, and economics, as well as national and international space policies and plans. The symposium also integrates the 30th IAA/SCIA/SCBA colloquium.

Co-Chairs
Benjamin Schoellfeld
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) — GERMANY

Jacques Monniet
European Space Agency (ESA) — THE NETHERLANDS

Rapporteurs

E3.1 International Co-operation - a cornerstone of 50 years UN Law on Space and peace diplomacy
International co-operation is a cornerstone of the United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space. The session will focus on the mechanisms of co-operation that emerged following the Treaty and the role of space as a basis for national and international co-operation.

Co-Chairs

Elena Iona
University of Rome “Tor Vergata” — ITALY

Rapporteurs

E3.2 Private Endeavour in Space Exploration
Space exploration is a decision to explore the moon like most of the space missions. It involves an investigation of the role of the private sector with new privately financed and led endeavours to explore space. This session will discuss the potential of new private space capabilities.

Co-Chairs

E3.3 The Demand Side of the Space Economic Equation: Understanding and Evaluating the Changing Market Dynamics in Space Activities
The session will feature space business sector such as telecommunications, navigation, and remote sensing. The session will examine the role of the private sector in developing the space business and its potential for the growth of the space sector.

Co-Chairs

E3.4 Assuring a Safe, Secure and Sustainable Space Environment for Space Activities
Space activities provide a wealth of interesting benefits for people on earth. However, space activities can only be carried out on a secure, safe, and sustainable space environment. This session will focus on the challenges and opportunities presented by the exploration of space.

Co-Chairs

E3.5 32nd Joint IAA/ISSL Round Table: Technological and legal challenges for on-orbit servicing
Inter-satellite links, on-orbit servicing capabilities, and debris removal are the three major components of on-orbit servicing technology.

Co-Chairs

E3.6 Strategic Risk Management for successful space programmes
Today’s global economies and industrial challenges, more and more space organizations have implemented a Corporate Risk Management (CRM) methodology to establish a successful space programme. This session will focus on developing strategies and solutions for managing and mitigating risk in space programmes.

Co-Chairs

E4 51st IAA History of Astronautics Symposium
The history of astronautics, technology, and development, reflects personal, national, and international achievements. The 51st IAA History of Astronautics Symposium will bring together scholars and participants to explore the history of astronautics and its impact on society.

Co-Chairs

E4.1 Memoirs and Organizational Histories
Historical narratives of space programs and the corresponding technical and scientific achievements.

Co-Chairs

E4.2 Scientific and Technical Histories
Historical narratives of space programs and the corresponding technical and scientific achievements.

Co-Chairs

E4.3A History of Australia’s Contribution to Astronautics
Special session with invited and invited speakers. Space history is a technical and political aspects of the space activities and programs in Australia.

Co-Chairs


Contemporary Arts Practice and Outer Space: A Multi-Disciplinary Approach

Space Societies, Professional Associations and Museums

28th IAA SYMPOSIUM ON SPACE AND SOCIETY

This 28th IAPI Symposium, organised by the International Academy of Astronautics (IAA), will review the impact and benefits of space activities on the quality of life on Earth, including arts and culture, societal representations from space, life-in-space, as well as technology and knowledge transfer.

Co-Chairs

Irving Langmuir

Canadian Aeronautics & Space Institute (CASI) — CANADA

Olga Bannova

University of Houston — UNITED STATES

Reporters

Nicole Bellomo

University of Houston — UNITED STATES

Robyn Herring

Harold and Martha Harbold Center for Entrepreneurship - UNC — UNITED STATES

E5.1 Architecture for humans in space: design, engineering, concepts and mission planning

The session welcomes papers on all aspects of the challenges of safeguarding, and growing accommodation for space habitats throughout the inner solar system: Earth-based habitats, orbiting habitats, sub-surface habitats, mining sites, asteroids, the Moon, the surface of Mars and the asteroids belt. These places share a need for basic protection against space radiation, microgravity and thermal extremes, but vary widely in gravity, proximity to gravity wells and resources, and social psychological impact. Architecutre concepts, including pressurized volume, shielding, life-support, food production, transportation access and social accommodation will stretch the limits of concepts and technologies for space architecture. The session seeks papers on topics including but not limited to: integration of architecture, structure, space systems, life-support systems, main interface and interaction technologies.

E5.2 Models for Successfully Applying Space Technology Beyond its Original Intention

Many AOIs integrate R&D for ways to maximise the revenue of their technology portfolio to also as well as to accommodate a broad community of stakeholders and users. Academic and governmental-sponsored space programs need to develop their science and technology portfolio relevant to technology transfer as well as to technology commercialisation and technology transfer. RPA will explore a variety of approaches that organisations can adopt for the successful transfer or technology to the RPA in space and non-space applications. Relevant legislative, business structure, models, markets, and implementation technology transfer models will be reviewed. Papers will provide examples of successful models with descriptions of the approach itself and other cases, results to data, issues addressed, and ongoing/next steps.

