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INTERNATIONAL ASTRONAUTICAL FEDERATION

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IAC 2027 POZNAN POLAND

78TH INTERNATIONAL ASTRONAUTICAL CONGRESS

27 September – 1 October 2027



One Space.
Shared Future.

CALL FOR PAPERS & REGISTRATION OF INTEREST

Co-hosted by:

POLSA Polish Space Agency

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Connecting @ll Space People

for a sustainable future

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1. Message from the International Astronautical Federation (IAF)

It is my distinct honor to invite you to the 78th International Astronautical Congress (IAC 2027), taking place in Poznań, Poland, from 27 September to 1 October 2027.

The theme for this edition, “One Space. Shared Future.” reflects the reality of our domain, as space being a unifying frontier that transcends borders, accelerates technological innovation, and drives scientific progress for the benefit of all humanity.

As the organizer of this flagship global event, the IAF is committed to building upon our proud legacy while reaching new heights of scientific excellence and international cooperation. The IAC 2027 in Poznań promises to be an exceptional gathering designed to uncover groundbreaking insights, forge strategic partnerships, and inspire the next generation of space pioneers.

IAC 2027 will proudly highlight Poland’s expanding space ecosystem while offering an unmatched platform for governments, industry, academia, and research institutions. By presenting your work in Poznań, you actively support the IAF’s core mission: ensuring that space remains an open, collaborative domain for research, innovation, and progress.

Join us and share your discoveries, technological advancements, and visionary ideas with leading experts from around the globe. Together, we will examine how space solutions continue to improve life on Earth and beyond.

We look forward to receiving your submissions and welcoming your vital contributions to an extraordinary congress in Poznań.

Warm regards,



Gabriella ARRIGO
President,
International Astronautical Federation (IAF),
Italy

2. Message from the Local Organizing Committee (LOC)

Dear Delegates,

As Chair of the IAC 2027 Local Organizing Committee and President of the European Space Foundation, together with Grupa MTP and The Way, and with the Polish Space Agency (POLSA) as co-host, I have the honor of inviting you, your colleagues, and your families to Poznań for the 78th International Astronautical Congress.

Polish space science is celebrating its 50th anniversary, dating back to the establishment of the first Polish space institution, the Space Research Centre of the Polish Academy of Sciences. Joining the European Space Agency in 2012 gave the sector a new boost, and a strong industry has grown around satellites, space robotics, propulsion, and the use of space data. In 2025, ESA project astronaut Sławosz Uznański-Wiśniewski flew to the International Space Station on the IGNIS mission, carrying experiments prepared by Polish teams. Poland also made its largest-ever commitment to ESA programs, worth EUR 731 million. In 2026, Poland adopted a national space law, and ESA selected Warsaw as the location of its new center for civil security and resilience. This growth is part of a wider change in Central and Eastern Europe, where around 1,000 companies now work in the space sector, from satellite manufacturing and communications to cybersecurity, software, propulsion and data processing. The region attracts investment in advanced technologies and is a growing market for them. IAC 2027 is a great opportunity to learn more.

The theme of IAC 2027 is "One Space. Shared Future." Space does not belong to any one country. Orbits, radio frequencies, and data connect all of us, and what we build in space affects everyone. The theme also reflects our region's ambition to contribute more to the global space community. With rising geopolitical tensions and a changing climate, peaceful cooperation in space has become a practical necessity.

The Technical Programme will remain at the center of the Congress, covering space science and exploration, technology, applications, law, policy, and security. We also want to include space-enabled industries.

Start-ups and investors will have dedicated opportunities to meet, and we will pay particular attention to students and young professionals, who are our Shared Future.

Poznań lies halfway between Berlin and Warsaw. It is a city with more than a thousand years of history, a strong economy, and a large academic community. The Congress will be held at Poznań International Fair, the largest event center in Central and Eastern Europe, located in the city center next to the main railway station.

I encourage you to submit abstracts for the Technical Sessions and look forward to welcoming you to Poznań from September 27 to October 1, 2027.



Łukasz WILCZYŃSKI

Chair,
IAC 2027 Local Organizing Committee (LOC),

President,
European Space Foundation and Planet Partners

3. Message from the International Programme Committee (IPC) Co-Chairs

On behalf of the International Programme Committee (IPC), it is our pleasure to invite you to submit abstracts for the 78th International Astronautical Congress (IAC 2027) to be held in the city of Poznań in Poland from 27 September to 1 October 2027. IAC 2027 is hosted by the European Space Foundation, MTP Group, and The Way, with the Polish Space Agency (POLSA) serving as co-host.

At a time of increasing geopolitical tensions and global uncertainty, our theme “One Space. Shared Future.” is more relevant than ever. Poland, and the broader Central and Eastern European (CEE) region share a long documented difficult history, often successfully overcoming crises. In this spirit, the goal of IAC 2027 is to stimulate work across the divide via cooperation at the regional and global scale and contributing to a shared peaceful future in space.

Poland, the newest member of the 1 trillion dollar club and the world’s 20th economy, is the perfect place to discuss how emerging space nations can transition to competitive global space technology actors. The record-setting Polish subscriptions to the European Space Agency (ESA), the establishment of a new ESA centre in Poland, the rapid expansion of national satellite capabilities, the successful launch of a Polish-developed rocket beyond the Von Kármán line and the implementation of national space policies all reflect developments and ambitions occurring across many countries and regions worldwide.

The International Astronautical Congress returns to Poland after 63 years. When the Congress was last held in Poland in 1964, only a few hundred participants gathered despite the height of the space race. 63 years later we face a new race: regarding the commercialization and industrialization of space.

We look forward to receiving thousands of abstracts for both oral and interactive presentations. As an IAC 2027 participant, you will have the unique opportunity to show your work and interact with top professionals from over 100 countries worldwide. We invite you to contribute to the interdisciplinary Technical Programme spanning subjects from cutting-edge engineering, exploration, and planetary science to space policy, education, medicine, and commercial applications. The IPC remains committed to ensure the highest quality of research excellence. All papers undergo a peer-review process, ensuring high visibility and recognition within the global scientific community. We invite you to share your expertise, ideas and join us in making IAC 2027 a very special and unforgettable gathering for the global space community.

We look forward to welcoming you to IAC 2027 in Poznań, Poland.
Kind regards,



Adam OKNIŃSKI

IAC 2026-2027 IPC Co-Chair,

Director, Space Technologies Center,
Łukasiewicz Research Network – Institute of Aviation (ILOT),
Poland



Mukhiddin IBRAGIMOV

IAC 2027-2028 IPC Co-Chair,

Deputy Director,
Uzbekspace Agency
Uzbekistan

4. International Astronautical Federation (IAF)

Founded in 1951, the International Astronautical Federation is the world's leading space advocacy body. The IAF has 621 members from 84 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 and its motto Connecting @ll Space People for a Sustainable Future - the Federation advances knowledge about space and fosters the development and application of space assets by advancing global cooperation.

As the organizer of premier global space events such as the International Astronautical Congress (IAC), IAF Global Conferences and other specialized meetings, the IAF actively promotes the peaceful use of space and facilitates the exchange of scientific and technical knowledge across the international space community.

INTERNATIONAL ASTRONAUTICAL FEDERATION

International Astronautical Federation (IAF)

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Website: www.iafastro.org

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Director,
International Affairs Directorate,
Italian Space Agency (ASI),
Italy



VP: NEXT GENERATION ACTIVITIES
Amal ALBINALI
Chief, Strategic Planning & Projects Management Department, Bahrain Space Agency (BSA),
Bahrain



Juan Carlos CORTÉS PULIDO
Director, Spanish Space Agency (AEE),
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Bulgaria



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Australian Space Agency,
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Scientific Secretary,
Indian Space Research Organisation (ISRO)
India



VP: TECHNICAL ACTITIVIES & IAF GLOBAL NETWORKING FORUM
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Rwanda Space Agency,
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OHB System AG-Bremen
Germany



Lijun YANG
Vice President, China Aerospace Science and Technology Corporation (CASC)
China



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Full Professor of International Law, Sapienza University of Rome, Italy



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Geir HOVMORK
Retired,
Norwegian Space Agency (NOSA), Norway



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Executive Director,
IAF Secretariat,
France

IAF Secretariat

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Myriam MORABET, General Manager
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Alessandra D'ARGENIO, Senior Projects Manager
Martina FABBIANI, *Senior Projects Manager*
Stefano PASCALI, Senior Projects Manager
Constance DELAUNE, Projects Manager
Svetlana VAKHRINA, Projects Manager
Srishti SINGH, Projects Assistant
Valentine KHOO, Projects Assistant
Martin FEICHTINGER, Administrative & Project Support
Sebastian FEICHTINGER, *Community Manager*

IAF Member Organizations

4iG SpaceandDefenceTechnologies	Hungary
A9C Capital	Bahrain
AAKA SPACESTUDIOCORP	Canada
Access	Germany
ADA SPACE	China
Adelaide University	Australia
Adriatic Aerospace Association	Croatia
Advanced Space	United States
AED Cluster Portugal	Portugal
Aerojet Rocketdyne	United States
Aerospace Research Institute	Iran
Aerospace Valley	France
Agence Spatiale Algérienne (ASAL)	Algeria
Agencia Espacial Española	Spain
Agencia Espacial Mexicana (AEM)	Mexico
AGH University of Krakow	Poland
AGI	United States
Agrupacion Astronautica Espanola	Spain
AIPAS – Association Of Italian Space Enterprises	Italy
Air and Space Academy (AAE)	France
Airbus Defence and Space GmbH	Germany
Airbus Defence and Space SA	Spain
Airbus Defence and Space SAS	France
Airbus Ltd.	United Kingdom
Airbus Netherlands B.V.	The Netherlands
Akula Tech	Australia
ALATYR	France
ALE	Japan
Alén Space	Spain
All Nations University	Ghana
Alma Mater Studiorum - University of Bologna	Italy
Alpha Impulsion	France
ALTEC	Italy
American Astronautical Society (AAS)	United States
American Institute of Aeronautics and Astronautics (AIAA)	United States
American Institute of Physics	United States
Andart Global	United Arab Emirates
Andøya Space Center	Norway
Angelantoni Test Technologies Srl	Italy
Angkasa-X	Malaysia
Angolan National Space Program Management Office (GGPEN)	Angola
ANU Institute for Space (InSpace)	Australia
ANYWAVES	France
ArianeGroup	France
Arianespace	France
Arizona State University	United States
ArkEdge Space	Japan
Armenian Aerospace Agency	Armenia
ARRIBES	Spain
ASELSAN	Türkiye
Asgardia	Austria
Asia-Pacific Space Cooperation Organization (APSCO)	China
Asociacion Civil Universidad de Ciencias y Humanidades	Peru
Association Aéronautique & Astronautique de France (3AF)	France
Association for Astronautics and Space Technologies (UAST)	Croatia
Association of Space Explorers (ASE)	United States
Associazione Italiana di Aeronautica e Astronautica (AIDAA)	Italy
ASTRALINTUFUTURO S.A	Ecuador
Astra-Terra Ltd.	United Kingdom
Astrax Astroengineering Technologies LLC	Japan
Astronautical Society of India	Belarus
Astroscale AstroWorks Ventures LLC	India
Australian Space Agency	Japan
Austrian Research Promotion Agency (FGG)	United States
AUSTROSPACE	Australia
Axiom Space	Austria
	Austria
	United States
Azercosmos Space Agency of the Republic of Azerbaijan	Azerbaijan
Bahrain Space Agency (BSA)	Bahrain
Baku State University	Azerbaijan
Bauman Moscow State Technical University	Russian Federation
Beihang University	China
Beijing Infinite Education	China
Beijing Minospace Technologies	China
Beijing Smart Satellite Technology	China
Beijing SpaceD Aerospace Application & Science Education Technology	China
Beijing Sunwise Space Technology	China

4Beijing Zerog Space Technology Co., LTD	China
Belgian Federal Science Policy Office (BELSPO)	Belgium
Ben-Gurion University of the Negev	Israel
Berkeley SETI Research Center	United States
BERLIN SPACE Consortium GmbH	Germany
beSpace	Germany
Beyond Gravity	Switzerland
BIOSEC SOLUTIONS LIMITED	Nigeria
Black Engine Aerospace	Germany
Blue Origin	United States
Boryung Corporation	Republic of Korea
Brazilian Space Agency (AEB)	Brazil
Bryce Space and Technology	United States
Budapest University of Technology and Economics	Hungary
C6 Launch Systems	Canada
Canadensys Aerospace Corporation	Canada
Canadian Aeronautics & Space Institute (CASI)	Canada
Canadian Space Agency (CSA)	Canada
Canadian Space Society	Canada
Cangyu Space	China
CAS Space	China
Center for Space Commerce and Finance	United States
Center of Space Exploration, Ministry of Education (COSE)	China
Central American Association for Aeronautics and Space (ACAE)	Costa Rica
Central Research Institute for Machine Building (JSC TSNIIMASH)	Russian Federation
Centre for Mechanical and Aerospace Science and Technologies (C-MAST)	Portugal
Centre National de la Cartographie et de la Teledetection (CNCT)	Tunisia
Centre National d'Etudes Spatiales (CNES)	France
Centre Royal de Télédétection Spatiale (CRTS)	Morocco
Centre Spatial de Liège (CSL)	Belgium
Centro de Investigacion y Difusion Aeronautico Espacial (CIDA-E)	Uruguay
Centro Interdisciplinario de Estudios Espaciales	Argentina
CHASM	Switzerland
China Head Aerospace Technology	China
China Strategic Technology Group Limited	China
Chinese Society of Astronautics (CSA)	China
CIRA Italian Aerospace Research Centre	Italy
Codimaths	India
Colegio Federado de Ingenieros y de Arquitectos de Costa Rica (CFIA)	Costa Rica
Colombian Space Agency	Colombia
Colorado Center for Astrodynamics Research, University of Colorado	United States
Comision Nacional de Actividades Espaciales (CONAE)	Argentina
Commission d'Astronautique de l'Academie Roumaine	Romania
Community of Ariane Cities (CVA)	France
COMSPOC	United States
Council of European Aerospace Societies (CEAS)	Belgium
Croatian Astronautical and Rocket Federation (HARS)	Croatia
CSIRO Space and Astronomy	Australia
CubeSpace	South Africa
Curtin University	Australia
Cydonia Foundation	Colombia
Cyprus Space Exploration Organisation (CSEO)	Cyprus
ANU Institute for Space (InSpace)	Australia
ANYWAVES	France
ArianeGroup	France
Arianespace	France
Arizona State University	United States
ArkEdge Space	Japan
Armenian Aerospace Agency	Armenia
ARRIBES	Spain
ASELSAN	Türkiye
Asgardia	Austria
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Azercosmos Space Agency of the Republic of Azerbaijan	Austria
Bahrain Space Agency (BSA)	Azerbaijan
Baku State University	Bahrain
Bauman Moscow State Technical University	Azerbaijan
Beihang University	Russian Federation
Beijing Infinite Education	China
Beijing Minospace Technologies	China
Beijing Smart Satellite Technology	China
Beijing SpaceD Aerospace Application & Science Education Technology	China
Beijing Sunwise Space Technology	China
Czech Space Alliance	China
Dalian University of Technology (DUT)	Czech Republic
Danish Aerospace Company A/S	China
Danish Astronautical Society	Denmark
Dassault Aviation	Denmark
Dcubed GmbH	France
Deep Space Exploration Laboratory (Tiandu Laboratory)	Germany
Deimos Space	China
Delft University of Technology	Spain
Department of Electronic Communications – Cyprus Space Office	The Netherlands
Department of Space Studies, University of North Dakota	Cyprus
Dereum Labs	United States
Designers in Space Community	Mexico
Deutsche Gesellschaft für Luft-und Raumfahrt, Lilienthal-Oberth (DGLR)	United Kingdom
Deutsches Zentrum für Luft-und Raumfahrt (DLR)	Germany
Dhruva Space Private Limited	Germany
DHV Technology	India
	Spain

D-Orbit	Italy
Dragonfly Aerospace	South Africa
Dynetics	United States
Ecole Polytechnique Fédérale de Lausanne (EPFL)	Switzerland
Ecosmic s.r.l.	Italy
Edge Aerospace	United States
Edrive Space Technology	China
Egyptian Space Agency	Egypt
ELITAL SPACE AND DEFENCE	Italy
EllipSpace	China
Embedded Instruments and Systems (EMXYS)	Spain
Embry-Riddle Aeronautical University	United States
EMPOSAT	China
EMROD	Germany
EnduroSat	Bulgaria
Engineers Australia	Australia
EngineRoom.io	Australia
EOIntelligence	Canada
EOS Data Analytics	United States
Epyphite Corp	Singapore
Equatorial Launch Australia	Australia
Estonian Business Innovation Agency	Estonia
EUMETSAT	Germany
EURISY	France
EURO2MOON	Luxembourg
EUROLAB Laboratory	Türkiye
European Conference for Aero-Space Sciences (EUCASS)	Belgium
European Organization for Nuclear Research (CERN)	Switzerland
European Space Agency (ESA)	France
European Space Foundation	Poland
European SpacePolicy Institute (ESPI)	Austria
European TestServices (ETS)	The Netherlands
European UnionAgency for the Space Programme (EUSPA)	Czech Republic
Eurospace	France
Eutelsat	France
Everlight Space	China
Exobotics Ltd	United Kingdom
Fachhochschule Wiener Neustadt	Austria
Faculty of Electrical Engineering and Information Technology of Slovak University of Technology in Bratislava	Slovakia
Federal Aviation Administration Office of Commercial Space Transportation (FAA/AST)	United States
Felix & Paul Studios	Canada
Finnish Astronautical Society	Finland
Firefly Aerospace	United States
Flinders University	Australia
Fondation pour la Recherche Stratégique	France
Fondazione E. Amaldi	Italy
For all Moonkind	United States
FOSSA Systems	Spain
Fraunhofer Alliance Space	Germany
Fundacion para el Desarrollo de las Ciencias la Sociedad y el Estado (FUNDECISE)	Costa Rica
Future Space Leaders Foundation	United States
FutureSpace Institute	China
G.A.U.S.S.	Italy
Geo-Informatics and Space Technology Development Agency (GISTDA)	Thailand
Georgia Tech Space Research Institute	United States
Geospatial AI Sdn Bhd	Malaysia
German Aerospace Industries Association (BDLI)	Germany
Ghalam	Kazakhstan
GIFAS	France
Gilmour Space	Australia
GK Launch Services	Russian Federation
GKN Aerospace Engine Systems	Sweden
GLOBAL - ENGINEERING - INTELLIGENCE CONSULTING S.A.S	Colombia
GMV Aerospace & Defence	Spain
Gokmen Space and Aviation Training Center (GUHEM)	Türkiye
GomSpace Aps	Denmark
Gran Sasso Science Institute	Italy
Graz University of Technology (TU Graz)	Austria
GTD	Spain
GTL Co., Ltd.	Republic of Korea
Gumush Aerospace & Defense	Türkiye
Habitat Company GR	Mexico
Harbin Institute of Technology	China
Harpy Aerospace	India
HAVELSAN	Türkiye
HE Space	Germany
Hebrew University of Jerusalem	Israel
Hellenic Space Centre Hermann-Oberth-Raumfahrt Museum	Greece
High Technology Unit (UAT) Faculty of Engineering	Germany
Hong Kong Polytechnic University	Mexico
Hungarian Astronautical Society (MANT) IABG Industrieanlagen Betriebsgesellschaft	China
Iceland Space Agency	Hungary
ICEYE	Germany
Ideia Space	Iceland
IHI Aerospace	Finland
Indian National Space Promotion and Authorization Centre (IN-SPACe)	Brazil
Indian Space Association (ISpA)	Japan
Indian Space Research Organization (ISRO)	India
Indian Technology Congress Association	India
Indonesian Space Agency Secretariat (INASA)	India
Infostellar	India
IngeniArs	Indonesia
INNOSPACE	Japan
Innovation Academy for Microsatellites, Chinese Academy of Sciences	Italy
Institut d'Estudis Espacials de Catalunya Institut Français d'Histoire de l'Espace	Republic of Korea
Institut Polytechnique des Sciences Avancées (IPSA)	China
Institut Supérieur de l'Aéronautique et de l'Espace (ISAE)	Spain
Institute for Q-shu Pioneer of Space (iQPS)	France
Institute of Biomedical Problems (IBMP), Russian Academy of Sciences (RAS)	France
Institute of Experimental and Applied Physics, Czech Technical University in Prague	Japan
Institute of Mechanics, Chinese Academy of Sciences	Russian Federation
Institute of Space Systems, University of Stuttgart	Czech Republic
Instituto Nacional de Pesquisas Espaciais (INPE)	China
Instituto Nacional de Tecnica Aeroespacial (INTA)	Germany
Instituto Tecnológico de Costa Rica (TEC)	Brazil
Intella S.r.l.	Spain
International Alliance of Aerospace Information Industry Ltd.	Costa Rica
International Association for the Advancement of Space Safety	Italy
	Singapore
	The Netherlands