E5.3 Contemporary Arts Practice and Outer Space: A Multi-Disciplinary Approach

Since the late 1970s, a number of artists have been negotiating access to space facilities and organisations, critiquing or making experiential the exploration and utilisation of space, whether, and which of these regulations could serve as a model for future initiatives.

Co-Chairs

Richard Gin

Art Technologies — UNITED STATES

Nahum Romero

Art Mexico: Arte y responsibility social — MEXICO

E5.4 Space Assets and Disaster Management

The session will explore the use of space assets and technology to aid in disaster management and emergency response. Papers will discuss how space assets and applications can be developed to assist disasters management and emergency. Examples subjects may include descriptions of private or government incubators or technology transfer programs or current practice or programs addressing specific needs.

E5.5 Space Societies, Professional Associations and Museums

Space societies, professional associations and museums form a special and important group of IAF members - nearly one quarter of the membership and, as a sector, second in size to the national space programs. They exist in traditional and emerging space nations. Some have a large membership of 10,000 or more, others can be small; a few are already a century old, others are just being created. They serve a wide variety of functions including policy advocacy, coordination of national space activities, training of professionals and political leaders, space science and technology education and outreach, representation from space industry, space agencies and the social and cultural building and promoting related projects crossing the various borders and boundaries of organized space practice.

Co-Chairs

Scott Hatton

Notre Dame Space Center — CANADA

John Charles

Canadian Aeronautics & Space Institute (CASI) — CANADA

E5.6 Business Innovation Symposium

The business community is made up of diverse businesses that observe, study, analyze, develop, and/or prepare any topic related to space activities that have commercial implications, whether from an academic and/or practitioner perspective.

Co-Chairs

John Cladio

Mars Research Program — UNITED STATES

Vesko Petkov

University of Southampton — UNITED KINGDOM

E6.1 New Space Individuals, Projects, Programs, or Business Units: Innovation, Entrepreneurship & Investment at The Microscopic Level of Analysis

Included in this session are topics of innovation, entrepreneurship, and investment at the microscopic level of analysis and conducted by any sector (e.g., public or private, government or industry). The session seeks papers on the impact of innovations, new business models, or current practices regarding individual projects, programs, businesses, efforts, R&D, etc. Example topics may include specific business plan ideas, descriptions of particular funding techniques, performance of specific devices within a company, etc.

E6.2 New Space Industry Segments, Firms, Actor Groups, and Multiple Programs: Innovation, Entrepreneurship, & Investment at The Macroscopic Level of Analysis

Included in this session are topics of innovation, entrepreneurship, and investment at the macroscopic level of analysis, (between the microscopic and the macroscopic levels) and conducted by any sector (e.g., public or private, government or industry). Examples of interest can include analyses, descriptive narratives, or current practices of entire programs, organizations, or even a state (capitals in a specific country), including data on innovation and entrepreneurial activity in terms of space sector employment, investment, or revenue. Example topics could focus on the definitions between the macro level and the micro level perspectives, etc. within a particular body.

E6.3 New Space at The National, International, and Overall Industry Levels: Innovation, Entrepreneurship, & Investment at The Macroscopic Level of Analysis

Topics of innovation, entrepreneurship, and investment from the macroscopic perspective may include theoretical analyses or narrative descriptions of current practice or programs at the national, regional, and/or international level of analysis. Examples could include descriptions of public partnership arrangements, industry-specific structure or change analyses (across multiple countries), etc.

E6.5 Interactive Presentations

Interactive Presentations are sessions with topics of innovation, entrepreneurship, and investment from the macroscopic level of analysis and conducted by any sector (e.g., public, private, government or industry, etc.). Subjects of interest can include analyses, descriptive narratives, or current practice of entire programs at the national, international, or comprehensive industry level. Example topics could include descriptions of entire programs, or technology transfer programs, multi-national analyses, entrepreneurial and environmental studies, etc.

E6.6 ISS Colloquium on the Law of Outer Space

This year’s Colloquium places a special focus on the fiftieth anniversary of the Outer Space Treaty, and discusses in main principles within the context of each individual dedicated ISS panel session.

Co-Chairs

Colleen Mulligan

European Space Agency (ESA) — ITALY

Tina Raghuram

University of Strathclyde — UNITED KINGDOM

E7.2 ‘NewSpace’, ‘New Laws?’ How governments can foster new space activities

Outer Space treaty principles of freedom of use, non-appropriation and state responsibility, a range of novel financial investors, are attracted to space activities, developing spacecraft constellations, introducing new practices, changing the conditions of access and use of outer space, prompting a new commercial space economy. This session explores how new business already influences the development of new law and how governments are reacting or ingesting new space activities. Papers are invited to analyze emerging trends in “NewSpace” and address the question: ‘Will ‘NewSpace’ necessarily mean ‘new law?’”