International Lunar Observatory Association	United States
International Peace Alliance	China
International Space Center - Space Park Israel Ashkelon	Israel
International Space University (ISU)	France
Internationaler Förderkreis für Raumfahrt – Hermann Oberth – Wernher von Braun Intersputnik	Germany
International Organization of Space Communications	Russian Federation
Interstellar Glory Aerospace Science and Technology Corporation	China
Invap	Argentina
Involve	Italy
Ionosphere institute	Kazakhstan
Iranian Space Agency	Iran
iSaisei Corporation	Italy
Isar Aerospace SE	Germany
ispace	Japan
Israel Aerospace Industries	Israel
Israel Space Agency	Israel
Italian Space Agency (ASI)	Italy
Japan Aerospace Exploration Agency (JAXA)	Japan
Japan Manned Space Systems Corporation (JAMSS)	Japan
Japan Society for Aeronautics and Space Sciences (JSASS)	Japan
Japanese Rocket Society	Japan
Joanneum Research	Austria
JSC Glavkosmos	Russian Federation
JSC NPO Energomash	Russian Federation
JSC SRC Progress	Russian Federation
Karman Project	Germany
KazSat	Kazakhstan
KBR	United States
Keldysh Research Center	Russian Federation
Kenya Space Agency	Kenya
Khalifa University of Science and Technology	United Arab Emirates
Khrunichev State Research & Production Space Center	Russian Federation
King Abdulaziz City for Science & Technology (KACST)	Saudi Arabia
Kongsberg NanoAvionics (NanoAvionics LLC)	Lithuania
Kongsberg Satellite Services	Norway
Korea Advanced Institute of Science and Technology (KAIST)	Republic of Korea
Korea AeroSpace Administration	Republic of Korea
Korea Aerospace Industries	Republic of Korea
Korea Aerospace Research Institute (KARI)	Republic of Korea
Korea Association for Space Technology Promotion (KASP)	Republic of Korea
Korea Astronomy and Space Science Institute	Republic of Korea
Korea Electrotechnology Research Institute	Republic of Korea
Korea Testing Laboratory	Republic of Korea
Kyushu Institute of Technology	Japan
Laboratory for Space Research, The University of Hong Kong	Hong Kong
LandSpace Technology Corporation	China
Lavochkin Science and Production Association	China
Law Offices of Sterns and Tennen	Russian Federation
Leanspace	United States
Leonardo	France
Libre Space Foundation	Italy
LIQUIFER Systems Group	Greece
Lithuanian Museum of Ethnocosmology	Austria
Lithuanian Space Association (LSA)	Lithuania
Lockheed Martin Corporation	Lithuania
Łukasiewicz Research Network – Institute of Aviation (ILOT)	United States
Lunar Policy Platform (LPP)	Poland
Luxembourg Space Agency	Estonia
Malaysia Space Industry Consortium (MASIC)	Luxembourg
Malaysian Space Agency (MYSA)	Malaysia
Mars Planet	Malaysia
Massachusetts Institute of Technology	Italy
Maxar	United States
McGill Institute for Aerospace Engineering (MIAE)	United States
MDA Space	Canada
MEDES - IMPS	Canada
MicroDrive Space	France
Miprons	China
Mission Control Space Services	Italy
Mission Space	Canada
Mitsubishi Electric Corporation	Luxembourg
Mitsubishi Heavy Industries	Japan
Mohammed Bin Rashid Space Centre (MBRSC)	Japan
Monaco Space Office	United Arab Emirates
Monacosat S.A.M.	Monaco
Moon Village Association (MVA)	Monaco
Moonshot Space	Austria
Moroccan Initiative for Space Industry (MISI)	Israel
Moscow Aviation Institute (MAI)	Morocco
MSP Philippines	Russian Federation
MT Aerospace	Philippines
Mudd Law	Germany
Nanjing University of Aeronautics and Astronautics	United States
Nanoracks	China
Nara Space	United States
National Aeronautics and Space Administration (NASA)	Republic of Korea
National Aerospace Agency of Azerbaijan Republic	United States
National Astronomical Research Institute of Thailand	Azerbaijan
National Autonomous University of Honduras	Thailand
National Institute of Information and Communications Technology (NICT)	Honduras
National Oceanic and Atmospheric Administration (NOAA)	Japan
National Space Agency of Singapore (NSAS)	United States
National Space Centre	Singapore
National Space Research and Development Agency (NASRDA)	Ireland
National Space Society	Nigeria
National Space Society Colombia	United States
National University of Science and Technology	Colombia
NEC Corporation	Pakistan
Netherlands Aerospace Centre (NLR)	Japan
Netherlands Space Office (NSO)	The Netherlands
Netherlands Space Society (NVR)	The Netherlands
NeuraSpace	The Netherlands
New Zealand Space Agency	Portugal
NGC Aerospace	New Zealand
Nokia of America Corporation	Canada
Northrop Grumman Corporation	United States
Northwestern Polytechnical University	United States
Norwegian Space Agency (NOSA)	China
	Norway

Nova Systems	Australia
Novaspace	France
Novespace	France
Obuda University	Hungary
ocullospace	Singapore
Office National d'Etudes et de Recherches Aérospatiales (ONERA)	France
OffWorld	United States
OHB Italia	Italy
OHB System AG - Munich	Germany
OHB System AG-Bremen	Germany
Omspace Rocket and Exploration Pvt Ltd	India
Open Cosmos	United Kingdom
Open Lunar Foundation	United States
Orbit Fab	United Kingdom
Orbital Express Launch Limited (Orbex)	United Kingdom
Orbital Space Technologies	Costa Rica
OrbitArch	India
Orienspace Technology	China
Pacific West Data Pty Ltd - Trading as ACME SpaceTek	Australia
Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)	Pakistan
Paraguayan Space Agency	Paraguay
Philippine Space Agency (PhilSA)	Philippines
PIESAT Information Technology Co.,Ltd.	China
PJSC "Elmiz"	Ukraine
Planet Labs Germany	Germany
Plan-S Satellite and Space Technologies	Türkiye
Polish Academy of Sciences	Poland
Polish Space Agency (POLSA)	Poland
Polish Space Industry Association	Poland
Politecnico di Milano	Italy
Politecnico di Torino	Italy
Portuguese Space Agency	Portugal
Poznan University of Technology	Poland
Prague Security Studies Institute	Czech Republic
Praxis Aerospace	Australia
PRETO BUSINESS Corp.	United States
PricewaterhouseCoopers Advisory (PwC)	France
Privateer Space	United States
Proximai	United States
Purple Mountain Observatory (PMO)	China
Qosmosys	Singapore
Quality Training Academy	Saudi Arabia
Qwaltec	United States
Rafael Advanced Defense Systems	Israel
Rakia Mission	Israel
Ramirez de Arellano y Abogados, S.C. Law Firm	Mexico
Redwire Space	United States
Remred	Hungary
Rendezvous Robotics	United States
ReOrbit	Finland
Rocket Factory Augsburg (RFA)	Germany
ROKETSAN Roket Sanayi ve Ticaret	Türkiye
Romanian Space Agency (ROSA)	Romania
ROSCOSMOS	Russian Federation
Rovsing A/S	Denmark
RSAT Space	Canada
RUDN University	Russian Federation
Russian Academy of Sciences	Russia
Rwanda Space Agency	Rwanda
S.P. Korolev Rocket and Space Corporation Energia	Russian Federation
Safe on Orbit	Brazil
Safran Aircraft Engines	France
SAHA Istanbul Defence & Aerospace Cluster	Türkiye
Saint Petersburg State University of Aerospace Instrumentation	Russian Federation
Samara National Research University (Samara University)	Russian Federation
Sant'Anna School of Advanced Studies	Italy
Sapienza University of Rome	Italy
SARS Technology and Innovation Private Limited	India
SARsatX	Saudi Arabia
Satcom Industry Association (SIA-India)	India
Sateliot	Spain
Satellite Research Center, Nanyang Technological University (NTU)	Singapore
Satellogic	Spain
Satlab	Denmark
Satrec Initiative	Korea, Republic of
Saudi Space Agency (SSA)	Saudi Arabia
Science Malta	Malta
Science Museum Group	United Kingdom
SDA Bocconi School of Management, Bocconi University	Italy
Secure World Foundation	United States
SEMECCEL Cité de l'Espace	France
Serbian Office for Space Sciences, Research and Development (SERBSPACE)	Serbia
SES	Luxemburg
SETI Institute	United States
Shaanxi Engineering Laboratory for Microsatellites	China
Shaanxi XingYi Space Technologies	China
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Space Arbitration Association	France
Space Canada Corporation	Canada
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Space Entrepreneurship Institute	Poland
Space Flight Laboratory (SFL)	Canada
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Space Generation Advisory Council (SGAC)	Austria
Space Industry Association of Australia	Australia
Space Latam	Paraguay

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Space Sustainability Rating	Switzerland
Space Tech Expo - Smarter Shows	United Kingdom
Space Trust	United Kingdom
SpaceBrainx	France
SpaceBuzz	The Netherlands
SpaceForest	Poland
SpaceLand Africa	Mauritius
Spacely Chile	Chile
SpaceNav	United States
SpaceNed	The Netherlands
SPACETIDE Foundation	Japan
Spacety	China
SpaceX	United States
Spade	France
Spartan Space	France
STAR.VISION Aerospace Group Limited	China
Starbound Space Solutions	Australia
Stardust	Canada
Starfire 7	United States
STARS International University	Uzbekistan
State Space Agency of Ukraine (SSAU)	Ukraine
Stichting Space Professionals Foundation (SSPF)	The Netherlands
Sultanate of Oman - National Centre for Space, Advanced Technology and Artificial Intelligence, Ministry of Transport, Communications and Information Technology	Oman
Surrey Satellite Technology (SSTL)	United Kingdom
Swedish Society for Aeronautics and Astronautics	Sweden
Swedish Space Corporation (SSC)	Sweden
Swiss Space Office (SSO)	Swizerland
Swissmem	Switzerland
SwissSpace Association	Switzerland
Teaching Science and Technology (TSTI)	United States
Technical University of Košice	Slovak Republic
Technical University of Munich	Germany
Technische Universität Dresden	Germany
Technische Universität Wien (TU Wien)	Austria
Techno System Developments	Italy
Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences	China
Telespazio	Italy
Telespazio VEGA UK	United Kingdom
Tensor Tech	Taiwan, China
Tesat-Spacecom	Germany
Thales Alenia Space France	France
Thales Alenia Space Italia	Italy
The Aerospace Corporation	United States
The Andy Thomas Space Foundation	Australia
The Astro Ben Podcast	United Kingdom
The Boeing Company	United States
The British Interplanetary Society	United Kingdom
The Chinese Aeronautical and Astronautical Society located in Taipei	Taiwan, China
The Exploration Company	Germany
The Federal University of Technology, Akure (FUTA)	Nigeria
The Johns Hopkins University Applied Physics Laboratory	United States
The Korean Society for Aeronautical and Space Sciences	Republic of Korea
The MITRE Corporation	United States
The National Space Science and Technology Center (NSSTC)	United Arab Emirates
The Ohio State University College of Engineering	United States
The Planetary Society	United States
The Sergei Korolev Space Museum	Ukraine
The University of Sydney	Australia
ThrustMe	France
TNO	The Netherlands
Transpace Technologies Pvt Ltd	India
Trapp Networks PR Social Media	Germany
Tsinghua University	China
Turin Polytechnic University in Tashkent	Uzbekistan
Turkish Space Agency (TUA)	Türkiye
Turkish Technology Team Foundation	Türkiye
TURKSAT	Türkiye
TY-Space Technology (Beijing) Ltd.	China
U.S. Geological Survey	United States
UAE Space Agency	United Arab Emirates
Ubinexus	China
UK Space Agency	United Kingdom
UNIO Enterprise GmbH	Germany
United Launch Alliance	United States
United States Accreditation	United States
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University of Tartu	Estonia
University of Trento, Department of Physics, National PhD in Space Science and Technology	Italy
University of Vigo	Spain
University Space Program, Universidad Nacional Autonoma de Mexico	Mexico
University Wuerzburg	Germany
Uzbekspace Agency	Uzbekistan
Vast	United States
Veganaut, Inc	United States
VENTURI SPACE	Monaco
Viasat	United States
Victorian Space Science Education Centre	Australia
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Vietnam National Space Center (VNSC)	Vietnam
Virgin Galactic	United States
Viterbi School of Engineering (USC)	United States
VITO nv	Belgium
Von Karman Institute for Fluid Dynamics	Belgium
Voyager Technologies	United States
VZLU AEROSPACE, a.s.	Czech Republic
WeMe Global	Austria
Wenchang International Aerospace City Administration	China
WeSpace Technologies Limited	Israel
Western Australian Space Science Education Centre	Australia
Wirtschaftsförderung Bremen (WFB)	Germany
Women in Aerospace Europe (WIA-E)	The Netherlands

World Space Week Association	United States
Yinhe Hangtian (Beijing) Internet Technology Company Limited (GalaxySpace)	China
Yuzhnoye State Design Office	Ukraine
ZARM Fab	Germany
Zenith Law Firm	China
Zhejiang E.O. Paton Welding Technology Research Institute	China
Zhuhai Orbita Aerospace Science & Technology	China

5. Partner Organizations

5.1 International Academy of Astronautics (IAA)

The International Academy of Astronautics (IAA) is an independent, non-governmental, and nonprofit organization dedicated to fostering the development of astronautics for peaceful purposes. Founded in Stockholm in 1960 by Theodore von Kármán. The Academy was established at the dawn of the space age as a global forum for scientific excellence and international cooperation in space activities to promote the development of astronautics for the benefit of all humanity and has been formally recognized by the United Nations since 1996.

For over six decades, the IAA has mobilized global collaboration to address urgent world challenges and foster inclusive dialogue. Serving as an honorary society for the world's foremost space experts, the Academy unites more than 1,250 members across 97 countries championing the sustainable advancement of space as a venture that transcends borders and professional affiliations.

The IAA's mission is to unite the world's space community to foster innovation, dialogue, and responsible use of outer space. Its core aims include: Driving the advancement of astronautics and space applications; Honoring individuals who have distinguished themselves in space science, technology, and related fields; Providing programs through which members may contribute; Championing international collaboration in the advancement of aerospace science to ensure it remains a shared venture for mankind.

As a driving force in the international space community, the IAA works closely with national space agencies, industry leaders, and academic institutions to shape space policy and forge new cooperation; organizes over 25 international conferences and symposia annually, including stand-alone, part of the IPSPACE and IAC, and several flagship "Academy Day" events; publishes Acta Astronautica premier multidisciplinary journal, which is ranked first in the world for space publications and recorded 2.2 million article downloads in 2025; produces one hundred influential "Cosmic Studies" on critical global challenges, a renowned series of multilingual dictionaries in 24 languages, and specialized book series; conducts joint events with numerous national academies worldwide to strengthen international scientific dialogue; connect fields ranging from engineering to economics and culture to ensure space exploration remains a tool for innovation and global understanding



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5.2 The International Institute of Space Law (IISL)

Founded in1960, the International Institute of Space Law (IISL) is an independent non-governmental organization dedicated to fostering the peaceful exploration of outer space, promoting the rule of law in outer space, and advancing the continuing development of space law.

Membership in the Institute comprises individuals and institutions from more than forty countries. Members are elected on the basis of their contributions to the field of space law or related social sciences. 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 authored by IISL members. Approximately sixty student teams from universities in Africa, the Asia Pacific, Europe, Latin America, 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 every year and are judged by sitting 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 permanent observer with the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS), and attends its annual sessions, including sessions of the Committee's Scientific and Technical and Legal Subcommittees. In cooperation with the European Centre for Space Law (ECSL), the IISL organizes an annual Space Law Symposium for delegations to the UN COPUOS Legal Subcommittee. Every year during the International Astronautical Congress (IAC), the Institute holds its annual Colloquium on the Law of Outer Space and publishes an annual volume of IISL Proceedings containing papers and reports presented during the Colloquium. In addition, the Institute organizes a variety of conferences on space law throughout the year in locations all over the world.



International Institute of Space Law (IISL)

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W: http:/iislweb.space
Facebook: https:/www.facebook.com/spacelaw
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5.3 The Space Generation Advisory Council (SGAC)

The Space Generation Advisory Council (SGAC), in support of the United Nations Programme on Space Applications, was established following a recommendation from the Vienna Declaration during UNISPACE III in 1999. Its purpose was to create a platform forstudents and young professionals to contribute to the peaceful uses of outer space, empowering the next generation through access, inclusion, and active engagement with the global space community.

Since its founding, SGAC has remained dedicated to this mission, serving as a bridge between young people and the broader space sector. Thanks to the continued commitment of our members, volunteers, staff, partners, and sponsors, SGAC has grown into a truly global organisation. As of 2025, we are proud to represent over 38,000 members from more than 165 countries, reflecting our core values of diversity, accessibility, and international collaboration.

In 2025 alone, SGAC successfully organised three global events, twelve regional and local workshops, and a wide range of online initiatives including webinars, training sessions, and collaborative research projects. With the generous support of our partners, we awarded over 200 scholarships, totalling more than $260,000, to enable participation in key space events worldwide. These efforts have been crucial in elevating the voices of students and young professionals and ensuring that space remains open and equitable for future generations.

Since 2026, SGAC has partnered with the American Institute of Aeronautics and Astronautics (AIAA) to co-organise SGx as part of the ASCEND conference in Washington, D.C. Our inaugural collaboration this year was a great success, bringing together the global space community through an expanded programme and new partnership opportunities. One of the highlights was an exclusive private screening hosted in collaboration with National Geographic, which provided a unique networking and outreach experience for participants. We are excited to continue building on this strong partnership in the years ahead.

Further information regarding SGAC can be found at www.spacegeneration.org

SGAC

Space Generation Advisory Council

SGAC European Space Policy Institute
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6. Message from the IAF Vice President for Technical Activities

Welcome to IAC 2027 Call for Papers

Organized annually by the International Astronautical Federation (IAF), the International Astronautical Congress (IAC) is the world's premier global space event, bringing together space agencies, industry, academia, governments, entrepreneurs, and emerging space nations to exchange ideas, forge partnerships, and shape the future of space.

I am delighted that the 78th International Astronautical Congress will be held in Poznań, Poland, from 27 September to 1 October 2027, in partnership with our Host, represented jointly by the European Space Foundation (ESF), MTP Group and The Way, and our Co-Host, the Polish Space Agency (POLSA), along with the support of the Polish Ministry of Economic Development and Technology.

The return of the IAC to Poland, for only the second time and after 60 years, marks an important milestone. Poznań offers an inspiring setting that combines rich historic heritage with a dynamic innovation ecosystem, scientific excellence, and a strong commitment to international collaboration. It provides an ideal environment for the global space community to connect, exchange ideas, and build partnerships.

Under the theme "One Space. Shared Future.", IAC 2027 will highlight the fundamental importance of international cooperation in unlocking the full potential of space for the benefit of humanity. At a time of growing geopolitical complexity and rapid technological transformation, collaboration across borders is essential - from scientific discovery and exploration to commercial innovation and sustainable development.

We welcome original and unpublished abstracts for consideration. Submissions should not be under review or submitted to any other event. Abstracts must fall within one of the five main IAC categories:

A. Science and Exploration
B. Applications and Operations
C. Technology
D. Infrastructure
E. Space and Society

Each category is overseen by dedicated Category Coordinators, alongside whom I have the pleasure of working in the IPC Steering Group. Their expertise helps ensure the scientific quality and coherence of the IAC Technical Programme.

Submit your **400-word abstract** with a title through the IAF submission platform and do not miss the **28 February 2027 (23:59 CET)** deadline.

All abstracts will be reviewed by Session Chairs and evaluated on their technical merit and relevance to the selected session. Submissions may be selected for oral presentations in Technical Sessions (TS) or Interactive Presentations (IP). Both presentation formats are equally valued, and papers will be included in the official Congress Proceedings, provided they are presented in person by the author in Poznań. The final selection will be made by the IPC during the IAF Spring Meetings in March 2027 in Paris, France.

Please note that alignment with the Congress theme will be considered a positive factor during the review process. To ensure fairness and maintain the quality of the Technical Programme, each registered author may submit a maximum of three abstracts for student submissions and five abstracts for professional submissions. Selected authors shall present no more than two papers at IAC 2027, regardless of whether the presentations are oral or interactive. These rules will apply across all sessions and must be considered during abstract submission.

IAC 2027 will provide unparalleled opportunities to discover the latest achievements in science, technology, and industry, engage with leading experts, expand professional networks, and contribute to the discussions shaping the future of the global space ecosystem.

As the IAF VP for Technical Activities, I warmly invite you to submit your abstract and join us in Poznań, Poland, from 27 September to 1 October 2027, for what promises to be an exceptional edition of the International Astronautical Congress.



David SPENCER
IAF Vice President, Technical Activities and IAF Global Networking Forum, International Astronautical Federation (IAF), United States

7. Technical Category Coordinators

Category Coordinator A: Science and Exploration



Pierre W. BOUSQUET
Deputy of the Associate Director for Exploration and Human Spaceflight, Centre National d'Etudes Spatiales (CNES), France

Category Coordinator B: Applications and Operations



Igor SOROKIN
Deputy Head of Space Stations Utilization Center, S.P. Korolev Rocket and Space Corporation Energia, Russian Federation

Category Coordinator C: Technology



John C. MANKINS
Vice President,
Moon Village Association (MVA),

Vice President,
ARTEMIS Innovation Management Solutions, United States

Category Coordinator D: Infrastructure



Roberta MUGELLESI-DOW
Integrated Applications Manager, European Space Agency (ESA), United Kingdom

Category Coordinator E: Space and Society



Pascale EHRENFREUND
IAF past President,
IAF Bureau,

President
President of Committee on Space Research (COSPAR), Austria

8. IAC 2027 Technical Sessions

TECHNICAL PROGRAMME TP

TS

IP

CATEGORY A: SCIENCE AND EXPLORATION

Systems sustaining missions, including life, microgravity, space exploration, space debris, astronomy and SETI

A1. IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM
A2. IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM
A3. IAF SPACE EXPLORATION SYMPOSIUM
A4. 55TH IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – THE NEXT STEPS
A5. 29TH IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM
A6. 24TH IAA SYMPOSIUM ON SPACE DEBRIS
A7. IAF SYMPOSIUM ON ONGOING AND NEAR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS

Category coordinated by Pierre W. Bousquet, Centre National d'Etudes Spatiales (CNES), France

A1. IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM

Coordinators

- **Dr. Alain Maillet,** *MEDES - IMPS, France*
- **Prof. Elena Fomina,** *State Scientific Center of Russian Federation, Institute of Biomedical Problems, Russian Academy of Sciences, Russian Federation*

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.

Co-Chairs

- **Prof. Nick Kanas,** *University of California, San Francisco (UCSF), United States*
- **Prof. Gro M. Sandal,** *University of Bergen, Norway*

A1.2. Human Physiology in Space

This session focuses on physiological effects of short- and long-duration spaceflight, and how this affects general health. Research into mitigation (countermeasures) of space effects are also included.

Co-Chairs

- **Prof. Elena Fomina,** *State Scientific Center of Russian Federation, Institute of Biomedical Problems, Russian Academy of Sciences, Russian Federation*
- **Dr. Jens Jordan,** *Institute of Aerospace Medicine (DLR), Germany*

Rapporteur

- **Dr. Alain Maillet,** *MEDES - IMPS, France*

- **Dr. Angelique Van Ombergen,** *European Space Agency (ESA), Netherlands (Kingdom of the)*

A1.3. Medical Care for Humans in Space

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

Co-Chairs

- **Prof. Satoshi Iwase,** *Aichi Medical University, Japan*
- **Prof. Oleg Orlov,** *Institute of Biomedical Problems (IBMP), Russian Academy of Sciences (RAS), Russian Federation*

Rapporteur

- **Prof. Hasan Birol Cotuk,** *Türkiye*
- **Dr. Katrin Stang,** *DLR (German Aerospace Center), Germany*

A1.4. Medicine in Space and Extreme Environments

Over the last decades numerous space missions and experiments have taken place. The use of microgravity as a tool to study new fundamentals of life revealed a substantial number of new scientific insights and surprises. Space is the most famous extreme environment but different extreme environments also exist on Earth, such as high altitudes, confined and isolated environments like Antarctica and Arctica or even submarines. Results from research in these environments can be successfully applied for the benefits of human beings both in space and on Earth. This session will cover the latest scientific results and technological achievements from medical-physiological or psychological research in extreme environments for the benefit on Earth.

Co-Chairs

- **Prof. Oleg Orlov,** *Institute of Biomedical Problems (IBMP), Russian Academy of Sciences (RAS), Russian Federation*
- **Prof. Hanns-Christian Gunga,** *Charité Universitätsmedizin Berlin, Germany*

Rapporteur

- **Dr. Jeffrey R. Davis**, *United States*
- **Prof. Alexander Choukér,** *University of Munich, Germany*

A1.5. Radiation Fields, Effects and Risks in Human Space Missions

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

Co-Chairs

- Prof. Lawrence Pinsky, *University of Houston, United States*
- Dr. Günther Reitz, *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*

Rapporteur

- Dr. Premkumar Saganti, *Prairie View A&M University, United States*

A1.6. Advancements in Astrobiology and Space Exploration

This session offers an insightful exploration of the latest advancements in astrobiology and space exploration. From ambitious human missions to the Moon and Mars to cutting-edge robotic exploration of Mars subsurface and ocean worlds like Europa, and Enceladus, this session covers all aspects of astrobiology. Therefore, this scientific gathering seeks to foster collaboration and knowledge exchange on extremophiles research, exobiology, biosignature detection, planetary protection, space exploration technology, and the quest to find evidence of habitability and life beyond our home planet.

Co-Chairs

- Dr. Fathi Karouia, *NASA Ames Research Center, Blue Marble Space Institute Of Science; BioServe Space Technologies, University of Colorado Boulder, United States*
- Dr. Stephan Ulamec, *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*

A1.7. Life Support, habitats and EVA Systems

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

Co-Chairs

- Prof. Gisela Detrell, *Technical University of Munich (TUM), Germany*
- Dr. Lucie Poulet, *Université Clermont Auvergne (UCA), France*

Rapporteur

- Dr. Hong Liu, *Xi'an Satellite Control Centre (XSCC), China*

A1.8. Biology in Space

This session focuses on all aspects of biology and biological systems related to gravity in ground-based and space flight experiments as well as on topics not covered by other sessions of this symposium.

Co-Chairs

- Dr. Didier Chaput, *Centre National d'Etudes Spatiales (CNES), France*
- Dr. Jancy C. McPhee, *National Aeronautics and Space Administration (NASA), Johnson Space Center, United States*

Rapporteur

- Dr. Marta Del Bianco, Italian Space Agency (ASI), Italy

A2. IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM

Coordinator

- Mrs. Angelika Diefenbach, *German Aerospace Center (DLR), Germany*
- Mr. Remi Canton, *Centre National d'Etudes Spatiales (CNES), France*
- Prof. Qiu-Sheng Liu, *Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China*

A2.1. Fundamental Physics in Low Gravity

This session is devoted to low gravity and microgravity experiments addressing research in fundamental physics. Focus areas include quantum physics, soft matter and general relativity.

Co-Chair

- Prof. Vladimir Pletser, *Blue Abyss, United Kingdom*

A2.2. Fluid and Materials Sciences

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

Co-Chairs

- Prof. Nickolay N. Smirnov, *Lomonosov Moscow State University, Russian Federation*
- Prof. Qi Kang, *National Microgravity Laboratory, Institute of Mechanics, Chinese Academy of Sciences., China*

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

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

Co-Chairs

- **Prof. Raffaele Savino,** *University of Naples "Federico II", Italy*
- **Prof. Rainer Willnecker,** *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*

Rapporteur

- **Prof. Vladimir Pletser,** *Blue Abyss, United Kingdom*

A2.4. Science Results from Ground Based Research

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

Co-Chairs

- **Prof. Valentina Shevtsova,** *University of Mondragon, Spain*
- **Prof. Antonio Viviani,** *Università degli Studi della Campania "Luigi Vanvitelli", Italy*

Rapporteur

- **Prof. Nickolay N. Smirnov,** *Lomonosov Moscow State University, Russian Federation*

A2.5. Facilities and Operations of Microgravity Experiments

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

Co-Chairs

- **Prof. Qiu-Sheng Liu,** *Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China*
- **Mr. Remi Canton,** *Centre National d'Etudes Spatiales (CNES), France*

A2.6. Microgravity Sciences on Board of Space Stations

This session focusses on the presentation of scientific and operational results obtained from microgravity sciences research conducted on large orbital platforms, in particular the ISS, the Chinese Space Station (CSS) and upcoming commercial space stations. Papers on planned or newly developed research topics and experiment scenarios are also invited. The session comprises the preparation scenarios for further long-term flight opportunities beyond low Earth orbits such as the Deep Space Gateway station.

Co-Chairs

- **Mrs. Angelika Diefenbach,** *German Aerospace Center (DLR), Germany*

- **Mrs. MengYun Chen,** *Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China*

A2.7. Life and Physical Sciences under reduced Gravity

This session focusses on the presentation of scientific and operational results obtained from life and physical sciences research conducted on large orbital platforms, in particular the ISS, the Chinese Space Station (CSS) and upcoming commercial space stations. Papers on planned or newly developed research topics and experiment scenarios are also invited. The session comprises the preparation scenarios for further long-term flight opportunities beyond low Earth orbits such as the Deep Space Gateway station.

Co-Chairs

- **Mrs. Angelika Diefenbach,** *German Aerospace Center (DLR), Germany*
- **Mr. Remi Canton,** *Centre National d'Etudes Spatiales (CNES), France*

Rapporteur

- **Dr. Peter Graef,** *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*

A2.8. In-Space Manufacturing and Production Applications

In-Space Manufacturing and Production Applications leverage microgravity, vacuum, and orbital environments to unlock pathways in biomedicine, advanced materials, and autonomous production that are impractical on Earth. This session convenes practitioners advancing: bioprocessing (cell and tissue expansion, organoid and disease models, protein crystallization, biologics and nucleic-acid manufacturing); materials (defect-suppressed alloys, ultra-low-loss optical fibers, semiconductor epitaxy, glass/ceramic processing); and production architectures (additive and hybrid manufacturing, in-space assembly, robotic autonomy, digital twins, in-process metrology, and closed-loop resource use). Emphasis is placed on flight-demonstrated results, scaling from parabolic and ISS/pathfinder missions to commercial platforms, and on standards, certification, biosafety, and traceability needed for quality and repeatability. The session aims to share methods, lessons learned, and roadmaps that reduce risk and cost, enable interoperability across platforms, and build resilient supply chains. By integrating biology, materials science, automation, and operations, the community will translate microgravity advantages into reliable production capabilities that accelerate exploration and deliver high-value products for terrestrial markets.

Co-Chairs

- **Dr. Fathi Karouia,** *NASA Ames Research Center, Blue Marble Space Institute Of Science; BioServe Space Technologies, University of Colorado Boulder, United States*
- **Prof. David Estrada,** *Boise State University (BSU), United States*

Rapporteur

- **Dr. Albert Houcine TOUATI,** *Université Clermont Auvergne (UCA), France*

A3. IAF SPACE EXPLORATION SYMPOSIUM

Coordinators

- **Mr. Pierre W. Bousquet,** *Centre National d'Etudes Spatiales (CNES), France*
- **Mr. Keyur Patel,** *National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States*
- **Dr. Maria Antonietta Perino,** *Thales Alenia Space Italia, Italy*

A3.1. Space Exploration Overview

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

Co-Chairs

- **Mr. Keyur Patel,** *National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States*
- **Dr. Norbert Frischauf,** *TU Graz, Austria*

Rapporteur

- **Mr. Dmitry Zarubin,** *Space Research Institute (IKI), Russian Academy of Sciences (RAS), Russian Federation*
- **Mr. Masaki Fujimoto,** *Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency, Japan*

A3.2A. Moon Exploration – Part 1

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

Co-Chairs

- **Prof. Bernard Foing,** *ILEWG "EuroMoonMars", Netherlands (Kingdom of the)*
- **Dr. David Korsmeyer,** *National Aeronautics and Space Administration (NASA), Ames Research Center, United States*

Rapporteur

- **Dr. Nadeem Ghafoor,** *Avalon Space, Canada*
- **Mr. Dmitry Zarubin,** *Space Research Institute (IKI), Russian Academy of Sciences (RAS), Russian Federation*

A3.2B. Moon Exploration – Part 2

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

exploration.

Co-Chairs

- Prof. Bernard Foing, *ILEWG "EuroMoonMars", Netherlands (Kingdom of the)*
- Dr. David Korsmeyer, *National Aeronautics and Space Administration (NASA), Ames Research Center, United States*

Rapporteur

- Dr. Nadeem Ghafoor, *Avalon Space, Canada*
- Mr. Dmitry Zarubin, *Space Research Institute (IKI), Russian Academy of Sciences (RAS), Russian Federation*

A3.2C. Moon Exploration – Part 3

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

Co-Chairs

- Prof. Bernard Foing, *ILEWG "EuroMoonMars", Netherlands (Kingdom of the)*
- Dr. David Korsmeyer, *National Aeronautics and Space Administration (NASA), Ames Research Center, United States*

Rapporteur

- Dr. Sylvie Espinasse, *European Space Agency (ESA), Netherlands (Kingdom of the)*
- Dr. Nadeem Ghafoor, *Avalon Space, Canada*

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.

Co-Chairs

- Mr. Vincenzo Giorgio, *Thales Alenia Space Italia, Italy*
- Mr. Pierre W. Bousquet, *Centre National d'Etudes Spatiales (CNES), France*

Rapporteur

- Ms. Cheryl L.B. Reed, *Northrop Grumman Corporation, United States*
- Prof. Michèle Lavagna, *Politecnico di Milano, Italy*

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.

Co-Chairs

- **Mr. Vincenzo Giorgio,** *Thales Alenia Space Italia, Italy*
- **Mr. Pierre W. Bousquet,** *Centre National d'Etudes Spatiales (CNES), France*

Rapporteur

- **Ms. Cheryl L.B. Reed**, *Northrop Grumman Corporation, United States*
- **Prof. Michèle Lavagna,** *Politecnico di Milano, Italy*

A3.4A. Small Bodies Missions and Technologies (Part 1)

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

Co-Chairs

- **Dr. Stephan Ulamec,** *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*
- **Ms. Cheryl L.B. Reed,** *Northrop Grumman Corporation, United States*

Rapporteur

- **Dr. Norbert Frischauf,** *TU Graz, Austria*
- **Ms. Shana Diez,** *SpaceX, United States*

A3.4B. Small Bodies Missions and Technologies (Part 2)

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

Co-Chairs

- **Dr. Stephan Ulamec,** *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*
- **Ms. Cheryl L.B. Reed,** *Northrop Grumman Corporation, United States*
-

Rapporteur

- **Dr. Norbert Frischauf,** *TU Graz, Austria*
- **Ms. Shana Diez,** *SpaceX, United States*

A3.5. Solar System Exploration including Ocean Worlds

This session covers robotic missions for Solar System exploration (inner and outer planets and their satellites, and space plasma physics) except the Earth, Moon, Mars, and small bodies covered in other sessions of this symposium. Special emphasis on papers addressing missions to so-called Ocean Worlds (Enceladus, Europa, Titan) is sought. Papers covering both new mission concepts as well as the associated specific technologies are invited.

Co-Chairs

- **Ms. Mariella Graziano,** *GMV Aerospace & Defence SAU, Spain*
- **Dr. Junichiro Kawaguchi,** *Australian National University (ANU), Australia*

Rapporteur

- **Mr. Charles E. Cockrell Jr.,** *United States*
- **Mr. Gabriel Pont,** *Centre National d'Etudes Spatiales (CNES), France*

A4. 56th IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – The Next Steps

Coordinator

- **Dr. Andrew Siemion,** *Berkeley SETI Research Center, United States*
- **Prof. Michael Albert Garrett,** *University of Manchester, United Kingdom*

A4.1. SETI Science and Technology: Current and Future Directions

This session examines the scientific and technical foundations of the Search for Extra Terrestrial Intelligence (SETI), focusing on how we design, execute, and refine strategies to detect evidence of other technological civilisations. Researchers are analysing huge astronomical datasets for technosignatures — from narrowband radio signals to unusual infrared or optical anomalies — across the entire electromagnetic spectrum. Increasingly, multi messenger approaches (e.g. gravitational waves, neutrinos etc) are also being applied to broaden the search. We aim to highlight developments in observational techniques, next generation instrumentation, and new search strategies, including the use of artificial intelligence to mine complex datasets for subtle anomalies. The session welcomes contributions on current and future projects, emerging technologies, and creative approaches that will shape the next generation of SETI research.

Co-Chair

- **Dr. Vishal Gajjar,** *SETI Institute, United States*

A4.2. SETI and Society: Exploring the Human Dimension

This session addresses the interdisciplinary aspects of the Search for Extra Terrestrial Intelligence (SETI), focusing on the profound social and cultural consequences of detecting a signal from another intelligent civilisation. Such a discovery would ripple through every aspect of human life, raising questions not only for scientists but for policymakers,

educators, politicians, artists, and the public at large.
We invite contributions exploring how different disciplines - from anthropology, sociology, psychology, and law to politics, media studies, education, and the arts — can help us understand and prepare for this momentous event. Topics include best practice for managing the search, engagement with the public and media, risk communication, and the institutional and ethical frameworks needed to guide our response. This session provides a forum for building a truly global, inclusive dialogue on how humanity might navigate first contact - intellectually, culturally, and practically.

Co-Chairs

- **Dr. Andreas Schwarz,** *Germany*
- **Dr. Gabriela Radulescu,** *National Air and Space Museum, United States*

A5. 30th IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM

Coordinator

- **Dr. Christian Sallaberger,** *Canadensys Aerospace Corporation, Canada*
- **Dr. Maria Antonietta Perino,** *Thales Alenia Space Italia, Italy*

A5.1. Human Exploration of the Moon and Cislunar Space

This session will examine the scenarios and infrastructure required to support human exploration of the Moon and Cislunar space. Papers are invited to discuss technology roadmaps as well as interfaces to allow international cooperation.

Co-Chairs

- **Dr. Nadeem Ghafoor,** *Avalon Space, Canada*
- **Dr. Greg Chavers,** *NASA, United States*

Rapporteur

- **Mr. Marc Haese,** *DLR, German Aerospace Center, Germany*
- **Mr. Henrik Pettersson,** *Swedish Space Corporation, Sweden*

A5.2. Human Exploration of Mars

This session will examine the scenarios and infrastructure required to support human exploration of Mars and the moons of Mars. Papers are invited to discuss technology roadmaps as well as interfaces to allow international cooperation.

Co-Chairs

- **Dr. Maria Antonietta Perino,** *Thales Alenia Space Italia, Italy*

- Dr. Norbert Frischauf, *TU Graz, Austria*

Rapporteur

- Dr. Nasr Al-Sahhaf, *Moon Village Association (MVA), Saudi Arabia*

A5.3-B3.6. Human and Robotic Partnerships in Exploration - Joint session of the IAF Human Spaceflight and IAF Exploration Symposia

This session seeks papers on new systems and technologies for current human spaceflight and exploration programmes, and the role of human and robotic partnerships in areas such as onboard robotic assistants, habitat / infrastructure construction support, human mobility support systems (e.g. EVA mobility aids, rovers); and robotic precursor activities to human spaceflights for test, validation, and demonstration of systems. This session also welcomes papers considering how the roles of humans, machines and intelligent systems are likely to evolve in the coming years and the corresponding impact on complex mission design, implementation, and operations.

Co-Chairs

- Mr. Pierre-Alexis Joumel, *Airbus Defence and Space, Germany*
- Mr. Mark Hempsell, *The British Interplanetary Society, United Kingdom*

Rapporteur

- Dr. Juergen Schlutz, *European Space Agency (ESA), Germany*
- Mr. Scott Ritter, *International Institute for Astronautical Sciences (IIAS), United States*

A5.4. Deep Space Habitats and Resources

This session will focus on the habitability aspects for Moon and Mars outposts and bases and to sustain human deep space exploration missions and the needed resources, exploring technical solutions like greenhouses, plant-growth in space, harvesting water from the Moon and Mars regolith.

Co-Chairs

- Prof. Anna Barbara Imhof, *Liquifer Systems Group (LSG), Austria*
- Dr. Maria Antonietta Perino, *Thales Alenia Space Italia, Italy*

Rapporteur

- Dr. Sandra Haeuplik-Meusburger, Technische Universität Wien (TU Wien), Austria
- Prof. Olga Bannova, University of Texas at San Antonio, United States

A6. 25th IAA SYMPOSIUM ON SPACE DEBRIS

Coordinators

- **Dr. Mark A. Skinner,** *The Aerospace Corporation, United States*
- **Dr. Noelia Sanchez Ortiz,** *Arribes Enlightenment, Spain*
- **Mr. Pierre Omaly,** *Astroscale France SAS, France*

A6.1. Space Debris Measurements and Orbit Determination SST (1)

This session will address all aspects related to the measurement of space objects and orbit determination. It will cover both ground-based and space-based techniques, as well as methods for identification and characterization of objects. Special attention will be given to data processing, orbit accuracy, and strategies to improve coverage and reliability of surveillance and tracking networks.

Co-Chairs

- **Prof. Thomas Schildknecht,** *SwissSpace Association, Switzerland*
- **Dr. Mark A. Skinner,** *The Aerospace Corporation, United States*

Rapporteur

- **Dr. Dmitriy Grishko,** *Bauman Moscow State Technical University, Russian Federation*

A6.2. Resident Space Objects Characterisation and High Velocity Impacts

This session will focus on the detailed characterization of resident space objects (RSO), including small debris and angular motion determination through estimation, simulation, and experimentation. It will also explore phenomena associated with high-velocity impacts, protection and shielding tests, and fragmentation simulations, with the objective of evaluating risks and effects on operational spacecraft.

Co-Chairs

- **Prof. Zizheng Gong,** *Beijing Institute of Spacecraft Environment Engineering, China Academy of Space Technology (CAST), China*
- **Prof. Satomi Kawamoto,** *Institute of Science Tokyo, Japan*

Rapporteur

- **Dr. Yukihito Kitazawa,** *Japan*

A6.3. Environment Modelling and Risk Assessment

This session will cover the modelling of the space debris environment and the assessment of associated risks. Topics will include collision risk analyses, estimations based on population models and deterministic catalogues, as well as studies on the reconstruction of break-up and fragmentation events. The session will also address validation of models through observations and laboratory experiments, aiming to improve the prediction of orbital environment evolution. It will also examine methods for assessing orbital capacity and congestion, including indicators for orbital slot usage,

and impact of allocation strategies on population dynamics. The combined perspective of environmental modelling and capacity management provides a comprehensive view of the long-term sustainability of the orbital environment.

Co-Chairs

- **Mr. Dan Oltrogge,** *COMSPOC Corp., United States*
- **Dr. Carmen Pardini,** *ISTI-CNR, Italy*

Rapporteur

- **Prof. Camilla Colombo,** *Politecnico di Milano, Italy*

A6.4. Operations in Congested Space: Situational Awareness and Space Traffic Management – SSA

This session will examine operations within the framework of Space Situational Awareness (SSA) and Space Traffic Management (STM). It will address strategies and systems for enhancing satellite operational safety, artificial intelligence applications in SSA, collision avoidance manoeuvres, and coordination of operations in large LEO constellations (LLC). Emphasis will be placed on data integration and international cooperation to ensure the safe management of the orbital environment.

Co-Chairs

- **Mr. Andrew Monham,** *EUMETSAT, Germany*
- **Mr. Vincent Martinot,** *Thales Alenia Space France, France*

Rapporteur

- **Dr. Darren McKnight,** *LeoLabs, United States*

A6.5. Post Mission Disposal and Space Debris Removal – SEM

This session will focus on space debris mitigation and remediation strategies, including Post-Mission Disposal (PMD) and Active Debris Removal (ADR) techniques and technologies (both ground and space-based). A particular focus will be given to in-orbit demonstration missions, ADR mission design and analysis, and rendezvous and proximity operations incorporating GNC and robotics aspects. The goal is to assess the feasibility, safety, and efficiency of these solutions to reduce on-orbit risks.

Co-Chairs

- **Prof. Roberto Opromolla,** *University of Naples "Federico II", Italy*
- **Mr. Christophe Bonnal,** *European Conference for Aero-Space Sciences (EUCASS), France*

Rapporteur

- **Dr. Jason Forshaw,** *Astroscale Ltd, United Kingdom*

A6.6. Orbit Propagation and Mitigation Assessment

This session will address the study of orbital dynamics of space objects, the development of propagation techniques, and long-term environment simulations, including aspects related with space ethics. It will assess the effectiveness of various mitigation measures and evaluate the impacts of different population evolution scenarios. Outcomes will support the definition of guidelines for sustainable management of Earth orbits.

Co-Chairs

- **Mr. Marlon Sorge,** *The Aerospace Corporation, United States*
- **Dr. Tim Flohrer,** *European Space Agency (ESA), Germany*

Rapporteur

- **Dr. Jan Siminski,** *ESA - European Space Agency, Germany*

A6.7. Re-entry Modelling and Interaction with Atmosphere

This session will discuss atmospheric re-entry modelling and its interaction with the atmosphere. It will cover prediction and safety aspects, analysis of atmospheric break-up processes (both mechanical and thermal), and experimental testing. The session will also consider the environmental impact of re-entry, including pollution and potential effects on aviation safety. Advances in models and prediction tools will be presented.

Co-Chairs

- **Dr. Ysolde PREVEREAUD,** *ONERA - The French Aerospace Lab, France*
- **Mr. Stijn Lemmens,** *European Space Agency (ESA), Netherlands (Kingdom of the)*

Rapporteur

- **Mr. Pierre Omaly,** *Astroscale France SAS, France*

A6.8-E9.1. Policy, Legal, Institutional, Economic and Security Aspects of Debris Mitigation, Debris Remediation and STM

This session will address all non-technical aspects of debris mitigation, debris remediation and STM. Papers may focus on aspects of responsibility, liability and registration, on the role of bodies such as UNCOPUOS or IADC, as well as on insurance, financial incentives and funding. In addition, security-related aspects and the role of international cooperation in addressing these issues may be considered.