E7.3 Refugees and the role of space communications/Status and Practice of Charter for Man-made Disasters

New space threats to peaceful use of outer space, especially in space activities that have commercial implications, whether from an academic and/or practitioner perspective.

Co-Chairs

S. Scott Killough

University of Minnesota — UNITED STATES

John L. Dobbins

University of Southampton — UNITED KINGDOM

Publication officers

Kai-Uwe Schrogl

Kai-Uwe Schrogl

International Astronautical Congress - IAC 2017

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**E7.4 Space law Developments in Asia-Pacific: Diverging national space legislation with regard to the applicability of space law to emerging space activities**

Outlook Space Treaty principle of state responsibility and liability, as well as the need to register spacecraft, while respecting the status of autonomous systems in space as standard. The last 25 years of space law developments have seen a growing trend of laws enacted to bring the international space regime in line with emerging space activities. The Asia-Pacific region has been at the forefront of this development, with a growing number of countries enacting national space laws. The seminar will discuss the specific character of emerging space activities in this region, the intent and content of national space laws, as well as the challenges and opportunities presented by the implementation and enforcement of such laws. The seminar will also provide an overview of the status of national space laws in the Asia-Pacific region and assess the impact of these laws on the international space regime.

**E7.5 Current Developments in Space Law**

Current developments in space law are rapidly changing with respect to emerging space activities in a peaceful and non-military context. The seminar will address the specific character of emerging space activities in the Asia-Pacific region, in line with the emerging national space legislation of the region. The seminar will discuss the specific character of emerging space activities in this region, the intent and content of national space laws, as well as the challenges and opportunities presented by the implementation and enforcement of such laws. The seminar will also provide an overview of the status of national space laws in the Asia-Pacific region and assess the impact of these laws on the international space regime.

**E7.6 32nd Joint IAA/IISL Round Table: Technological and legal challenges for on-orbit servicing.**

32nd Joint IAA/IISL Round Table: Technological and legal challenges for on-orbit servicing. This round table will bring together experts from different fields to discuss the technological and legal challenges for on-orbit servicing. The aim of this round table is to identify and discuss the key challenges and opportunities for on-orbit servicing, as well as to identify potential solutions and recommendations for the future development of this technology.

**E7.7 Joint IAF/Islands Conference 2023 on the Legal Framework for Collaborative Space Activities**

Joint IAF/Islands Conference 2023 on the Legal Framework for Collaborative Space Activities. The conference will address the legal framework governing collaborative space activities, in particular governmental exploration programmes and their preparatory measures. It will also focus on future collaborative efforts in relation to human space flight.

**E7.1P Interactive Presentations**

Interactive Presentations. Authors with an abstract accepted for an interactive presentation will be asked to prepare videos and display them in the context of the congress on plasma screens. Authors will be assigned to interactive sessions in which they must be near the plasma screens to engage in interactive discussions with other congress attendees.

**E8 IAA MULTILINGUAL ASTRONAUTICAL TERMINOLOGY SYMPOSIUM**

The Symposium, organized by the International Academy of Astronautics (IAA), will present the progress in multi-lingual space terminology and its impact on international cooperation in space. The Symposium is key for a better understanding among people using various languages and cultures. Essential for international cooperation diversity cannot be achieved if the need for a better understanding among people using various languages and cultures is not met. The Symposium will address the need for a better understanding among people using various languages and cultures, as well as the need for a better understanding of the international space regime and its impact on international cooperation in space. The Symposium will also address the need for a better understanding of the international space regime and its impact on international cooperation in space.

**E8.1 IAA MULTILINGUAL ASTRONAUTICAL TERMINOLOGY**

The Symposium, organized by the International Academy of Astronautics (IAA), will present the progress in multi-lingual space terminology and its impact on international cooperation in space. The Symposium is key for a better understanding among people using various languages and cultures. Essential for international cooperation diversity cannot be achieved if the need for a better understanding among people using various languages and cultures is not met. The Symposium will address the need for a better understanding among people using various languages and cultures, as well as the need for a better understanding of the international space regime and its impact on international cooperation in space. The Symposium will also address the need for a better understanding of the international space regime and its impact on international cooperation in space.
Calendar of Main IAC 2017 Deadlines

- Abstracts Submission Deadline: 28 February 2017
- Abstracts Selection: 21-23 March 2017
- Papers Submission Deadline: 7 September 2017
- Presentations Submission Deadline: 14 September 2017

Preliminary Congress at a Glance Chart
Instructions to Authors

Abstract Preparation

Format
• Abstracts must be written in English.
• Abstract length should not exceed 400 words.