Co-Chairs

- **Dr. David Spencer,** *The Aerospace Corporation, United States*
- **Prof. Serge Plattard,** *University College London (UCL), United Kingdom*

- Dr. Tanja Masson-Zwaan, *International Institute of Air and Space Law, Leiden University, Netherlands (Kingdom of the)*
- Dr. Andrea Capurso, *LUISS Guido Carli University, Italy*

Rapporteur

- Ms. Victoria Samson, *Secure World Foundation, United States*
- Dr. Emma Kerr, *Defence Science and Technology Laboratory (DSTL), United Kingdom*

A6.9. Space Debris Measurements and Orbit Determination SST (2)

This session will address all aspects related to the measurement of space objects and orbit determination. It will cover both ground-based and space-based techniques, as well as methods for identification and characterization of objects. Special attention will be given to data processing, orbit accuracy, and strategies to improve coverage and reliability of surveillance and tracking networks. The session expands the scope of A6.1.

Co-Chairs

- Dr. Fabrizio Piergentili, *Sapienza University of Rome, Italy*
- Mr. Juan Carlos Dolado Perez, *Look Up Space, France*

A6.10-B4.10. Joint Small Satellite/Space Debris Session on Small Satellite Operations for the Sustainability of Space

This session facilitates bilateral discussions between Small Satellite and Space Debris communities for shared understanding of the challenges/issues and to promote practical small satellite solutions for the long-term sustainability of space. It will include topics such as, but not limited to:
- Small satellite constellations operations, sustainability, post-mission disposal and de-orbiting
- Small-satellite missions: Lessons learned in the LEOP phase and in small satellite identification in early operational phase
- Debris risk mitigation and Space Traffic Management technologies for small satellites and constellations
- Small satellites for Post Mission Disposal, In-orbit servicing and support to sustainability actions and Space Traffic Management
- Capacity and slotting for small satellite constellations
- Lessons learned from sustainability and debris mitigation actions for small satellite missions and constellations
- Active Debris Removal missions and rendezvous and docking missions.
- Small satellite technology related to space sustainability
- Best practice in implementing sustainability on very small spacecraft.

Co-Chairs

- Dr. Paolo Marzioli, *Sapienza University of Rome, Italy*
- Mr. Philip Davies, *Byspace Ltd, United Kingdom*

Rapporteur

- Dr. Norman Fitz-Coy, *University of Florida, United States*

A7. IAF SYMPOSIUM ON ONGOING AND NEAR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS

Coordinator

- Dr. Andrew Court, *TNO, Netherlands (Kingdom of the)*
- Dr. Alessandra Di Cecco, *Agenzia Spaziale Italiana (ASI), Italy*
- Prof.Dr. Gustavo Medina Tanco, *Universidad Nacional Autónoma de México (UNAM), Mexico*

A7.1. Space Astronomy missions, strategies and plans

The session comprises invited talks by international space-agency division directors about their long-term views, priorities, and plans to implement developments and missions for the four fields (exoplanets, space astronomy, space physics and fundamental physics). The mission scope ranges from flagship-class, large-class, medium-class, and small-class to Smallsat platforms. The programme scope includes status updates on current programmes, near-term investment priorities, and long-range directions, including the relationship to community and guiding research panels.

Co-Chairs

- Dr. Eric Wille, *ESA, Netherlands (Kingdom of the)*
- Dr. Alessandra Di Cecco, *Agenzia Spaziale Italiana (ASI), Italy*

Rapporteur

- Dr. Andrew Court, *TNO, Netherlands (Kingdom of the)*

A7.2. Science Goals and Drivers for Future Exoplanet, Space Astronomy and Space Physics

The session has invited and contributed talks about scientific motivations, goals, opportunities, and needs in the four fields (exoplanets, space astronomy, space physics, and fundamental physics). New directions for measurements that are being opened by emergent results and newly understood phenomena will be explored, and science roadmaps to pursue them will be discussed.

Co-Chairs

- Prof. Pietro Ubertini, *INAF, Italy*
- Mrs. Maria Cristina Falvella, I*talian Space Agency (ASI), Italy*

Rapporteur

- **Dr. Alessandra Di Cecco,** *Agenzia Spaziale Italiana (ASI), Italy*

A7.3. Technology Needs for Future Missions, Systems, and Instruments

The session includes invited and contributed talks about the technology challenges and plans required to enable breakthrough science objectives in: exoplanet detection and characterization; astronomy throughout the electromagnetic spectrum and using gravitational waves; space physics including fractional gravity regimes and heliophysics; and fundamental physics including relativity. Topical focus includes measurement techniques, data types, performance requirements, instrument designs, mission concepts and systems, and associated technology developments.

Co-Chairs

- **Dr. Eric Wille, ESA,** *Netherlands (Kingdom of the)*
- **Dr. Andrew Court,** *TNO, Netherlands (Kingdom of the)*

Rapporteur

- **Mrs. Maria Cristina Falvella,** *Italian Space Agency (ASI), Italy*

A7.4. Lunar astrophysics: scientific instrumentation and ancillary systems

The return to the Moon will mark human society. A proof of the global interest is that already Artemis has reached 56 signatories, while ILRSCO already counts 12 signatories. Grand science can be both a beneficiary and a business model enabling the lunar economy. The symposium, in accord with the stated mission of the SATC, recognizes the importance of the Moon as a unique platform for astrophysical research in several domains, e.g.: (a) high-sensitivity observations of low-frequency radio waves, facilitating studies of the early universe, cosmic dawn, and galactic magnetic fields, (b) optical and infrared large interferometer arrays supporting exoplanet detection, stellar evolution studies, and galaxy formation research, (c) gravitational wave detection through lunar-based interferometers, impacting research on binary mergers and cosmic events, (d) large cosmic ray observatories enabling the direct measurement of the primary component of the flux. Such experiments need extensive infrastructure and face considerable technological, engineering and logistical challenges which require the tight cooperation between industry and scientists. The symposium will provide a space for the identification of both the scientific challenges, and the technologies which must be developed by industry to meet them, promoting the discussion among scientific and industrial actors as well as decision makers.

Co-Chairs

- **Prof.Dr. Gustavo Medina Tanco,** *Universidad Nacional Autónoma de México (UNAM), Mexico*
- **Prof. Pietro Ubertini,** *INAF, Italy*

Rapporteur

- **Dr. Andrew Court,** *TNO, Netherlands (Kingdom of the)*

CATEGORY B: APPLICATIONS AND OPERATIONS

On-going and future operational applications, including Earth observation, communication, navigation, human space endeavours and small satellites

B1. IAF EARTH OBSERVATION SYMPOSIUM
B2. IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM
B3. IAF HUMAN SPACEFLIGHT SYMPOSIUM
B4. 33RD IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS
B5. IAF SYMPOSIUM ON INTEGRATED APPLICATIONS
B6. IAF SPACE OPERATIONS SYMPOSIUM

Category coordinated by Igor V. Sorokin, *S.P. Korolev Rocket and Space Corporation Energia, RUSSIAN FEDERATION*

B1. IAF EARTH OBSERVATION SYMPOSIUM

Coordinator

- **Mr. Luís Ferreira,** *Airbus Defence and Space, Germany*
- **Dr. Annamaria Nassisi,** *Thales Alenia Space Italia, Italy*
- **Dr. Shimrit Tirosh Maman,** *Israel Space Agency, Israel*

B1.1. International Cooperation in Earth Observation Missions and Systems

This session focuses on Earth Observation missions, systems, and value-added products that are developed, implemented, or operated through international cooperation. To frame the strategic landscape, the session intends to host high-level keynote speakers addressing global EO trends, international policy frameworks, and the strategic alignment of multi-agency systems. Beyond direct multi-partner collaborations, we also welcome submissions examining holistic EO trends, international space policy, open data-sharing frameworks, and global climate monitoring strategies.
We invite abstracts presenting real-world case studies and experiences where cross-border collaboration between space agencies, governmental programs, public–private partnerships (PPPs), commercial entities, or academic institutions was essential to achieving mission objectives. Submissions should address the programmatic, organizational, governance, and management aspects of collaborative initiatives—sharing plans, current status, lessons learned, and the unique risks and challenges of multi-partner projects. We particularly encourage case studies demonstrating how international partnerships advance societal needs, such as climate change mitigation, Earth system health, disaster response, policy support, and capacity building in emerging space nations.
Areas of Interest Include:

- Joint Missions: Single spacecraft, constellations, and sustained EO programs developed across borders.
- Collaborative Systems: Co-developed spacecraft, instruments, ground segments, data processing suites, archiving, distribution, and calibration/validation networks.
- Shared Applications: Value-added products and services benefiting society, business, and scientific advancement.

Papers with technical focus should be submitted to B1.2.

Co-Chairs

- **Ms. Kyriaki Minoglou,** *European Space Agency (ESA), Netherlands (Kingdom of the)*
- **Mr. Cristian Bank,** *EUMETSAT, Germany*

Rapporteur

- **Dr. Mukund Kadursrinivas Rao,** *Independent consultant, India*
- **Mr. José Gavira Izquierdo,** *International Space Consultant, Netherlands (Kingdom of the)*

B1.2. Earth Observation Systems

Focus is on innovative and new concept system solutions for Earth observations and how well they perform to meet user / mission objectives. Functional and technical description are encouraged. Papers covering all phases of the life cycle are requested including for systems envisioned, planned, recently launched, ongoing, and historical for single spacecraft missions and constellations, and for all categories of purposes including for scientific research, experimental demonstration, and operational / commercial Earth observation. All sources of missions are sought including governmental / agency programs, public / private partnerships, commercial, academic / non-governmental / non-commercial. Desired papers convey design features, technical performance, status of technical execution (concept study, concept design, preliminary design, detailed design, development, operations, retirement, historical), and technical challenges of the associated program, and highlighting unique / unprecedented features and the technical value they provide. Papers with a management / organization / programmatic / business model / cooperation focus should be submitted to B1.1

Co-Chairs

- **Dr. Timo Stuffler,** *OHB System AG - Munich, Germany*
- **Prof. Erick Lansard,** *Satellite Research Center, Nanyang Technological University (NTU), Singapore*

Rapporteur

- **Dr. Annamaria Nassisi,** *Thales Alenia Space Italia, Italy*
- **Dr. Doris Klein,** *DLR (German Aerospace Center), Germany*

B1.3. Earth Observation Sensors and Technology

First focus is on Earth Observation sensors and instruments including future concepts being proposed, developed, tested, or calibrated, and those in operations for all aspects of Earth observation. Driven by user and scientific requirements, particular emphasis is on instrument systems that make innovative measurements and deliver improved performance for science, operational or commercial applications.
Second focus is on technologies for instruments, spacecraft and missions which enable innovation and advancement in sensor observations performance and capability. Capability advancement could be in coverage, resolution, onboard features such as processing, autonomy, adjustability/ adaptability, user commanding, or other technology that provides or is intended to provide improved utility to targeted and other users.

Co-Chair

- **Dr. Andrew Court,** *TNO, Netherlands (Kingdom of the)*

- **Dr. Oana van der Togt,** *Netherlands Aerospace Centre (NLR), Netherlands (Kingdom of the)*

Rapporteur

- **Mr. Jeffrey Apeldoorn,** *ICEYE, Finland*
- **Mr. Camilo Andres Reyes Mantilla,** *Colombian Space Agency, Colombia*

B1.4. Earth Observation Data Systems and Technology

The focus is on the development and operations of Earth Observation-related data processing systems. The emphasis of the session is on the challenges of emerging information and web-based technology (e.g. Big Data, Cloud-based operations, internet of things, crowd sourcing) for acquisition, communication, processing, dissemination and archiving of data.
The session also covers innovative methods for making data analysis ready, the extraction of information from these resulting large data sets (e.g. machine learning and artificial intelligence) and methods for making the information available timely to decision makers. This session also includes the evolving data processing infrastructure like federated Cloud systems and digital twin.

Co-Chair

- **Ms. Ana-Mia Louw,** *Simera Sense, South Africa*
- **Mr. James Graf,** *Jet Propulsion Laboratory, United States*

Rapporteur

- **Ms. Agnieszka Lukaszczyk,** *Hialtitude Space, Poland*
- **Dr. Meka Rajasekhar,** *Indian Space Research Organisation (ISRO), SDSC SHAR, Astronautical Society of India, India*

B1.5. Earth Observation Societal and Economic Applications, Challenges and Benefits

The focus of the session is on generating information and delivering applications and services using Earth Observations data for meeting sustainable development challenges, addressing socio-economic benefits, and delivering commercial services.
Presentation of analyses, methods, algorithms, processors, case studies and results from developing and operating applications and services (e.g., including consideration of investment cost, economic return, and societal benefits, especially leveraging innovative approaches), are encouraged. Optimized application satellite constellations, that emphasize the socio-economic aspects of these collective systems rather than focusing on individual techniques or single satellites are also encouraged.

Co-Chair

- **Dr. Na Yao,** *Qian Xuesen Laboratory of Space Technology, China Academy of Space Technology (CAST), China*
- **Dr. Michael Kern,** *ESA, France*

Rapporteur

- **Dr. Masami Onoda,** *Japan Aerospace Exploration Agency (JAXA), Japan*
- **Mr. Luís Ferreira,** *Airbus Defence and Space, Germany*

B1.6. AI to Improve Earth Observations across the value chain

AI is rapidly developing across a wide range of use cases that dramatically improve the collection, integration, accessibility, analysis, information content, and usability of satellite-based Earth observations for science, business, public, security and governmental applications.
This session seeks demonstrations, developments, and operational experience with new applications of AI in satellite remote sensing-based Earth observations. These include but are not limited to onboard processing, operational management of spacecraft, subsystems, constellations and missions, processing and analysis of data, calibration and validation, integration and data fusion, search ability and accessibility, user interface, enabling non-experts to execute use cases, extracting more information content, and utilizing satellite remote sensing data to improve models.

Co-Chair

- **Ms. Krystal Azelton,** *Secure World Foundation, United States*
- **Dr. Mariel Borowitz,** *Georgia Tech Space Research Institute, United States*

Rapporteur

- **Dr. Chen Xiaoli,** *Beijing Institute of Space Mechanics & Electricity, China Academy of Space Technology (CAST), China*
- **Ms. Alexandra Jercaianu,** *Nara Space, Republic of Korea*

B1.7. Earth Observations to address Earth's Environmental and Climate Challenges

The IPCC reports on climate change articulate the major global environmental challenges that require vast and sustained measurement and information systems to monitor key climate parameters and inform decision makers and enable potential mitigations.

Global governmental agencies, commercial and public/private partnerships are investing in creating systems and applications for environmental monitoring and prediction, and climate monitoring and change mitigation. This session focuses on the latest major findings in climate research and the systems being used to address the climate challenges, Earth Observations science, weather, oceanography, and land monitoring. Presentation of algorithms, processing chains and services especially leveraging innovative approaches, are encouraged. Optimized application satellite constellations, which do not focus on individual techniques or single satellites and describe the environmental / climate aspects of these collective systems, are also encouraged.

Co-Chair

- **Dr. Ole Morten Olsen,** *Norwegian Space Agency (NOSA), Norway*

- Dr. Shimrit Tirosh Maman, *Israel Space Agency, Israel*

Rapporteur

- Dr. Peter Schulte, *SARsatX, Saudi Arabia*
- Mr. Harry A. Cikanek, *National Oceanic and Atmospheric Administration (NOAA), United States*

B2. IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM

Coordinator

- Dr. Laszlo Bacsardi, *Budapest University of Technology and Economics, Hungary*
- Dr. Morio Toyoshima, *National Institute of Information and Communications Technology (NICT), Japan*

B2.1. Space-based PNT (Position, Navigation, Timing) Architectures, Applications, and Services

This session is focused on advances in space-based navigation systems, including the existing global systems (Beidou, Galileo, GLONASS, GPS) and regional systems (EGNOS, IRNSS, QZSS, WAAS), as well as proposed and emerging new space-based systems. The session also addresses advances in the services and applications of those systems for position, velocity, and time determination and tracking, and integrity assurance on Earth, Moon, and potentially other bodies of the solar system.

Co-Chair

- Prof. Giovanni B. Palmerini, *Sapienza University of Rome, Italy*
- Dr. Raj Thilak Rajan, *Delft University of Technology (TU Delft), Netherlands (Kingdom of the)*

Rapporteur

- Ms. Rania Toukebri, *AKKA, Germany*
- Ms. Stephanie Wan, *ICEYE, United States*

B2.2. Space-based PNT (Position, Navigation, Timing) Sensors and Systems

This session is focused on advances in technology applicable to space-based navigation systems. Technologies include hardware or software necessary for the entire navigation system (spacecraft, monitor and control system, end-user equipment) for GNSS and alternative navigation satellite architectures (such as LEO constellations), ground and space-based navigation user equipment, sensor fusion algorithms, frequency and time transfer standards, crosslink ranging, precise orbit & satellite clock error determination, etc. Technologies should be applicable to position, velocity, and time determination and tracking, and integrity assurance on Earth, Moon, and other off-Earth platforms.

Co-Chair

- Dr. Sanat K Biswas, *IIIT Delhi, India*

- **Dr. Peter Buist,** *European Union Agency for the Space Programme (EUSPA), Netherlands (Kingdom of the)*

Rapporteur

- **Prof. Chris Rizos,** *University of New South Wales, Australia*
- **Ms. Rania Toukebri,** *AKKA, Germany*

B2.3. Advance Higher Throughput Communications and Networks for GEO and LEO satellites

This session is focused on advanced higher throughput communications and networks for LEO constellations, GEO, MEO and Molnya to improve performances (increased capacity, low latency and reduced cost) including all aspects of space communications and networks, services, architecture and infrastructure: fixed, mobile and broadcast services; High-Throughput Satellite (HTS); Very-High Throughput Satellites (VHTS); Ultra-High Throughput Satellites (UHTS); Software Defined Satellite (SDS); inter-satellite link technologies; 5G integration into satellite networks; multiple access; Ku- and Ka-band, Q/V/W/E bands and higher frequencies; optical communications for HTS; VSAT/ESIM and broadcasting/radio/television and internet services, including video to users; and Artificial Intelligence (AI)/Machine Learning (ML) related technologies.

Co-Chair

- **Dr. Norbert Frischauf,** *TU Graz, Austria*
- **Ms. Hoda Awny,** *Egyptian Space Agency (EgSA), Egypt*

Rapporteur

- **Dr. Debra Emmons,** *The Aerospace Corporation, United States*
- **Prof. Otto Koudelka,** *Graz University of Technology (TU Graz), Austria*

B2.4. Space-based Optical and Quantum Communications

This session is focused on all aspects of space-based optical and quantum communications and networking: in-orbit, on-ground demonstrations and results; present and future scenarios; next generation systems and applications; terrestrial-based systems; small satellites; ranging technology with optical communications; imaging technology for optical communications; optical devices; optoelectronic subsystems and components; laboratory demonstration hardware; atmospheric propagation and modeling, transmission effects; compensation techniques; site-diversity techniques; modulation formats; trade-offs between optical and microwave (RF) systems; Quantum Key Distribution (QKD); advances in quantum communications; quantum internet; and atomic clocks.

Co-Chair

- **Dr. Laszlo Bacsardi,** *Budapest University of Technology and Economics, Hungary*
- **Mr. Kevin Shortt,** *Airbus Defence & Space, Germany*

Rapporteur

- **Dr. Nader Alagha,** *ESA, Netherlands (Kingdom of the)*
- **Dr. Christopher Vasko,** *European Space Agency (ESA), Netherlands (Kingdom of the)*

B2.5. Communications Systems and Networks for Near-Earth, Lunar, and Deep Space

Humanity's reach in space is expanding—from increasingly complex operations near Earth to sustained activity at the Moon and exploration across the solar system. Communications and navigation make that expansion possible, connecting spacecraft, explorers, and infrastructure while bringing science and data home across ever-greater distances.
This session explores the technologies, architectures, services, and policies that will enable this future. Topics include communications for lunar, planetary, and science missions; relay and network architectures; flight and ground demonstrations; next-generation RF, optical, and quantum communications; small-spacecraft communications; AI/ML-enabled systems and operations; and modeling and performance assessment. The session also welcomes work addressing spectrum allocation, interference, regulation, interoperability, and the challenges of an increasingly congested space environment.

We welcome new concepts, technologies, demonstrations, lessons learned, and forward-looking studies addressing a fundamental challenge of exploration: how do we build the communications infrastructure that takes us from the Moon to deep space and beyond?

Co-Chair

- **Mr. Dipak Srinivasan,** *The Johns Hopkins University Applied Physics Laboratory, United States*
- **Dr. Ramon P. De Paula,** *Retired NASA, United States*

Rapporteur

- **Dr. Sara AlMaeeni,** *Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates*
- **Mr. Dunay Badirkhanov,** *Azercosmos, Space Agency of Republic of Azerbaijan, Azerbaijan*

B2.6. Cubesat, Internet of Things, and Mobile Direct Communications

This session is focused on small satellite, IoT and mobile communication services that can communicate directly with 3GPP mobile phone terminals including all aspects of space communications, services, architecture and infrastructure: Narrow Band (NB)-IoT, 3GPP IoT terminals; LoRa IoT terminals; Low Power Wide Area (LPWA); Non-Terrestrial Network (NTN); cube-, pico-, nano-, micro-satellites; High Altitude Platform Station (HAPS); aircraft control; in-orbit, on-ground demonstrations and results; present and future scenarios; next generation systems and applications; terrestrial-based systems; small satellites; Earth observation satellites; devices; subsystems and components; laboratory demonstration hardware; site-diversity techniques; modulation formats. Both terrestrial and satellite networks will be available at the same terminal, and coverage is expected to expand significantly.

Co-Chair

- **Dr. Debra Emmons,** *The Aerospace Corporation, United States*
- **Mr. Giuseppe D'Amore,** *Agenzia Spaziale Italiana (ASI), Italy*

Rapporteur

- **Dr. Enrique Pacheco Cabrera,** *International Academy of Astronautics, Mexico*
- **Dr. Yuma Abe,** *National Institute of Information and Communications Technology (NICT), Japan*

B2.7. Advances in Space-based Communication Technologies

This session is focused on all aspects of advanced spacecraft and Earth station communications technologies for space-based communications, as applied to both existing and future systems. It covers – among others – communication devices and components, communications subsystem design, modulation and coding, propagation, power amplifiers, digital payload technologies including onboard processing and adaptive transmit technologies, and all other technology relevant to space communications.