Content
• Tables or drawings are not allowed in the abstract.
• Formulas can be included using the toolbox provided on the abstract submission web page.
• Abstracts should specify: purpose, methodology, results and conclusions.
• Abstracts should indicate that substantive technical and/or programmatic content is included.

Co-authors
All your co-authors should be added at the time you submit your abstract using the tool provided online. You should register all of them online indicating their name, affiliation, full postal address, phone and email address.

Abstract Submission

Signing in
• The submission of abstracts must be done exclusively on the IAF website restricted area www.iafastro.net.
• If you are submitting an abstract on our website for the first time, you will need to register.
• In case you have forgotten your password, please use the password recovery utility.

Submission
• Go to the new abstract submission page.
• Browse the technical programme and choose the symposium and technical session for which you want to submit your abstract.
• Type the title and content of your abstract into the related fields.
• Choose your presentation preference: oral presentation only, poster presentation only, oral or poster.
• Confirm that the material is new and original and that it has not been presented at a previous meeting.
• Confirm that your attendance at IAC 2017 to deliver and present the paper is assured.

Note: An abstract can be submitted to only one technical session.

Abstract Selection

Submitted abstracts will be evaluated by the Session Chairs on the basis of technical quality and relevance to the session topics. Selected abstracts may be chosen for eventual oral or poster presentation – any such choice is not an indication of quality of the submitted abstract. Their evaluation will be submitted to the Symposium Coordinators, who will make acceptance recommendations to the International Programme Committee which will make the final decision. Please note that any relevance to the Congress’ main theme will be considered as an advantage.

Paper and Presentation Submission

• Details on how to prepare and submit your final paper as well as your presentation material will be available on www.iafastro.org by mid-April.
• Authors with an abstract accepted for oral presentation will be offered a presentation slot of 10 to 20 minutes.
• Authors with an abstract accepted for interactive presentation will be offered a presentation slot of 5 to 10 minutes.
• Authors with an abstract accepted for an interactive presentation will be asked to prepare slides and display them for the duration of the congress on plasma screens. Authors will be assigned to interactive sessions in which they must be near the plasma screens to engage in interactive discussions with other congress attendees.

International Astronautical Federation (IAF)

Preliminary versions of the IAC proceedings will be available to participants at the congress electronically. More information about the IAC paper archive is available on www.iafastro.org.

International Academy of Astronautics (IAA)

Authors should follow the above general procedure. An additional suitability requirement is that the proposed topic must be related to a potential or on-going IAA Study Group activity.

International Institute of Space Law (IISL)

Authors should follow the above instructions for the submission of their abstracts. In addition to the IAC Proceedings, the papers of the Colloquium, along with other materials, will be published in the Proceedings of IISL. Authors who qualify may ask to be considered for the Dr I.H. Ph. Diederiks-Verschoor Award for Best Paper. Please contact the IISL secretary for the regulations at secretary@iisolweb.org.

DEADLINES

Abstract Submission 28 February 2017
Paper Submission 7 September 2017
Presentation Submission 14 September 2017

Please make sure to check the IAF website (www.iafastro.org) regularly to get the latest updates on the Technical Programme!

AUSTRALIAN SPACE HERITAGE and PROSPECTS

Australia has an unusual and often misunderstood space heritage. Our principal commitments have been in support of our allies, initially the United Kingdom and, since the 1960s, the United States. We do mark, however, some important national milestones and achievements. Australia was the third or fourth nation (depending on the definition of sovereign territory) to launch a locally designed and manufactured satellite from its own territory. This was the Weapons Research Establishment satellite (WRESAT) in 1967. Australian diplomats played an active role in the negotiations that led to the signing of the Outer Space Treaty in 1967 and an Australian chaired the technical sub-committee of the Committee on the Peaceful Uses of Outer Space (COPUOS) for the first three decades of the sub-committee’s existence.

Two astronauts are Australian born and the television images of Neil Armstrong stepping onto the moon were first received by stations in SE Australia before they were broadcast to the world.

The location of the Australian continent, equidistant in longitude from Europe and North America and the radio quietness of much of the landmass, means that it is very well suited to host ground stations such as those for ESA in Western Australia and the NASA ground station at Tidbinbilla near Canberra. Radio astronomy is a national strength and the national space narrative incorporates and acknowledges the importance of astronomy.

Beyond providing real estate for the use of others, to this point Australian government and industry investment in space has been focused on satellite communications (including satellites) and data processing from satellites owned and operated by others. Technology is reducing the cost and other barriers of entry to space and various Australian organizations are presently building cubesats as a first step to the development of a 21st Century space industry that builds on entrepreneurship, agility, speed to market and profound collaboration. Of necessity new approaches to regulation, investment and priority and goal setting will be needed to best capitalise on these developments. The Space Industry Association of Australia invites all delegates to contribute to the discussion and the debate about the emergent Australian space sector at IAC2017 in Adelaide from 25-29 September 2017.