Co-Chair

- **Dr. Enrique Pacheco Cabrera,** *International Academy of Astronautics, Mexico*
- **Mr. Steven Shumsky,** *Millennium Space Systems, A Boeing Company, United States*

Rapporteur

- **Mr. Elemer Bertenyi,** *Canadian Aeronautics and Space Institute, Canada*
- **Mr. Alvin Michael Mulumba,** *International Space University (ISU), France*

B2.8-GTS.3. Space Communications and Navigation Global Technical Session

This is a hybrid (virtual and in person) session that targets a global audience where developments in a wide range of satellite communication and space-based PNT (position, navigation, timing) topics are presented and discussed. Communication topics include fixed, mobile, broadcasting, and data relay technologies and services. Space-based PNT topics include sensors, systems, architectures, applications, and services. Topics ranging from Earth orbit to interplanetary space can be addressed. Authors are welcome to either present their work in person at the conference or remotely via the IAF's online platform.

This session offers authors the unique opportunity to directly engage an audience beyond just the on-site attendees and is co-sponsored by the Space Communications and Navigation Committee and the Workforce Development/Young Professionals Programme Committee.

Co-Chair

- **Dr. Eric Wille, ESA,** *Netherlands (Kingdom of the)*
- **Dr. Joshua Critchley-Marrows,** *ArkEdge Space Inc., Australia*
- **Mrs. Eleonora Lombardi,** *Fondazione E. Amaldi, Italy*

Rapporteur

- **Mr. Alvin Michael Mulumba,** *International Space University (ISU), France*
- **Mr. Manish Saxena,** *Indian Space Research Organization (ISRO), India*

B3. IAF HUMAN SPACEFLIGHT SYMPOSIUM

Coordinator

- **Mr. Kevin D. Foley,** *The Boeing Company, United States*
- **Mr. Sam Scimemi,** *National Aeronautics and Space Administration (NASA), United States*
- **Mr. Alex Karl,** *Space Applications Services, Belgium*
- **Dr. Kavya Manyapu,** *Space Generation Advisory Council (SGAC), United States*

B3.1. Governmental Human Spaceflight Programmes (Overview)

The session provides the forum for updates and annual "Overview" presentations on present and evolving governmental Human Spaceflight programmes. Each year, the session will focus on specific themes dealing with human spaceflight exploration. These will be selected by the session chairs based on the received abstracts. The session will accept manuscripts from any organization (agencies, industries, research centers, academia, etc.) dealing with international, Governmental human space programmes initiatives. The range of topic to be addressed in this session include mission to sub-orbital, LEO and BEO and include orbital systems, crew and cargo transportation systems, as well as surface systems and operations on the Moon. The format of the session (e.g. panel, pitching presentations, keynote speech) will be a result of such a selection.

Co-Chair

- **Ms. Robyn Gatens,** *National Aeronautics and Space Administration (NASA), United States*
- **Dr. Juergen Schlutz,** *European Space Agency (ESA), Germany*

Rapporteur

- **Mr. Antonio Fortunato,** *European Space Agency (ESA), Germany*

B3.2. Commercial Human Spaceflight Programmes

This session provides a forum for technical papers describing commercial human spaceflight applications in low Earth orbit (LEO) and beyond Earth orbit (BEO) inclusive of orbital, lunar, deep space and sub-orbital endeavours. Topics on international orbital space stations, the International Space Station, , human-tended space station platforms, commercial transportation systems, cis-lunar space, lunar surface operations as well as deep space exploration will be recognized. Areas of focus may include the architecture of commercial human spaceflight systems, commercial operations and utilization projects, commercial crew and cargo transportation, habitation, logistics systems, mobility, data and communication services. Other topics appropriate for this session include new technology, applications and capabilities in areas such as artificial intelligence, food and nutrition, health and medical, in-space manufacturing, in-situ resource utilization, robotics and automation, sustainability as well as market and economic development activity for human spaceflight in low Earth orbit (LEO) or beyond Earth orbit (BEO).

Co-Chair

- **Mr. Kevin D. Foley,** *The Boeing Company, United States*
- **Mr. Michael Lopez-Alegria,** *Axiom Space, United States*

Rapporteur

- Dr. Sergey K. Shaevich, *Khrunichev State Research & Production Space Center, Russian Federation*

B3.3. Advancements in Human Space Habitation for Orbital, Transit, and Surface Environments

This session features papers that highlight the latest advancements in human space habitation systems, covering orbital, transit, and planetary surface applications. Technical papers will present innovative technological advancements and architectural strategies that are crucial for ensuring the safety, sustainability, and well-being of crews during extended missions beyond Earth. Topics include achievements, technologies, design concepts, and future prospects for crewed and crew-tended space habitats, emphasizing all aspects of their utilization. Additionally, discussions will cover terrestrial-based test and analog facilities pivotal in advancing the development of future space habitation outposts.

Co-Chair

- Ms. Eleanor Morgan, *Lockheed Martin Corporation, United States*
- Dr. Kavya K. Manyapu, *NASA, United States*
- Mr. Thomas A.E. Andersen, *Danish Aerospace Company A/S, Denmark*

B3.4-B6.4. Flight & Ground Operations aspects of Human Spaceflight - Joint Session of the IAF Human Spaceflight and IAF Space Operations Symposia

This session addresses systems, advanced concepts, key challenges and their solutions related to flight and ground operations within governmental and commercial human spaceflight. Topics include among others; cutting-edge operational tools, solutions, efficient cost reduction measures, improved operational ground facilities or infrastructure, enhanced logistics concepts as well as new approaches for mission planning, ground transportation, and sustainment for sub-orbital, LEO and BEO.

Co-Chair

- Dr. Dieter Sabath, *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*
- Dr. Annamaria Piras, *Thales Alenia Space Italia, Italy*

Rapporteur

- Mr. Jérôme Campan, *European Space Agency (ESA), Germany*
- Ms. Maria Grulich, *Telespazio Germany GmbH, Germany*

B3.5. Astronaut Training, Accommodation, and Operations in Space

This session begins with an Astronaut Roundtable where an international group of astronauts from the various programmes will discuss their experiences in a roundtable format. There will be an extended Question and Answer period of interaction with the audience. This session concentrates on all aspects of spaceflight that are unique to the

presence of astronauts. It encompasses astronaut activities such as selection, training, workload management, and task division between flight and ground segments. It includes spacecraft systems and robotic tools; interfaces; international command, control and communications; payloads; research; and utilization. It addresses the unique spacecraft systems required to safely accommodate astronauts during intravehicular and extravehicular activities. The session includes astronaut pre-mission, mission, and post-mission support of technological and scientific space-based research and utilization of human space complexes and the space environment for sub-orbital, LEO and BEO missions.

Co-Chair

- Dr. Igor V. Sorokin, *S.P. Korolev Rocket and Space Corporation Energia, Russian Federation*
- Mr. Alan T. DeLuna, *American Astronautical Society (AAS), United States*

Rapporteur

- Mrs. Andrea Boyd, *Germany*

B3.6-A5.3. Human and Robotic Partnerships in Exploration - Joint session of the IAF Human Spaceflight and IAF Exploration Symposia

This session seeks papers on new systems and technologies for current human spaceflight and exploration programmes, and the role of human and robotic partnerships in areas such as onboard robotic assistants, habitat / infrastructure construction support, human mobility support systems (e.g. EVA mobility aids, rovers); and robotic precursor activities to human spaceflights for test, validation, and demonstration of systems. This session also welcomes papers considering how the roles of humans, machines and intelligent systems are likely to evolve in the coming years and the corresponding impact on complex mission design, implementation, and operations.

Co-Chair

- Mr. Mark Hempsell, *The British Interplanetary Society, United Kingdom*

Rapporteur

- Mr. Jan Marius Bach, *DLR (German Aerospace Center), Germany*
- Mr. Scott Ritter, *International Institute for Astronautical Sciences (IIAS), United States*

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 for sub-orbital, LEO and BEO, especially those driven by advanced technologies and innovations. Papers are solicited that address potential future subsystems, technologies, innovations, logistics, processes, procedures, etc. Papers are also encouraged that address key factors in enabling innovation and new system insertion in human space flight, including reliability, availability, first time use, learning by doing, early testing and integration results, and prototyping. Topics which enable or significantly improve future human space mission objectives are of interest including for exploration, commercial initiatives, tourism, and industrial undertakings. Also, lessons learned from past missions and their application to future missions are essential topics in this session.

Co-Chair

- Dr. Mauro Augelli, *UK Space Agency, United Kingdom*
- Mr. Sébastien BARDE, *Centre National d'Etudes Spatiales (CNES), France*

Rapporteur

- Dr. Gi-Hyuk Choi, *Korea Aerospace Research Institute (KARI), Republic of Korea*

B3.8. Human Space & Exploration

This session addresses current and future missions, applications and preparatory plans for human lunar and planetary exploration activities. The session covers human exploration of the Moon including its surface and cislunar space as well as Mars missions. Papers that delve into the programmatic and technical aspects of these activities are encouraged. Both national and international perspectives are invited as are emerging areas of commercial human exploration activities.

Co-Chair

- Mr. Dan King, *MDA Space, Canada*
- Mr. Joost van Tooren, *ALATYR, France*

Rapporteur

- Mr. Joao Lousada, *GMV GmbH, Spain*

B3.9-GTS.2. Human Spaceflight Global Technical Session

The Human Space Endeavours Global Technical Session is targeting individuals and organizations with the objective of sharing best practices, future projects, research and issues for the future of Human Space Endeavours for sub-orbital, LEO and BEO. This is a Global session co-sponsored by the Human Space Endeavours Committee and the Workforce Development/Young Professionals Programme Committee.

Co-Chair

- Mr. Guillaume Girard, *Zero2infinity, Spain*
- Ms. Andrea Jaime, *Isar Aerospace Technologies GmbH, Germany*

Rapporteur

- Mr. Joao Lousada, *GMV GmbH, Spain*

B4. 34th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS

Coordinator

- Mr. Alex da Silva Curiel, *Surrey Satellite Technology Ltd (SSTL), United Kingdom*

- Dr. Jian Guo, *Delft University of Technology (TU Delft), Netherlands (Kingdom of the)*

B4.1. 28th Workshop on Small Satellite Programmes at the Service of Developing Countries

This workshop is organized jointly by the United Nations Office for Outer Space Affairs (UNOOSA) and the International Academy of Astronautics (IAA). It shall review the needs that could be satisfied and results achieved by developing nations through using small satellites. National space plans and examples of application results and benefits shall be included. Small satellite programmes in Africa, Middle East, and Central Asia would be of particular interest to the session. The workshop shall also review the results of international cooperation, technology transfer, lessons learned and the extent to which these efforts have contributed to the space maturity of developing countries.

Co-Chair

- Dr. Sias Mostert, *Space Commercial Services Holdings (Pty) Ltd, South Africa*
- Ms. Nathalie RICARD, *United Nations Office for Outer Space Affairs, Austria*

Rapporteur

- Prof. Danielle Wood, *Massachusetts Institute of Technology (MIT), United States*
- Dr. Taiwo Raphael Tejumola, *University of Southampton, United Kingdom*

B4.2. Small Space Science Missions

Small satellites provide an opportunity for flying Earth observation (please submit those to B4.4), near-Earth geospace (upper atmosphere, ionosphere), magnetosphere, cis-lunar, heliospheric, solar as well as planetary and astrophysics missions. Recently space weather has attracted significant investment for practical applications (e.g. Ionospheric data products), atmospheric drag measurements, and energetic particle measurements. Other practical problems include spacecraft charging (especially for polar orbits) and radiation monitoring and characterization for cislunar and lunar surface operations. Basic physics experiments can also be carried out in space – these are also of interest. Your talk describing a mission or instrument suitable for a small spacecraft is welcome. Constellations described from the science perspective are of interest as well.

Co-Chairs

- Dr. Larry Paxton, *The Johns Hopkins University Applied Physics Laboratory, United States*
- Dr. Oana van der Togt, *Netherlands Aerospace Centre (NLR), Netherlands (Kingdom of the)*

Rapporteur

- Ms. Roberta Mugellesi-Dow, *European Space Agency (ESA), United Kingdom*

B4.3. Small Satellite Operations

This session covers the planning for, and execution of, cost-effective approaches for Small Satellite Operations, with emphasis on new missions, including constellations of small satellites, with new models of operation to reduce mission lifecycle costs and to minimize the cost impact of mission extensions. Papers addressing innovation, an entrepreneurial approach to new business opportunities, novel finance and business models, management techniques,

and international cooperation in support of Small Satellite Operations are particularly encouraged. Papers that discuss the application of novel technology to mission operations, such as automation and autonomy, constraint resolution, and timeline planning, as well as reports on missions recently accomplished and lessons learned, are also welcome.

Co-Chairs

- **Mr. Andreas Hornig,** *AerospaceResearch.net, Germany*
- **Mr. Nijin Jose Thykkathu,** *Science and Technology Facilities Council, United Kingdom*

Rapporteur

- **Ms. Lynette Tan, Space Faculty, Singapore**
- **Mr. Stephan Roemer, OHB, Germany**

B4.4. Small Earth Observation Missions

Small satellites enable a wide range of capabilities that can be cost effective means of collection of data for decision makers, scientists, engineers, and managers. We solicit contributions that address approaches to delivering cost-effective small satellite missions, their associated instruments, enabling technologies, and/or designs of both current and planned Earth observation missions. If your mission is observing the Earth upper atmosphere (mesosphere, thermosphere, ionosphere) please consider session B.4.2. Small satellites missions can also be used to develop national capabilities; missions that address emerging users of space are welcome. Small satellites are well-suited to lower-cost constellations; missions in development and commercial applications are encouraged. Pathfinders for possible constellations are also of interest.

Co-Chairs

- **Dr. Larry Paxton,** *The Johns Hopkins University Applied Physics Laboratory, United States*
- **Dr. Eugene D Kim,** *Satrec Initiative, Republic of Korea*

Rapporteur

- **Mr. Carsten Tobehn, European Space Agency (ESA),** *Netherlands (Kingdom of the)*
- **Mr. Marco Gomez Jenkins,** *United Kingdom*

B4.5. Access to Space for Small Satellite Missions

A key challenge facing the viability and growth of the small satellite community is affordable and reliable space access. Topics of interest for this session include the utilization of dedicated launches; development of ride-share systems, auxiliary payload systems, and separation and dispenser systems; and responsive integration approaches that will enable efficient small satellite access to space. Includes lessons learned from users on technical and programmatic approaches. For a dedicated discussion of small satellite propulsion systems, please refer to session B4.5A-C4.8. For a discussion of small launchers concepts and operations, please refer to session D2.7.

Co-Chairs

- **Mr. Yves Gerard,** *Airbus Defence & Space, France*

- **Mr. Philip Davies,** *Byspace Ltd, United Kingdom*

Rapporteur

- **Mr. Jeffrey Michlitsch,** *The Aerospace Corporation, United States*
- **Mr. Carlos Niederstrasser,** *Northrop Grumman Corporation, United States*

B4.5A-C4.8. Joint Session between IAA and IAF for Small Satellite Propulsion Systems

This session will pay particular attention to propulsion systems and associated technologies as an enabler to efficient small satellite access to space and orbit change. Papers are invited discussing the particular challenges of design, manufacture, testing, operations and technological developments of small satellite propulsion systems, and the challenges of obtaining high performance within a small volume and mass. The scope includes chemical and electric propulsion systems for major orbit changes, fine orbit control and maintenance, and end-of-life disposal. This session will be accepting submissions for oral presentations only.
For papers with an emphasis on the small satellite and its system design, refer to other B4 sessions. For a focus on other propulsion systems and technologies, refer to other C4 sessions.

Co-Chairs

- **Mr. Jeffrey Michlitsch,** *The Aerospace Corporation, United States*
- **Prof. Paolo Gessini,** *Brazilian Space Agency (AEB), Brazil*

Rapporteur

- **Mrs. Elena Toson,** *Space Generation Advisory Council (SGAC), Italy*
- **Prof. Sabrina Corpino,** *Politecnico di Torino, Italy*

B4.6A. Generic Technologies for Small Satellites (1)

This session, together with session B4.6B, covers emerging and promising generic technologies for small satellites, including platform and payload technologies. Real-life examples are particularly encouraged, both recently launched and shortly to be launched (next 3 years).

Co-Chairs

- **Mr. Philip Davies,** *Byspace Ltd, United Kingdom*
- **Mr. Joost Elstak,** *ICEYE, Netherlands (Kingdom of the)*

Rapporteur

- **Dr. Jian Guo,** *Delft University of Technology (TU Delft), Netherlands (Kingdom of the)*
- **Mr. Thomas Terzibaschian,** *Astro- und Feinwerktechnik Adlershof GmbH, Germany*
- **Prof. Youngho Eun,** *Yonsei University, Republic of Korea*

B4.6B. Generic Technologies for Small Satellites (2)

This session, together with session B4.6A, covers emerging and promising generic technologies for small satellites, including platform and payload technologies. Real-life examples are particularly encouraged, both recently launched and shortly to be launched (next 3 years).

Co-Chairs

- **Mr. Andy Vick, RAL Space,** *United Kingdom*
- **Dr. Martin von der Ohe,** *Lacuna Space, Germany*

Rapporteur

- **Ms. Hoda Awny,** *Egyptian Space Agency (EgSA), Egypt*
- **Dr. Paolo Marzioli,** *Sapienza University of Rome, Italy*

B4.7. Constellations and Distributed Systems

Small satellites offer important advantages in creating new opportunities for implementing spatially-distributed space-based systems (e.g. Constellations). In this session we focus on new, emerging, or enabling technologies that can be used or are being used to create networked data collection systems via small satellites. Specifically, Session B4.7 focuses on Constellations (e.g. Constellation missions for Earth Observation, IoT/M2M and LEO Communications), distributed architectures (e.g. Distributed SAR systems) and sensor systems and how these low-cost and rapidly delivered technologies offer the potential to fulfil complex user needs, working in coordination with other small or large space infrastructures (e.g. mega-constellations), as well as with airborne or terrestrial assets. Papers should show how cross-platform compatibility (both hardware and software aspects) can be used to enable these systems, any standards that are proposed or adopted, design techniques that enable this cross-platform compatibility, etc. We are particularly interested in technologies that enable small spacecraft to play an important role in upcoming applications, such as (but not limited to) civil security, telecommunications in remote areas, navigation support (e.g., along the new foreseen routes in the Arctic), natural disaster management (e.g., damage assessment and first responders support), and planetary exploration. In this regard, the development and usage of Commercial-off-the-shelf (COTS) technologies are also of specific interest to the session. Distributed systems and their impact in terms of new opportunities for the emerging Commercial Space Industry and new commercial space missions with small platforms is also of specific interest to the session. The integrated applications of these sensor systems are covered in Symposium Session B5.2, and the broader view of tools and technologies to enable integrated applications are covered in B5.1. In B4.7 authors are also invited to analyze technological enhancements and new developments needed to guarantee small satellite integration with existing and scheduled assets from both the bus and payload perspectives. Also analysis of inter-operability within integrated systems can be addressed, like payload data management, spacecraft operation, and formation flying.

Co-Chairs

- **Dr. Rainer Sandau,** *International Academy of Astronautics (IAA), Germany*
- **Prof. Michele Grassi,** *University of Naples "Federico II", Italy*

Rapporteur

- **Dr. Jaime Esper,** *National Aeronautics and Space Administration (NASA), United States*
- **Dr. Maria Daniela Graziano,** *University of Naples "Federico II", Italy*
- **Prof. Klaus Schilling,** *University Wuerzburg, Germany*

B4.8. Small Spacecraft for Deep-Space Exploration

This session focuses on innovative small spacecraft designs, systems, missions and technologies for the exploration and commercialization of space beyond Earth orbit. Target destinations for these miniaturized space probes include the Earth's Moon, Mars, comets and asteroids, as well as other destinations that are targets for in-situ resource utilization (ISRU). Small exploration probes covered by this session may come in many different forms including special-purpose miniature spacecraft, standard format small platforms such as Cubesats or other microsats, nanosats, picosats, etc. Topics include new and emerging technologies including the use of commercial off the shelf (COTS) technologies, miniaturized subsystems including propulsion, avionics, guidance navigation & control, power supply, communication, thermal management, and sensors and instruments. The main focus of this session is on new and emerging systems, missions, driving technologies and applications that are both government-funded as well as driven by commercial ventures.

Co-Chairs

- **Dr. Leon Alkalai,** *Mandala Space Ventures, United States*
- **Prof. Rene Laufer,** *Luleå University of Technology, Sweden*

Rapporteur

- **Dr. Lihua Zhang,** *DFH Satellite Co. Ltd., China*
- **Prof. Zhaokui Wang,** *Tsinghua University, China*

B4.9-GTS.5. Small Satellite Missions Global Technical Session

The Small Satellite Missions Global Technical Session (GTS) is a collaboration between the International Academy of Astronautics (IAA) Small Satellite Missions Symposium and the International Astronautical Federation (IAF) Workforce Development/Young Professionals Programme Committee. This session is unique in that it allows for sharing of information on a global scale with presenters and audience both at the IAC venue and online at their home/work/university locations.

Abstracts are solicited regarding operational missions or mature proposals for small satellite systems and related topics. These must have clear relevance on an international scale or at a business level, and must also provide young professionals a taste of what the space sector has to offer. Where possible, abstracts should have a wide interest in the community and should include transferable knowledge or lessons learned. Abstracts highlighting ingenuity or innovation are preferred. Examples include space missions utilizing small satellites that address specific new societal, scientific or commercial challenges, or novel technologies that have the potential to revolutionize space missions and/or enable their access to space. Papers are to describe the specific need, the small satellite approach that addresses this need, the benefits of this approach and the use of space technology, and demonstrate that other non-space approaches provide inferior solutions.
Papers from, or directed at the young professional community are preferred. This session will be accepting submissions for oral presentations only.

Co-Chairs

- **Dr. Matthias Hetscher,** *DLR (German Aerospace Center), Germany*
- **Mr. LIKHIT WARANON,** *Geo-Informatics and Space Technology Development Agency (Public Organization), Thailand*

Rapporteur

- **Mr. Alex da Silva Curiel,** *Surrey Satellite Technology Ltd (SSTL), United Kingdom*
- **Prof. Victoria Barabash,** *Luleå University of Technology, Sweden*

B4.10-A6.10. Joint Small Satellite/Space Debris Session on Small Satellite Operations for the Sustainability of Space

This session facilitates bilateral discussions between Small Satellite and Space Debris communities for shared understanding of the challenges/issues and to promote practical small satellite solutions for the long-term sustainability of space. It will include topics such as, but not limited to:

- Small satellite constellations operations, sustainability, post-mission disposal and de-orbiting
- Small-satellite missions: Lessons learned in the LEOP phase and in small satellite identification in early operational phase
- Debris risk mitigation and Space Traffic Management technologies for small satellites and constellations
- Small satellites for Post Mission Disposal, In-orbit servicing and support to sustainability actions and Space Traffic Management
- Capacity and slotting for small satellite constellations
- Lessons learned from sustainability and debris mitigation actions for small satellite missions and constellations
- Active Debris Removal missions and rendezvous and docking missions.
- Small satellite technology related to space sustainability
- Best practice in implementing sustainability on very small spacecraft.

Co-Chairs

- **Dr. Paolo Marzioli,** *Sapienza University of Rome, Italy*
- **Mr. Philip Davies,** *Byspace Ltd, United Kingdom*

Rapporteur

- **Dr. Norman Fitz-Coy,** *University of Florida, United States*

B5. IAF SYMPOSIUM ON INTEGRATED APPLICATIONS

Coordinators

- **Dr. Jeanne Holm,** *University of California, Los Angeles (UCLA), United States*
- **Ms. Roberta Mugellesi-Dow,** *European Space Agency (ESA), United Kingdom*

B5.1. Tools and Technology in Support of Integrated Applications

The session will focus on the systems, tools, and technologies that support integrated applications, with particular attention to the practical and strategic challenges involved in their development and deployment. It will examine the types of data required, the methods used to collect and validate those data, and the ways in which diverse datasets can be integrated, analysed, and distributed to respond effectively to key user needs. In this context, integrated applications are understood as solutions that exploit both space-based combined with terrestrial and digital technologies to deliver tangible benefits for society, industry, public services, and the global population more broadly. The session will also consider how emerging and disruptive technologies— including Generative AI, Quantum computing technologies, advanced data analytics, and other rapidly evolving digital capabilities—are transforming infrastructure, reshaping global and local economies, and creating new opportunities for the space sector. Understanding the potential of these technologies, as well as their implications for shifting demographics, global connectivity, service delivery, and user engagement, is essential for ensuring that space-enabled applications remain relevant, resilient, and impactful. Possible topics may include ground-truthing of data collected from space platforms; innovative and cost-effective approaches to data distribution and access, with a specific focus on the space segment; novel methods for integrating space and non-space data; data fusion, modelling, and visualisation tools; enabling technologies that support the development of new applications; models and frameworks for application delivery; the management of integrated applications programmes; and public outreach initiatives designed to connect communities, stakeholders, and end users with the value and potential of space-enabled services.

Co-Chairs

- **Dr. Jeanne Holm,** *University of California, Los Angeles (UCLA), United States*
- **Ms. Roberta Mugellesi-Dow,** *European Space Agency (ESA), United Kingdom*

Rapporteur

- **Ms. Marion Allayioti,** *European Space Agency (ESA), United Kingdom*

B5.2. Integrated Applications End-to-End Solutions

The session will provide a forum for presenting end-to-end solutions, operational use cases, case studies, proof-of-concept applications, pilot activities, and ongoing projects that demonstrate how terrestrial and space-based data sources can be combined with models, digital tools, and enabling technologies to address clearly defined user needs. Particular attention will be given to innovative, practical, and sustainable solutions that integrate satellite Earth observation, navigation, telecommunications, in-situ measurements, ground-based information, socio-economic data, artificial intelligence, advanced modelling, and other relevant technologies to support informed decision-making and deliver measurable benefits to users and stakeholders. The session will welcome contributions from a wide range of sectors, including disaster and crisis monitoring and management, climate resilience, energy, food security, agriculture, smart cities, urban planning, transport, logistics, health, maritime activities, education, tourism, environmental protection, and other domains where integrated applications can create operational, economic, and societal value. Contributions may address the identification and prioritisation of user requirements, the organisation and engagement of user communities, the design of the service value chain, data access and distribution, service validation, scalability, sustainability, business models, and the pathways through which solutions can move from demonstration to implementation and long-term adoption. The session will also encourage discussion on partnerships between space and non-space stakeholders, including public authorities, industry, research organisations, service providers, local communities, and end users, as these collaborations are essential for ensuring that integrated applications are relevant, trusted, and effectively embedded into existing practices and decision-making processes. Examples of projects that have established partnerships, demonstrated user uptake, or shown clear potential for replication across regions or

sectors are particularly encouraged. In addition, the session will consider the different approaches used to assess the impact of integrated applications, including their contribution to addressing user and stakeholder needs, improving efficiency and resilience, supporting policy objectives, strengthening service delivery, creating new market opportunities, and generating broader societal benefits.

Co-Chairs

- **Ms. Roberta Mugellesi-Dow,** *European Space Agency (ESA), United Kingdom*
- **Dr. Jeanne Holm,** *University of California, Los Angeles (UCLA), United States*

Rapporteur

- **Ms. Marion Allayioti,** *European Space Agency (ESA), United Kingdom*
- **Mrs. Laura Alvarez,** *The Ohio State University College of Engineering, United States*

B5.3. Integrated Commercial Satellite Applications for Sustainability and Climate

Spaceflight represents one of humanity's most powerful tools for addressing our planet's most pressing global challenges . From monitoring Ozone depletion and deforestation to enabling precision agriculture and disaster response, space-derived data and insights have been essential in advancing sustainable solutions. This session invites paper focused on integrated commercial stallite applications that directly support the seventeen (17) UN Sustainable development goals, including but not limited to efforts in climate change mitigation, biodiversity preservation, food and water security, and public health. Contributions are encouraged that demonstrate how space-based assets integrated with terrestrial systems, innovative analytics, and cross-sector partnerships, can enable measurable progress toward sustainability objectives. Relevant domains include (but are not limited to): agriculture, water and air quality, maritime and land resource management, disaster resilience, space domain awareness and orbital debris mitigation, transportation and mobility, and energy transition. Papers may present operational case studies, prototype systems, cross-domain architectures, or strategic frameworks that showcase the power of integrated space applications to make life on Earth more sustainable, equitable, and resilient.

Co-Chairs

- **Dr. Bruce Chesley,** *Teaching Science and Technology, Inc (TSTI), United States*
- **Dr. John M. Horack,** *The Ohio State University College of Engineering, United States*

Rapporteur

- **Prof. Marcello Romano,** *Technical University of Munich (TUM), Germany*

B5.4. Advancing Earth observation with artificial intelligence across the full value chain

The integration of Artificial Intelligence (AI) into Earth Observation is expected to be a truly transformative force, going well beyond incremental improvements to fundamentally reshape the way the sector designs missions, processes data, develops services, and delivers actionable insights to users. While several existing sessions already provide opportunities to discuss the application of AI to specific technical challenges and use cases, the added value of this session lies in its holistic, end-to-end perspective. It aims to examine how AI can act not only as a tool for solving

isolated problems, but also as an enabling engine across the full Earth Observation value chain, from early mission conception and system design through onboard processing, data compression, multimodal data fusion, analytics, prediction, service generation, and operational decision support.
The session will invite contributions from academia, industry, public institutions and service providers, to present the state of the art in AI methods, platforms, and applications. Particular interest will be given to adaptive and autonomous EO systems, onboard intelligence, integration of EO with complementary data sources, and socio-economic data, generative AI approaches that broaden access to EO capabilities, and scalable AI infrastructures supporting the growing EO data economy. The session will also explore ethical AI practices.
By bringing together technical innovation, operational experience, and user-driven perspectives, the session will provide a comprehensive view of the AI-driven transformation currently emerging in Earth Observation. Ultimately, it will illustrate how AI can strengthen the role of Earth Observation in addressing environmental, societal, economic, and policy challenges.

Co-Chairs

- **Mr. Luís Ferreira,** *Airbus Defence and Space, Germany*
- **Ms. Giulia Manzetti,** *OHB, Germany*

Rapporteur

- **Mrs. Beatrice Barresi,** *European Space Agency (ESA), Netherlands (Kingdom of the)*

B6. IAF SPACE OPERATIONS SYMPOSIUM

Coordinators

- **Mr. Andreas Rudolph,** *European Space Agency (ESA), Germany*
- **Dr. Otfrid G. Liepack,** *National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States*
- **Mrs. Zeina Mounzer,** *Telespazio VEGA Deutschland GmbH, Germany*
- **Mr. Borre Pedersen,** *Kongsberg Satellite Services AS, Norway*
- **Mr. Claude Audouy,** *Centre National d'Etudes Spatiales (CNES), France*

B6.1. Ground Operations - Systems and Solutions

This session addresses all aspects of ground systems and solutions for all mission types, for both preparation and execution phases.

Co-Chairs

- **Mr. Sean Burns,** *EUMETSAT, Germany*
- **Mr. Claude Audouy,** *Centre National d'Etudes Spatiales (CNES), France*

Rapporteur

- Dr. Regina Mosenkis, *Airbus Defence & Space, Germany*
- Mr. Keyur Patel, *National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States*

B6.2. Innovative Space Operations Concepts and Advanced Systems

This session addresses innovative space operations and addresses advanced concepts, systems, approaches, processes and tools for operating existing and new types of missions, improving mission output in quality and quantity, and reducing cost.

Co-Chairs

- Mr. Mario Cardano, *Thales Alenia Space France, Italy*
- Dr. Andreas Ohndorf, *European Space Agency (ESA-ESTEC), Netherlands (Kingdom of the)*

Rapporteur

- Dr. Jackelynne Silva-Martinez, *NASA, United States*
- Mr. Yuichiro Nogawa, *Japan Manned Space Systems Corporation (JAMSS), Japan*

B6.3. Mission Operations, Validation, Simulation and Training

This session addresses the broad topic of operations, from preparation through validation, simulation and training, including operations concepts, execution and lessons learned. This includes both flight and surface operations.

Co-Chairs

- Mr. Andreas Rudolph, *European Space Agency (ESA), Germany*
- Mrs. Zeina Mounzer, *Telespazio VEGA Deutschland GmbH, Germany*

Rapporteur

- Mr. Borre Pedersen, *Kongsberg Satellite Services AS, Norway*
- Mr. Samuel Peterson, *Embry-Riddle Aeronautical University Worldwide, United States*

B6.4-B3.4. Flight & Ground Operations of HSF Systems - A Joint Session of the IAF Human Spaceflight and IAF Space Operations Symposia

This session addresses systems, advanced concepts, key challenges and their solutions related to flight and ground operations within governmental and commercial human spaceflight. Topics include among others; cutting-edge operational tools, solutions, efficient cost reduction measures, improved operational ground facilities or infrastructure, enhanced logistics concepts as well as new approaches for mission planning, ground transportation, and sustainment for sub-orbital, LEO and BEO.

Co-Chairs

- Dr. Dieter Sabath, *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*
- Dr. Annamaria Piras, *Thales Alenia Space Italia, Italy*

Rapporteur

- Mr. Jérôme Campan, *European Space Agency (ESA), Germany*
- Ms. Maria Grulich, *Telespazio Germany GmbH, Germany*

B6.5. Large Constellations & Fleet Operations

Access to space has been simplified and opened the door to a wider range of applications. Organisations are opting for distributed architectures of satellite constellations instead of single-satellite missions. The complexity of the overall system has shifted and necessitated a focus on efficient management and operation of a multitude of heterogeneous smaller elements. This session addresses the operations of large constellations, covering all related elements and phases; the operations concepts and solutions, the required ground segment architecture, the scale-up, deployment, and exploitation, the space traffic management approaches, end-of-life management, as well as the advantages, challenges, the outlook and foreseen developments.

Co-Chairs

- Mr. Simon Plum, *European Space Agency (ESA-ESOC), Germany*
- Dr. Thomas Uhlig, *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*

Rapporteur

- Ms. Shawn Linam, *Qwaltec, Inc., United States*
- Dr. Mario Cardano, *Thales Alenia Space Italia, Italy*

CATEGORY C: TECHNOLOGY

Common technologies to space systems, including astrodynamics, structures, power and propulsion

C1. IAF ASTRODYNAMICS SYMPOSIUM
C2. IAF MATERIALS AND STRUCTURES SYMPOSIUM
C3. IAF SPACE POWER SYMPOSIUM
C4. IAF SPACE PROPULSION SYMPOSIUM
C.5. ENGINEERING FOUNDATIONS OF SPACE ROBOTICS, AUTONOMOUS SYSTEMS, AND INTELLIGENT MACHINES

Category coordinated by John C. Mankins, *ARTEMIS Innovation Management Solutions, LLC, UNITED STATES*

C1. IAF ASTRODYNAMICS SYMPOSIUM

Coordinators

- **Dr. Elena Fantino,** *Khalifa University of Science and Technology (KUST), United Arab Emirates*
- **Mr. Vincent Martinot,** *Thales Alenia Space France, France*

C1.1. Orbital Dynamics (1)

This theme discusses advances in the knowledge of natural motions of objects in orbit around the Earth, planets, minor bodies, Lagrangian points and more generally natural orbital dynamics of spacecraft in the Solar System. It also covers advances in orbit determination.

Co-Chair

- **Mr. Yoshitsugu Hitachi,** *ispace, inc., Japan*
- **Prof. Kathleen Howell,** *Purdue University, United States*

Rapporteur

- **Dr. Danil Ivanov,** *Keldysh Institute of Applied Mathematics of RAS, Russian Federation*

C1.2. Orbital Dynamics (2)

This theme discusses advances in the knowledge of natural motions of objects in orbit around the Earth, planets, minor bodies, Lagrangian points and more generally natural orbital dynamics of spacecraft in the Solar System. It also covers advances in orbit determination.

Co-Chairs

- **Prof. Roberto Armellin,** *The University of Auckland, New Zealand*
- **Prof. Josep J. Masdemont,** *Universitat Politecnica de Catalunya (UPC), Spain*

Rapporteur

- **Dr. Mar Vaquero,** *NASA Jet Propulsion Laboratory, United States*

C1.3. Attitude Dynamics (1)

This theme discusses advances in spacecraft attitude dynamics and control, as well as design, testing and performance of novel attitude sensors and actuators. This theme also covers dynamics and control of multiple interconnected rigid and flexible bodies, including tethered systems, and in-orbit assembly.

Co-Chair

- **Prof. Marcello Romano,** *Technical University of Munich (TUM), Germany*
- **Dr. Zhanfeng Meng,** *China Academy of Space Technology (CAST), China*

Rapporteur

- **Dr. Vladimir Razoumny,** *RUDN University, Russian Federation*

C1.4. Attitude Dynamics (2)

This theme discusses advances in spacecraft attitude dynamics and control, as well as design, testing and performance of novel attitude sensors and actuators. This theme also covers dynamics and control of multiple interconnected rigid and flexible bodies, including tethered systems, and in-orbit assembly.

Co-Chairs

- **Dr. Feng Jinglang,** *University of Strathclyde, United Kingdom*
- **Bang Hyochoong,** *Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea*

Rapporteur

- **Prof. Anna Guerman,** *Centre for Mechanical and Aerospace Science and Technologies (C-MAST), Portugal*

C1.5. Guidance, Navigation and Control (1)

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

Co-Chair

- **Prof.Dr. Shinichiro Sakai,** *ISAS/JAXA, Japan*
- **Prof. Steve Ulrich,** *Carleton University, Canada*

Rapporteur

- **Ms. Yuying Liang,** *China*

C1.6. Guidance, Navigation and Control (2)

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

Co-Chairs

- **Prof. Mai Bando,** *Kyushu University, Japan*
- **Dr. Chen-Huan Pi**

Rapporteur

- Dr. Florian Renk, *European Space Agency (ESA), Germany*

C1.7. Guidance, Navigation and Control (3)

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

Co-Chair

- Dr. Puneet Singla, *Pennsylvania State University, United States*
- Dr. Bernard Lübke-Ossenbeck, *OHB System AG-Bremen, Germany*

Rapporteur

- Dr. Antonio Fernando Bertachini de Almeida Prado, *INPE - Natiional Institute for Space Research, Brazil*

C1.8. Mission Design, Operations & Optimization (1)

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

Co-Chairs

- Prof. Erick Lansard, *Satellite Research Center, Nanyang Technological University (NTU), Singapore*
- Prof. Paolo Teofilatto, *Sapienza University of Rome, Italy*

Rapporteur

- Prof. Michèle Lavagna, *Politecnico di Milano, Italy*

C1.9. Mission Design, Operations & Optimization (2)

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

Co-Chair

- Dr. Diane Davis, *Texas A&M University, United States*
- Prof. Stéphanie Lizy Destrez, *SUPAERO- Ecole Nationale Supérieure de l'Aéronautique et de l'Espace, France*

Rapporteur

- Dr. Mauro Pontani, *Sapienza University of Rome, Italy*

C2. IAF MATERIALS AND STRUCTURES SYMPOSIUM

Coordinators

- **Dr. Jochen Albus,** *ArianeGroup, Germany*
- **Mr. Alwin Eisenmann,** *Deutsche Gesellschaft für Luft-und Raumfahrt, Lilienthal-Oberth e.V. (DGLR), Germany*

C2.1. Space Structures I Design, Development and Verification (Launch Vehicles and Space Vehicles, including their Mechanical/Thermal/ Fluidic Systems)

The topics addressed in this session cover the aspects of the design, development and verification of space launch system structures (e.g. pressurized propellant tanks, non-pressurized structures of space vehicles, control surfaces) and their components (e.g. fluidic equipment and propulsive lines, thermal control systems). The aspects of design, development, verification, and qualification concern:

• Thermo-Mechanical loads and environment
• New structural concepts (e.g. Multi-functional structures, design concepts for reusability)
• Structure design and verification (stiffness, strength, static and dynamic stability, damage tolerance, reusability)
• design, verification and qualification of fluidic and thermal control systems
• Structure optimization
• Materials
• Static and dynamic ground testing
• Exploitation of flight measurements and in-orbit testing
• Lessons learned related to space vehicle structures and components development, verification and qualification

Co-Chair

- **Mr. Alwin Eisenmann,** *Deutsche Gesellschaft für Luft-und Raumfahrt, Lilienthal-Oberth e.V. (DGLR), Germany*
- **Dr. Jochen Albus,** *ArianeGroup, Germany*

Rapporteur

- **Ms. Coraline Dalibot,** *Rutherford Appleton Laboratory, United Kingdom*

C2.2. Space Structures II Development and Verification (Orbital deployable and dimensionally stable structures, including mechanical and robotic systems and subsystems)

The topics to be addressed within this session concern all aspects of deployable and dimensionally stable structures e.g. reflectors, telescopes, antennas etc. It includes structural design, analysis and verification, shape control and thermal distortion as well as evaluation of analysis versus test results, of both on-ground and in-orbit testing. Furthermore, related mechanical, thermal and robotic systems and subsystems/mechanisms will be covered.

Co-Chairs

- **Prof. Paolo Gasbarri,** *University of Rome "La Sapienza", Italy*
- **Prof. Pavel Trivailo,** *RMIT University (Royal Melbourne Institute of Technology), Australia*

Rapporteur

- **Prof. Jiawen Qiu,** *China*
- **Dr. Javad Fatemi,** *Airbus Defence and Space Netherlands, Netherlands (Kingdom of the)*

C2.3. Space Structures III Design, Development and Verification (Orbital infrastructure for in orbit service & manufacturing, Robotic and Mechatronic systems, including their Mechanical/Thermal/ Fluidic Systems)

The topics to be addressed include all aspects of orbital infrastructures design, development and verification, including their mechanical/robotic/thermal/fluidic systems and subsystems, such as manned and unmanned spacecraft, space stations, re-entry vehicles and small satellites. Advanced subsystems and design of future exploration missions will be covered, considering issues arising from material selection, cost efficiency and reliability, and advancements in development with respect to engineering analysis, manufacturing, and test verification. Furthermore, design and testing of robotic and mechatronics systems for exploration, in-orbit servicing and manufacturing of space structures will be addressed.

It is also planned to discuss the issues of experimental and computational simulation of functioning and full-scale tests of space infrastructures and their systems/subsystems. Attention will be paid to the problem of verification and validation of mathematical models for the design and experimental development of these objects at various phases of their life cycle.

Co-Chair

- **Dr. Andreas Rittweger,** *DLR (German Aerospace Center), Germany*
- **Prof. Pier Marzocca,** *RMIT University, Australia*

Rapporteur

- **Prof. Ijar Da Fonseca,** *ITA-DCTA, Brazil*
- **Prof.Dr. Oleg Alifanov,** *MAI, Russian Federation*

C2.4. Space Structures Control, Dynamics and Microdynamics

The topics to be addressed include dynamics analysis and testing, modal identification, landing and impact dynamics, pyro-shock, test facilities, vibration suppression techniques, damping, micro-dynamics, in-orbit dynamic environment, wave structural propagation, excitation sources and in-orbit dynamic testing.
Attention will be paid to dynamics modelling and control of robotic and mechatronic systems (e.g. Manipulators for the servicing and/or assembly of space structures, pointing mechanisms, etc).

Co-Chairs

- **Dr. Federica Angeletti,** *University of Rome "La Sapienza", Italy*
- **Dr. Élcio Jeronimo de Oliveira,** *Associazione Italiana di Aeronautica e Astronautica (AIDAA), Uruguay*

Rapporteur

- **Prof. Harijono Djojodihardjo,** *Bandung Institut of Tecnology, Indonesia*
- **Mr. André Da Silva,** *European Space Agency (ESA), France*

C2.5. Space Structures and Materials for Extreme Environment

The topics to be addressed include structures and materials for extreme environments, including both cryogenic applications and high temperature applications in space related domains. The session covers the full spectrum of material, design, manufacturing and testing.
Operation of structures and mechanisms in cryogenic environment is quite challenging. This concerns the components design as well as the materials they are made of or lubricants needed for proper functioning. Tanks for storage of cryogenic propellants for launch vehicle application or long term storage of cryogenic liquids require an appropriate material selection and characterization, especially when organic composite materials are considered.
Cryogenic insulation for propellant tanks and lines, especially for reusable launch vehicles exposed to aerothermal loads might require a combination with high temperature thermal protection systems. (Foam with metallic protection, vacuum insulated sandwich, stand-off thermal protection…).
For the elevated temperature regime, this session includes carbon-carbon and ceramic matrix composites, ultra-high temperature ceramic matrix composites, ablative materials, ceramic tiles and insulations, together with innovative structural concepts making use of the above, for propulsion systems, launchers, hypersonic vehicles, re-entry vehicles, aero capture, power generation.

Co-Chair

- **Dr. David E. Glass,** *National Aeronautics and Space Administration (NASA), United States*
- **Mr. James Tucker,** *American Astronautical Society (AAS), United States*

Rapporteur

- **Dr. Pierre Baudry,** *ArianeGroup, France*

C2.6. Space Environmental Effects, Spacecraft and Habitats Protection

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

Co-Chair

- Dr. Antonio Del Vecchio, *CIRA Italian Aerospace Research Centre, Italy*
- Mr. Anatolii Lohvynenko, *Yuzhnoye State Design Office, Ukraine*

Rapporteur

- Dr. Giuliano Marino, *CIRA Italian Aerospace Research Centre, Italy*

C2.7. Manufacturing and industrialization for Launch Vehicle and Space Vehicle Structures and components

This session explores manufacturing and industrialization approaches that enable scalable, cost-efficient, and high-quality production of launch vehicle and spacecraft structures and their components. We invite contributions covering innovative manufacturing methods, digital and automated production lines, design-to-manufacturing concepts, and industrialization strategies that reduce production cost, shorten time-to-market and increase reliability. Topics include advanced materials processing, high-cadence production, lean manufacturing, and the integration of digital tools such as AI, AR/VR, machine learning, digital twins, and real-time data analytics. Special attention will be given to case studies and lessons learned from the transition from prototype to series production – highlighting how digitalization and automation are transforming the way space systems are built.

Co-Chair

- Mr. Aicke Patzelt, *MT Aerospace AG, Germany*
- Dr. Elizabeth Barrios, *American Institute of Aeronautics and Astronautics (AIAA), United States*

Rapporteur

- Dr. Oliver Kunz, *Beyond Gravity, Switzerland*

C2.8. Advancements in Materials Applications, Additive Manufacturing, and Rapid Prototyping Manufacturing and Rapid Prototyping

The topics to be addressed include advancements in materials applications, novel technical concepts in the rapid prototyping of space systems, and materials and processes for in space manufacturing and construction. Continuous improvements in materials and structural concepts are always needed to achieve extremely demanding goals in performance, reliability, and affordability of space components, especially in terms of greater accuracy/dimensional stability, longer life, greater survivability to both natural and threat environments, and producibility capability for high volume production.
Different additive manufacturing (AM) processes are currently used for different materials in the fabrication of metal, ceramic, and plastic parts. New and different processes are being developed for utilization of lunar regolith materials for manufacturing and construction.
As a very new technique, AM is strongly emerging due to the capability of optimization of structural parts for space applications as it concerns weight reduction, improvement of mechanical properties and reduction of development and lead times as well as cost reduction. The ability to utilize in situ resources for manufacturing and construction is very attractive for logistics reduction for deep space exploration.

Co-Chair

- Dr. Eleonore Poli, *Centre Suisse d'Electronique et de Microtechnique SA (CSEM), Switzerland*
- Prof. Mario Marchetti, *Sapienza University of Rome, Italy*

Rapporteur

- Prof. Pengfei Wang, *China Academy of Aerospace Science and Innovation, China*

C2.9. Smart Materials and Adaptive Structures & Specialized Technologies, Including Nanotechnology

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

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

Co-Chair

- Dr. Behnam Ashrafi, *Canadian Aeronautics & Space Institute (CASI), Canada*
- Mr. Aashish Agrawal, *Space Applications Centre (ISRO), India*

Rapporteur

- Prof. Kanjuro Makihara, Tohoku University, Japan

C3. IAF SPACE POWER SYMPOSIUM

Coordinator

- Mr. John C. Mankins, *ARTEMIS Innovation Management Solutions, LLC, United States*
- Dr. Koji Tanaka, *Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency, Japan*
- Mr. Serdar Baycan, *Solar Space Technologies Pty Ltd, Australia*

C3.1. Solar Power Satellite

This session deals with all aspects of concepts and architectures for space-based solar power plants and concepts integrating space and terrestrial energy activities. It will be 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 all types of conceptual, technical and organizational progress to better integrate space and terrestrial energy activities. It is the primary international forum for scientific and technical exchanges on this topic and thus provides a unique common platform for discussions. Topically it will include all system-level, architectural, organizational and commercial aspects, including modeling and optimization as well as related non-technical aspects.

Co-Chairs

- **Mr. John C. Mankins,** *ARTEMIS Innovation Management Solutions, LLC, United States*
- **Dr. Ming Li,** *DFH Satellite Co., Ltd., China*

Rapporteur

- **Dr. Leopold Summerer,** *European Space Agency (ESA), Netherlands (Kingdom of the)*
- **Dr. Koji Tanaka,** *Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency, Japan*

C3.2. Wireless Power Transmission Technologies and Application

This session focuses on all aspects of wireless power transmission systems. It covers wireless power transmission technologies, including laser, microwave based as well as novel wireless power transmission technologies from the short ranges (e.g. within spacecraft or between two surface installations) up the very large distances for space exploration and power transmission from space to ground. The session covers theoretical as well as applied and experimental results, including emitter/receiver antenna architectures and deployment.

Co-Chairs

- **Dr. Ming Li,** *DFH Satellite Co., Ltd., China*
- **Dr. Koji Tanaka,** *Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency, Japan*

Rapporteur

- **Prof. Massimiliano Vasile,** *University of Strathclyde, United Kingdom*
- **Prof. Nobuyuki Kaya,** *Kobe University, Japan*

C3.3. Advanced Space Power Technologies

This session covers all types of advanced space power technologies and concepts for the satellites, moon/asteroid/planetary exploration and manned space activities. These include technologies and concepts related to power generation (solar, nuclear, other) and harvesting, power conditioning, management and distribution, power transmission, energy storage and related thermal management technologies and concepts.

Co-Chair

- **Mr. Gary Barnhard,** *National Space Society, United States*
- **Mr. Michael Gross,** *Jet Propulsion Laboratory, United States*

Rapporteur

- **Dr. Koji Tanaka,** *Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency, Japan*

C3.4. Space Power Systems for Ambitious Missions

This session is devoted to emerging concepts ranging from very small power (micro- and milli- watt power) to very large power systems toward future ambitious space missions and space utilizations such as future moon village. These include concepts and technology developments of space power system for the increasing spacecraft market by the nano-, micro- and mini- spacecraft. In addition, lunar and planetary surface power is of interest, as well as for long-duration exploration probes and sensors The session will also address space power systems for novel missions and markets including orbital and other high-capacity data centers. This session is dedicated to power systems for such applications.

Co-Chair

- **Prof. Massimiliano Vasile,** *University of Strathclyde, United Kingdom*
- **Dr. Xinbin Hou,** *CAST, China*

Rapporteur

- **Mr. Michael Gross,** *Jet Propulsion Laboratory, United States*

C3.5-C4.10. Joint Session on Nuclear Power and Propulsion Systems, and Propellantless Propulsion

This session, organized jointly between the Space Power and the Space Propulsion Symposia, addresses all aspects related to nuclear power and propulsion systems for space applications.
The session also addresses all types of propellantless propulsion including (but not limited to) solar sails, magnetic sails, laser propulsion, tethers, etc.

Co-Chairs

- **Dr. Leopold Summerer,** *European Space Agency (ESA), Netherlands (Kingdom of the)*
- **Dr. Saroj Kumar,** *Propulsion Research Center, University of Alabama in Huntsville, United States*
- **Mr. Markus Jaeger,** *The Exploration Company GmbH, Germany*

Rapporteur

- **Dr. Lahib Balika,** *Thales Alenia Space, United Kingdom*

- **Ms. Lisa May,** *United States*

C4. IAF SPACE PROPULSION SYMPOSIUM

Coordinators

- **Dr. Angelo Cervone,** *Delft University of Technology (TU Delft), Netherlands (Kingdom of the)*
- **Dr. Adam Okninski,** *Łukasiewicz Research Network – Institute of Aviation (ILOT), Poland*
- **Dr. Ozan Kara,** *Technology Innovation Institute (TII), United Arab Emirates*
- **Dr. Saroj Kumar,** *Propulsion Research Center, University of Alabama in Huntsville, United States*
- **Dr. Andrei Shumeiko,** *Bauman Moscow State Technical University, Russian Federation*

C4.1. Liquid Propulsion (1)

The session Liquid Propulsion (1) is dedicated to Liquid Rocket Engines (mono-propellant or bi-propellant), with particular emphasis on full engine systems. The session welcomes manuscripts on all research and development areas, with a significant technical content: design, testing (including diagnostics and test facilities), analysis and calculations, modelling, applications, science and fundamentals.

Co-Chair

- **Mr. Giuseppe Fiore,** *CNES, France*
- **Dr. Ozan Kara,** *Technology Innovation Institute (TII), United Arab Emirates*

Rapporteur

- **Dr. Adam Okninski,** *Łukasiewicz Research Network – Institute of Aviation (ILOT), Poland*
- **Dr. Justin Hardi,** *German Aerospace Center (DLR), Germany*

C4.2. Liquid Propulsion (2)

The session Liquid Propulsion (2) is dedicated to Liquid Rocket Engines (mono-propellant or bi-propellant), with particular emphasis on sub-systems and specific components (including propellants). The session welcomes manuscripts on all research and development areas, with a significant technical content: design, testing (including diagnostics and test facilities), analysis and calculations, modelling, applications, science and fundamentals.

Co-Chair

- **Dr. Angelo Cervone,** *Delft University of Technology (TU Delft), Netherlands (Kingdom of the)*
- **Mr. Andrew Devereaux,** *UK Civil Aviation Authority, United Kingdom*

Rapporteur

- **Dr. Christian Bach,** *Technische Universität Dresden (DTU), Germany*
- **Ms. Bhavyashree Janardhana,** *Women in Aerospace Europe (WIA-E), Germany*

C4.3. Solid and Hybrid Propulsion (1)

The session Solid and Hybrid Propulsion (1) is dedicated to Solid and Hybrid Rocket motors, with particular emphasis on full systems. The session welcomes manuscripts on all research and development areas: design, testing (including diagnostics and test facilities), analysis and calculations, modelling, applications, science and fundamentals.

Co-Chair

- **Dr. Ozan Kara,** *Technology Innovation Institute (TII), United Arab Emirates*
- **Dr. Jouke Hijlkema,** *ONERA, France*

Rapporteur

- **Dr. Djamal DARFILAL,** *Khalifa University of Science and Technology (KUST), United Arab Emirates*
- **Dr. Yuji Saito,** *Tohoku University, Japan*

C4.4. Solid and Hybrid Propulsion (2)

The session Solid and Hybrid Propulsion (2) is dedicated to Solid and Hybrid Rocket motors, with particular emphasis on sub-systems and specific components (including propellants). The session welcomes manuscripts on all research and development areas: design, testing (including diagnostics and test facilities), analysis and calculations, modelling, applications, science and fundamentals.

Co-Chair

- **Dr. Yuji Saito,** *Tohoku University, Japan*
- **Dr. Adam Okninski,** *Łukasiewicz Research Network – Institute of Aviation (ILOT), Poland*

Rapporteur

- **Dr. Mario Kobald,** *HyImpulse Technologies GmbH, Germany*
- **Dr. Jouke Hijlkema,** *ONERA, France*

C4.5. Electric Propulsion (1)

The sessions Electric Propulsion (1) and Electric Propulsion (2) are dedicated to all aspects of Electric Propulsion, including full systems, sub-systems and specific components. The sessions welcome manuscripts on all research and development areas: design, testing (including diagnostics and test facilities), analysis and calculations, modelling, applications, science and fundamentals.

Co-Chair

- **Mr. Giorgio Saccoccia,** *Vast, France*
- **Dr. Marco Di Clemente,** *Italian Space Agency (ASI), Italy*

Rapporteur

- Ms. Merve Balaban, Berlin Space Consortium GmbH, Germany
- Mr. Vincent Guyon, *SAFRAN, France*

C4.6. Electric Propulsion (2)

The sessions Electric Propulsion (1) and Electric Propulsion (2) are dedicated to all aspects of Electric Propulsion, including full systems, sub-systems and specific components. The sessions welcome manuscripts on all research and development areas: design, testing (including diagnostics and test facilities), analysis and calculations, modelling, applications, science and fundamentals.

Co-Chairs

- Dr. Djamal DARFILAL, *Khalifa University of Science and Technology (KUST), United Arab Emirates*
- Dr. Lahib Balika, *Thales Alenia Space, United Kingdom*

Rapporteur

- Dr. Andrei Shumeiko, *Bauman Moscow State Technical University, Russian Federation*
- Prof. Paolo Gessini, *Brazilian Space Agency (AEB), Brazil*

C4.7. Hypersonic Air-breathing and Combined Cycle Propulsion, and Hypersonic Vehicle

This session covers hypersonic air-breathing and combined cycle propulsion with space applications. The typical types of engine considered in this session include: turbojet, ramjet, Scramjet, detonation engine, Turbine Based Combined Cycle (TBCC), Rocket Based Combined Cycle (RBCC), Hypersonic Pre-cooled Propulsion, Air Turbo Rocket (ATR) and other types of hypersonic combined cycle propulsion, together with the associated vehicle.

Co-Chairs

- Dr. Mario Kobald, *HyImpulse Technologies GmbH, Germany*
- Prof. Riheng Zheng, *Beihang University, China*

Rapporteur

- Dr. Angelo Cervone, *Delft University of Technology (TU Delft), Netherlands (Kingdom of the)*

C4.8-B4.5A. Joint Session between IAA and IAF for Small Satellite Propulsion Systems

This session will pay particular attention to propulsion systems and associated technologies as an enabler to efficient small satellite access to space and orbit change. Papers are invited discussing the particular challenges of design, manufacture, testing, operations and technological developments of small satellite propulsion systems, and the

challenges of obtaining high performance within a small volume and mass. The scope includes chemical and electrical propulsion systems for major orbit changes, fine orbit control and maintenance, and end-of-life disposal. For papers with an emphasis on the small satellite and its system design, refer to other B4 sessions. For a focus on other propulsion systems and technologies, refer to other C4 sessions.

Co-Chairs

- **Mr. Jeffrey Michlitsch,** *The Aerospace Corporation, United States*
- **Prof. Paolo Gessini,** *Brazilian Space Agency (AEB), Brazil*

Rapporteur

- **Dr. Elena Toson,** *T4i, Italy*
- **Prof. Sabrina Corpino,** *Politecnico di Torino, Italy*

C4.9. Disruptive Propulsion Concepts for Enabling New Missions

This session will explore advanced and disruptive propulsion technologies, systems, ideas (including integration of different propulsion concepts) showing potential to enable new mission concepts, or to enhance the capabilities of current mission concepts.

Co-Chair

- **Dr. Justin Hardi,** *German Aerospace Center (DLR), Germany*
- **Dr. Christian Bach,** *Technische Universität Dresden (DTU), Germany*

Rapporteur

- **Mr. Markus Jaeger,** *The Exploration Company GmbH, Germany*
- **Dr. Marco Di Clemente,** *Italian Space Agency (ASI), Italy*

C4.10-C3.5. Joint Session on Nuclear Power and Propulsion Systems, and Propellantless Propulsion

This session, organized jointly between the Space Power and the Space Propulsion Symposia, addresses all aspects related to nuclear power and propulsion systems for space applications.
The session also addresses all types of propellantless propulsion including (but not limited to) solar sails, magnetic sails, laser propulsion, tethers, etc.

Co-Chair

- **Dr. Leopold Summerer,** *ESA - European Space Agency, Netherlands (Kingdom of the)*
- **Dr. Saroj Kumar,** *Propulsion Research Center, University of Alabama in Huntsville, United States*
- **Mr. Markus Jaeger,** *The Exploration Company GmbH, Germany*

Rapporteur

- **Dr. Lahib Balika,** *Thales Alenia Space, United Kingdom*
- **Ms. Lisa May,** *United States*

C.5. Engineering Foundations of Space Robotics, Autonomous Systems, and Intelligent Machines

The IAF Symposium on Engineering Foundations of Space Robotics, Autonomous Systems, and Intelligent Machines addresses the state of the art, emerging developments and future directions in space robotics, autonomous systems and intelligent machines. Its scope encompasses enabling technologies, robotic and intelligent capabilities, integrated systems, demonstrations and operational experience across planetary and orbital applications. It connects technology development with mission needs, representative tasks, operational constraints and evidence from integration, testing, demonstration and use.

Coordinator

- **Dr. Jessica Grenouilleau, European Space Agency (ESA-ESTEC), Netherlands (Kingdom of the)**

CATEGORY D: INFRASTRUCTURE

Systems sustaining space missions, including space system transportation, future systems and safety

D1. IAF SPACE SYSTEMS SYMPOSIUM
D2. IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM
D3. 24TH IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT
D4. 24TH IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE
D5. 59TH IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES
D6. IAF SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES

Category coordinated by Roberta Mugellesi-Dow, *European Space Agency (ESA), UNITED KINGDOM*

D1. IAF SPACE SYSTEMS SYMPOSIUM

Coordinators

- Mr. Matteo Emanuelli, Airbus Defence and Space, Germany
- Dr. Mamatha Maheshwarappa, UK Space Agency, United Kingdom
- Ms. Jill Prince, National Aeronautics and Space Administration (NASA), United States

D1.1. Innovative Systems toward Future Architectures

This session explores innovative system concepts, technical capabilities that enable future architectures, new applications, new business models and evolution of the global ecosystem. It also analyses how new challenges such as reduction of environmental impact (space debris, CO2 footprint reduction) can induce new space system architectures, applications, eventually proposing solutions to reduce global warming and debris mitigation. As examples: Could Space based Solar Power contribute to reduction of CO2 emission and make an economically and technically feasible option to meet the energy needs? Will in-space transportation and logistics develop in association with reusable launchers? Which new applications could be enabled i.e., Active Debri Removal (ADR), In-orbit Service and Manufacturing (IOSM) or recycling? How would these changes affect the ecosystems?
This session objective is to connect innovators and researchers in building a vision of transformation of space systems architecture. In this perspective, the dreams of yesterday are the hope of today and the reality of tomorrow

Co-Chair

- **Mr. Xavier Roser,** *Thales Alenia Space France, France*
- **Mr. Hui Du,** *Institute of Spacecraft System Engineering,China Academy of Space Technology (CAST), China*

Rapporteur

- **Mr. Daniel Wischert,** *European Space Agency (ESA), Netherlands (Kingdom of the)*
- **Mr. Marcos Eduardo Rojas Ramirez,** *Space Generation Advisory Council (SGAC), France*

D1.2. Technologies that Enable Space Systems

This session focuses on innovative and technological developments that are often high risk, but which have the potential to significantly enhance the performance of existing and new space systems. Leading-edge technologies that enable space applications come in many diverse forms, from system level innovations down to the subsystem or component level. Examples include instrumentation, sensors, biotechnology, components, micro- and nano-technology, advanced new structures and software techniques. Additionally, architectural solutions incorporating technologies such as artificial intelligence, machine learning, virtual/augmented reality, autonomy and automation are also of interest.
The scope of the session includes architectures for single satellite systems or multiple satellite systems, such as constellations, formations, swarms, distributed systems, and system-of-systems (including hybridization with terrestrial systems). Ground-versus-space allocation of functionality and aspects of autonomy, both on-board and on-ground, may be addressed.

Co-Chair

- **Ms. Jill Prince,** *National Aeronautics and Space Administration (NASA), United States*
- **Mr. Steven Arnold,** *The Johns Hopkins University Applied Physics Laboratory, United States*

Rapporteur

- **Dr. Audrey Berquand,** *European Space Agency (ESA), Netherlands (Kingdom of the)*
- **Mr. Sybren De Jong,** *Netherlands Aerospace Centre (NLR), Netherlands (Kingdom of the)*

D1.3. Emergent Space Systems

This session focuses on the novel aspects of currently emerging systems, with a special emphasis put on new system design paradigms related to Human-Centered Design (HCD) and Very Low Earth Orbit (VLEO) systems. In this context, we seek ideas on how and where HCD, Human System Integration (HSI), User Experience/User Interface (UX/UI) design, Augmented and Virtual Reality (AR/VR) systems, as well as designerly processes may broaden technical fields and provide demonstrable benefit throughout the full lifecycle, from formulation through implementation to operations. Our session addresses today's challenges by leveraging novel approaches for current and emerging space systems, but also for system of systems, where the space element represents key contributions to overall system topology.

Co-Chairs

- **Dr. Tibor Balint,** *International Academy of Astronautics (IAA), United States*
- **Dr. Reinhold Bertrand,** *European Space Agency (ESA), Germany*

Rapporteur

- **Prof. Igor V. Belokonov,** *Samara National Research University (Samara University), Russian Federation*
- **Dr. Alena Probst,** *EnduroSat AD, Germany*

D1.4. Cooperative Systems

Emphasis of this session is on innovative cooperative and self-organizing approaches to address increasing complexities in space systems coordinating several actors. Examples concern the following fields: formations in multi-satellite systems, in-space servicing, robotics in planetary explorations or in satellite production. Contributions related to algorithms, software simulations, testbeds and in-orbit experiences for cooperative systems are highly encouraged.

Co-Chairs

- **Dr. Otfrid G. Liepack,** *National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States*
- **Prof. Klaus Schilling,** *Zentrum für Telematik, Germany*

Rapporteur

- **Prof. Eberhard Gill,** *Delft University of Technology, Netherlands (Kingdom of the)*
- **Prof. Avid Roman-Gonzalez,** *Universidad Nacional Tecnológica de Lima Sur, Peru*

D1.5. Systems Engineering Modeling and Analysis

This session focuses on digital applications for improved systems engineering modeling and analysis across the product life-cycle. The session will gather a community of those on "the front lines" of implementing system modeling. Papers are sought in three topical areas: 1. Tactical results, use cases or examples, which validate mission, systems or sub-system application and subsequent return on investment for traditional versus future SE approaches. 2. Strategic results, organizational progress toward a fully integrated enterprise digital solution, including how SE modeling fits into that solution space. 3. Innovative approaches, more forward looking or lower TRL tooling advances which offer large improvement opportunities and their potential application (AI/ML for example). Lessons learned on

challenges and opportunities within the three topic areas are of special interest and highly desired.

Co-Chairs

- **Mr. Jon Holladay,** *National Aeronautics and Space Administration (NASA), United States*
- **Mr. Thierry Floriant,** *Centre National d'Etudes Spatiales (CNES), France*

Rapporteur

- **Ms. Sapna Rao,** *Lockheed Martin (Space Systems Company), United States*
- **Mr. Marcos Eduardo Rojas Ramirez,** *Space Generation Advisory Council (SGAC), France*

D1.6. Systems Engineering Approaches, Processes and Methods

This session focuses on state-of-the-art systems engineering methodologies to deliver space systems of high quality that meet stakeholder needs at a manageable risk, reducing the development time and life cycle cost. Of special interest are papers on multi-disciplinary approaches, processes, methods, tools, and training used for improving development and life cycle productivity and risk management, and increasing safety, availability, reliability, resilience, dependability, testability, ease of operation, serviceability and quality of life cycle cost estimates. Papers are sought in four topical areas: 1) space systems architecting, which includes campaign analysis and design, mission analysis and design, and systems of systems (SoS); 2) trade off studies, optimization, and simulation tools and decision analysis; 3) AIV&V (assembly, integration, verification and validation); and 4) space systems management, which includes stakeholder management, technical planning, control and assessment of space system design, earned value management, technical risk management, requirements management, configuration management, and information management.

Co-Chairs

- **Dr. Guilherme Venticinque,** *Instituto Nacional de Pesquisas Espaciais (INPE), Brazil*
- **Mr. Timothy Cichan,** *Lockheed Martin Corporation, United States*

Rapporteur

- **Dr. Dapeng Wang,** *International Academy of Astronautics (IAA), China*
- **Dr. Geilson Loureiro,** *Instituto Nacional de Pesquisas Espaciais (INPE), Brazil*

D1.7. Lessons Learned in Space Systems

Lessons learned are essential to significantly improve space projects implementation practices and, in turn, increase their success-rate. Collecting and sharing information regarding analysis of past and recent successes/failures is deemed the key element to support that and, in addition, it is also highly valuable since it can foster setting up of a collaborative paradigm where people from different Systems Engineering & Management cultures, in different projects, and at different maturity stages, share knowledge among teams, organizations and people, to contribute to the above common practice.
For the above practice to be effective, this retrospective viewpoint shall come from a variety of sources. In this regard, the scope of the D1.7 session covers the full spectrum of a space project life-cycle activities such as: project management and systems engineering; systems and missions design; systems MAIVT (manufacturing, assembly,

integration, verification, and testing); mission execution, systems exploitation, and post-mission evaluation. Additional added-value can also come from discussion and examination on side-aspects (yet important) as: diversity of standards/practices including lessons learned yielded from their adoption interpretation and application; as well as project-data management approaches (design results, engineering models, documentation, mission results, etc.) to preserve and make them available to future missions.

Co-Chairs

- **Mr. Yoshihisa Arikawa,** *Japan Aerospace Exploration Agency (JAXA), Japan*
- **Mr. Giuseppe Guidotti,** *Deimos Space SLU, Italy*
- **Mr. Hamed Gamal,** *Mynaric, Germany*

Rapporteur

- **Dr. Alena Probst,** *EnduroSat AD, Germany*

D2. IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM

Coordinator

- **Prof. Yuguang Yang,** *China Aerospace Science & Industry Corporation (CASIC), China*
- **Dr. Oliver Kunz,** *Beyond Gravity, Switzerland*
- **Dr. Aaron Weaver,** *National Aeronautics and Space Administration (NASA), United States*
- **Mr. Akhil Gujral,** *The Aerospace Corporation, United States*
- **Prof. Nicole Viola,** *Politecnico di Torino, Italy*

D2.1. Launch Vehicles in Service or in Development

Review of up to date status of launch vehicles currently in use in the world or under short term development with a special focus on the Space Transportation activities in emerging space-fairing nations: This session also plans to highlight the Space Transportation activities in emerging space-fairing nations. This can include: - Launch related propulsion/ stage development, - Orbital launch systems in development and operational, - Orbital launch sites as well as - In space Transportation systems.

Co-Chairs

- **Dr. Aaron Weaver,** *National Aeronautics and Space Administration (NASA), United States*
- **Dr. Martin Sippel,** *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*

Rapporteur

- **Dr. Giuseppe Rufolo,** *CIRA Italian Aerospace Research Centre, Italy*

- Mr. Anurup Marath, *Indian Space Research Organization (ISRO), India*

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

Review of the current and planned launch services and support, including economics of space transportation systems, financing, cost, insurance, licensing. Advancements in ground infrastructure, ground operations, production methods, mission planning and mission control for both expendable and reusable launch services.

Co-Chairs

- Mrs. Tina Buechner da Costa, *European Space Agency (ESA), France*
- Mr. Iwao Igarashi, *Mitsubishi Heavy Industries, Ltd., Japan*
- Mr. Akihiro Sato, *Mitsubishi Heavy Industries, Ltd., Japan*

Rapporteur

- Mr. Christian Corba, *EUMETSAT, Germany*
- Mr. Geovian Stower, *Kenya Space Agency (KSA), Kenya*
- Dr. Jeremy Pinier, *National Aeronautics and Space Administration (NASA), Langley Research Center, United States*
- Mr. Jon Harr, *Andøya Space AS, Norway*

D2.3. Upper Stages, Space Transfer, Entry & 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

- Dr. Oliver Kunz, *Beyond Gravity, Switzerland*
- Prof. Nicole Viola, *Politecnico di Torino, Italy*

Rapporteur

- Dr. John M. Horack, *The Ohio State University College of Engineering, United States*
- Dr. Ysolde PREVEREAUD, *ONERA - The French Aerospace Lab, France*

D2.4. Future Space Transportation Systems

Discussion of future overall transportation system designs and operational concepts for both expendable and reusable systems for Earth-to orbit transportation and exploration missions considering also emerging space ventures and deep space transportation.

Co-Chairs

- Mr. José Gavira Izquierdo, *International Space Consultant, Netherlands (Kingdom of the)*
- Mr. Pier Michele Roviera, *True Anomaly, Inc., United States*

Rapporteur

- Mr. Nicolas Bérend, *ONERA - The French Aerospace Lab, France*
- Mr. Geovian Stower, *Kenya Space Agency (KSA), Kenya*

D2.5. Technologies for Future Space Transportation Systems

Discussion of technologies enabling new reusable or expendable launch vehicles and in-space transportation systems. Emphasis is on early TRL hardware development and verification prior to flight, including ground testing and/or innovative technology prototype demonstrations not yet involving flight.

Co-Chairs

- Mr. Franck Koebel, *ArianeGroup, France*
- Mr. Christophe Bonnal, *European Conference for Aero-Space Sciences (EUCASS), France*

Rapporteur

- Dr. Shoyo Hyodo, *Mitsubishi Heavy Industries, Ltd., Japan*
- Ms. Shana Diez, *SpaceX, United States*

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

Discussion of atmospheric and in-space flight testing and qualification of system, sub-system, and advanced technologies for future launch vehicles and in-space transportation systems. Emphasis is on higher TRL in-flight experimentation, demonstration, and qualification, including test plans and innovative technology prototype demonstrations involving or leading to flight as well as new and unique test platforms and capabilities.

Co-Chairs

- Dr. David E. Glass, *National Aeronautics and Space Administration (NASA), United States*
- Dr. Mauro Augelli, *UK Space Agency, United Kingdom*

Rapporteur

- Dr. Christie Maddock, *University of Strathclyde, United Kingdom*
- Mr. Tetsuo Hiraiwa, *Japan Aerospace Exploration Agency (JAXA), Japan*

D2.7. Small Launchers: Concepts, Technologies and Operations including Sub-Orbital and Student Rocketry

Discussion of existing, planned and future Launchers for small payloads ranging from 1500 kg to as low as 1 kg into Low Earth Orbit or Sub-Orbital. Student Rocketry programs, designs and achievements are welcome. Includes innovative solutions such as airborne systems, evolutions from sub-orbital concepts, combinations of existing / emerging elements and new elements, reusable, partially reusable and expendable concepts, and flexible, highly responsive concepts. The session also addresses development of subsystems, safety issues, and technology innovation.

Co-Chairs

- Mr. Harry A. Cikanek, *National Oceanic and Atmospheric Administration (NOAA), United States*
- Mr. Christian Corba, *EUMETSAT, Germany*

Rapporteur

- Mr. Bryan Smith, *NASA Glenn Research Center, United States*

D2.8. In-Space Transportation Solutions and Space Logistics

This session is focused on in-space transportation capabilities and mission architectures, existing or under study. Related enabling and support missions, such as robotic servicing and supply, as well as technology roadmaps shall be discussed. The session will also focus on creating scalable, sustainable, and interoperable infrastructure that implements large scale exploration and operational missions.

Co-Chairs

- Mr. Akhil Gujral, *The Aerospace Corporation, United States*
- Mr. Josef Wiedemann, *Isar Aerospace Technologies GmbH, Germany*

Rapporteur

- Dr. Élcio Jeronimo de Oliveira, *Associazione Italiana di Aeronautica e Astronautica (AIDAA), Uruguay*

D2.9-D6.2. Sustainable Approaches and Impact of Space Transportation Solutions on Earth + Space Environment and on General Safety

This session is dedicated to the study of the impact of space transportation solutions on the earth and space environment and on the relevant safety aspects. This session can address methodologies for life cycle analysis, environmental impact mitigation and assessment, sustainability, and eco-design for space transportation. It will also address new and emerging technologies for space transportation systems to mitigate the impact on the earth and space environments, yet guaranteeing Space and Ground Safety.

Co-Chairs

- Ms. Shana Diez, *SpaceX, United States*
- Mr. Charles E. Cockrell Jr., *United States*

Rapporteur

- Dr. Francesco Santoro, *Altec S.p.A., Italy*
- Mrs. Emmanuelle David, *Space Sustainability Rating, Switzerland*

D3. 25th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT

Coordinator

- Mr. John C. Mankins, *ARTEMIS Innovation Management Solutions, LLC, United States*
- Dr. Maria Antonietta Perino, *Thales Alenia Space Italia, Italy*

D3.1. Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and Development

Future scenarios for sustainable exploration and development in space will unfold in the context of global conditions that vary greatly from those of the 1950s-1970s (the first generation of space programmes, driven by international competition), or those of the 1980s-2000s (the second generation of space programmes, enabled by international cooperation). Looking to the future, it is likely that space-faring countries will pursue their goals and objectives in a more building-block fashion focused on developing high-value future space capabilities, rather than through massive, geo-politically driven programmes.
Increasingly, these developments may also reflect future commercial space opportunities. As a result, it is important that the international community should engage in an ongoing discussion of strategies and architectures to frame a “building block” approach to our future in space. Such a discussion should involve sustainable budgets and multiple-purpose system-of-systems capabilities that lead to a diverse range of future activities of broad benefit to humanity. This session, which is related to a prospective new International Academy of Astronautics (IAA) study group, will address strategies and architectural approaches that may allow a new paradigm, a “building block” approach, to be established among the space-faring countries. Papers are solicited in these and related areas.

Co-Chairs

- Mr. John C. Mankins, *ARTEMIS Innovation Management Solutions, LLC, United States*
- Dr. Maria Antonietta Perino, *Thales Alenia Space Italia, Italy*

Rapporteur

- Dr. Nasr Al-Sahhaf, *Moon Village Association (MVA), Saudi Arabia*

D3.2A. Systems and Infrastructures to Implement Sustainable Space Development and Settlement - Systems

The emergence of novel systems and infrastructures will be needed to enable ambitious scenarios for sustainable future space exploration and utilization. New, reusable space infrastructures must emerge in various areas include the following: (1) infrastructures that enable affordable and reliable access to space for both exploration systems and logistics; (2) infrastructures for affordable and reliable transportation in space, including access to/from lunar and planetary surfaces for crews, robotic and supporting systems and logistics; (3) infrastructures that allow sustained, affordable and highly effective operations on the Moon, Mars and other destinations; and, (4) supporting in space infrastructures that provide key services (such as communications, navigation, etc.). Considering its focus on design and operation solutions for future crewed missions, This session will be jointly curated with the recently-formed IAF Space Habitats Committee, whose aims include fostering research and partnerships in the design, the construction, the scalability, the commercialization, the disassembling and the sustainability of space habitats and associated infrastructures, emphasizing Moon and Mars surface structures and orbital stations. Papers are solicited in all areas related to the scope of this session, from a variety of disciplinary approaches.

Co-Chairs

- **Mr. Frank Preud'homme,** *Redwire Space, Belgium*
- **Mr. Gary Barnhard,** *National Space Society, United States*

Rapporteur

- **Ms. Paivi Jukola,** *Aalto University, Finland*

D3.2B. Systems and Infrastructures to Implement Sustainable Space Development and Settlement - Technologies

The emergence of new technologies will be essential to realizing the various systems and infrastructures that will be needed to enable ambitious scenarios for sustainable future space exploration, utilization and eventual settlement. Technologies for new, reusable space infrastructures are needed, including the following: (1) infrastructures that enable affordable and reliable access to space for both exploration systems and logistics; (2) infrastructures for affordable and reliable transportation in space, including access to/from lunar and planetary surfaces for crews, robotic and supporting systems and logistics; (3) infrastructures that allow sustained, affordable and highly effective robotic and human operations on the Moon, Mars and other destinations; and, (4) supporting in space infrastructures that provide key services (such as communications, navigation, etc.). Papers are solicited in these and related areas.

Co-Chairs

- **Dr. Raymond G. Clinton,** *NASA Marshall Space Flight Center, United States*

Rapporteur

- Mr. Gary Barnhard, *National Space Society, United States*

D3.3. Space Technology and System Management Practices and Tools

The effective management of space technology and systems development is critical to future success in space exploration, development and discovery. This session is the next in an ongoing series at the International Astronautical Congress that provides a unique international forum to further the development of a family of 'best practices and tools' in this important field. Specific areas of potential interest include: (1) Technology Management Methodologies and Best Practices; (2) R&D Management Software Tools and Databases; and (3) Systems Analysis Methods and Tools. The full range of R&D activities is appropriate for discussion, ranging from technology development long-term planning, through technology R&D programmes, to system development projects, with special emphasis on the transition of new technologies from one stage to the next. Particular topics could include: Technology Readiness Levels (TRLs) and Technology Readiness Assessments, Technology R&D Risk Assessments and Management, Advanced Concepts Modeling Approaches and Tools, etc. Either more theoretical discussions, or examples of applications of R&D management techniques and/or tools to specific R&D programmes and projects are of interest for the session.

Co-Chairs

- Dr. Maria Antonietta Perino, *Thales Alenia Space Italia, Italy*
- Mr. John C. Mankins, *ARTEMIS Innovation Management Solutions, LLC, United States*

Rapporteur

- Ms. Paivi Jukola, *Aalto University, Finland*

D4. 25th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE

Coordinators

- Dr. Giuseppe Reibaldi, *Moon Village Association (MVA), Austria*
- Prof.Dr. Shuai Yuan, *Harbin Institute of Technology, China*

D4.1. Innovative Concepts and Technologies

1) In order to realize future, programs of space exploration and resource utilization, a focused suite of transformational new system concepts and enabling technologies must be developed during the coming decades. The technical objectives to be pursued should be drawn from a broad, forward-looking view of the technologies and system needed, but must be sufficiently focused, to allow tangible progression and dramatic improvements over current capabilities. 2) Ideally, the concepts should be presented in three categories: 1. Concepts which represent a significant advance, but require laboratory advancement, and 2. Concepts which have been demonstrated to some level in the laboratory, but require demonstration to validate their utility, and 3. Concepts which identify cross-cutting advances which, when combined can be successfully developed to support transformational new system concept. Papers are solicited in

these and related areas, with a priority on concepts that have progressed at least into laboratory experiments.

Co-Chairs

- Dr. Alessandro Bartoloni, *National Insitute of Nuclear Physics - INFN, Italy*
- Dr. Ulpia Elena Botezatu, *Romanian Space Agency (ROSA), Romania*

Rapporteur

- Mr. Timothy Cichan, *Lockheed Martin Corporation, United States*

D4.2. Contribution of Moon Village technologies and activities to Humanity Challenges

Moon Village is a concept that brings together efforts, world-wide, from the private sector, governments, academics and others to explore and use the Moon in a sustainable manner. Moon Village is a community of projects carried out by stakeholders from different fields (for example, technical, scientific, cultural, economic) working together. The implementation of the Moon Village has already started with missions and activities in line with its spirit, It is a major step forward for the peaceful development of humankind. Moon Village can offer a new start to humanity on the Moon and on the Earth by contributing to solve global societal issues.
The session will discuss the contributions of the Moon Village to the solution of global challenges (e.g., energy, population, sustainable development, many others). How the Moon Village will support the understanding of the global societal issues and bring benefits to society on a global scale will also be discussed. The session will include also the identification of the related technologies that need to be developed. The definition of a roadmap complementary to the UN Agenda 2030 will be also discussed.

Co-Chairs

- Dr. Giuseppe Reibaldi, *Moon Village Association (MVA), Austria*
- Prof. Xiaowei WANG, *China Academy of Launch Vehicle Technology (CALT), China*

Rapporteur

- Ms. Paivi Jukola, *Aalto University, Finland*

D4.3. Modern-Day Space Elevator Permanent Logistics Infrastructure

Initial discussions will address an architectural concept for Modern-Day Space Elevators as massive logistics engines for GEO, Lunar and Martian missions. Follow-on discussions will help explain the transition to initial design and testing of its major segments: Earth Spaceports, Tether Climbers, Tethers, GEO Spaceports, the Apex Anchor Spaceports, and the Headquarters and Computational Centers. To assist in this transition, research results must be collected and shared for feedback. In addition, this technical session will present recent research results, proposed future engineering steps, and progress of tether material refinements. The recently initiated International Academy of Astronautics Permanent Committee on Space Elevators will share their progress and show potential research and development steps towards initial capabilities. Some concepts that could be presented are two-dimensional material development, simulation of the 100,000 km tether deployed with multiple tether climbers, power choices to tether climbers and finally, a look at mature Modern-Day Space Elevators' strengths as permanent infrastructure Logistics Giants.

Co-Chairs

- Dr. Peter Swan, *Space Elevator Development Corporation, United States*
- Dr. Yoji Ishikawa, *Obayashi Corporation, Japan*
- Dr. John Knapman, *International Space Elevator Consortium, United Kingdom*

Rapporteur

- Prof. Masashi Kamogawa, *University of Shizuoka, Japan*

D4.4. Interstellar Exploration - Strategies, Capabilities and Opportunities

Interstellar space exploration – visiting another star—has engaged the intellect and imagination of people across time and the across globe.

A sober, serious examination of achieving the scientific, technological, and societal capabilities required for interstellar flight—travel beyond our solar system to another star—reveals one undeniable fact—it is very, very difficult. The extreme challenges exist not only within a single discipline, for example, propulsion; revolutionary advances must be made across the range of human knowledge, skills and experience including biological and human social structures. New integrated systems and technologies must be contemplated. And this is exactly what imbues the interstellar journey with such compelling opportunities to benefit not only current space exploration, but also life here on Earth. Interstellar pushes us to think beyond the commonplace and small increments.

This session seeks to define specific strategies, capabilities, technologies, and knowledge systems leading to major advances in areas such as: safe, reliable, propulsion and energy systems; life support, crew habitability and health; creation of viable star-bound space communities; enhanced robotics, automation, intelligent systems and equipment to use extra-terrestrial resources; opportunities for industry in space; navigation and computation; transfer of these advancements to benefit and enrich the quality of life on earth; connection to and improvement of the vitality of capabilities to establish human presence on the moon, Mars, or elsewhere in the solar system that will lead the way to the stars; assess and evolve technologies like solar sails, laser propulsion, fusion engines that are on the horizon. Clearly this is list is incomplete and a key objective of the session is to also find the gaps.

Papers presented in this session are expected to provide rigorous grounding, references and justification from existing fields of study from social sciences, physical sciences, life sciences, materials, computer sciences to arts and communication, governance, the marketplace, manufacturing – whether concepts are stepwise or discontinuous.

Co-Chairs

- Dr. Mae Jemison, *100 Year Starship, United States*
- Prof. Giancarlo Genta, *Politecnico di Torino, Italy*

Rapporteur

- Mr. Les Johnson, *United States*

D4.5. Space Resources, the Enabler of the Space Exploration

Space Resources are available on the Moon, Asteroids, Mars and other celestial bodies. Their utilization will have a key

role in the future of humanity in general and for space exploration in particular.
The first steps in the utilization of space resources will take place on the Moon as approximately one hundred missions from around the world are planned to explore and utilize lunar resources.
The effective use of space resources will require the establishment of an enabling environment for technological and regulatory developments.
At the moment a few countries have enacted national laws regarding the use of space resources, but these norms are not recognized at the international level.

The United Nations COPUOS has set up a working group to create a set of principles that will form the foundation for an agreed legal framework. The development of this framework is of paramount importance in order to attract investors in US, China and the rest of the world to fund space resource activities.

This session seeks innovative ideas and concepts regarding the legal and technological issues arising from space resource activities as well as papers describing the state of the art of planned or ongoing resource activities. This session also seeks prospective investors to present concepts regarding the financing of space resource activity.

Co-Chairs

- **Mr. Roger X. Lenard,** *LPS, United States*
- **Prof. Mark Sundhal,** *Cleveland State University, United States*

Rapporteur

- **Prof. Güneş Ünüvar,** *University of Exeter, United Kingdom*

D5. 60th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES

Coordinators

- **Dr. Jeanne Holm,** *University of California, Los Angeles (UCLA), United States*
- **Ms. Roberta Mugellesi-Dow,** *European Space Agency (ESA), United Kingdom*

D5.1. Quality and Safety driving successful space programs

Space programmes are complex and demanding, and no space mission can succeed without a rigorous and thoughtful approach to quality and safety. In such a challenging environment, relying on luck is not the way to proceed: success depends on robust methods, disciplined engineering practices, continuous learning, and a clear understanding of the risks that may affect performance, reliability, and mission outcomes.
This session invites participants from across the space community—whether beginners or experienced professionals, and whether working in training, science, industry, small missions, or large-scale programmes—to share their projects, methods, observations, lessons learned, and analyses of both successes and failures.
The discussion will address methods, tests, standards, and practices used to analyse, manage, and mitigate the many risks associated with space activities, with the objective of maintaining the desired level of quality and achieving the required level of safety. Topics may include design principles, development and production philosophies, operational approaches, verification and validation activities and risk management strategies.

The session is relevant to all types of space missions, including transportation systems, orbital systems, exploration vehicles, and related infrastructures.

Co-Chairs

- Prof. Alexander S. Filatyev, Lomonosov Moscow State University, Russian Federation
- Ms. Kaitlyn Holm, University of Pennsylvania, United States

D5.2. Emerging trends of knowledge management in organizations

Space activities respond to some of society's most fundamental needs: feeding and protecting communities, supporting education, enabling communication, strengthening collaboration, and fostering innovation. Because of this broad societal relevance, the space sector offers a particularly rich environment in which knowledge is continuously created, shared, tested, and transformed. Knowledge is not produced in isolation; it emerges through interaction among public institutions, industry, academia, research organisations, service providers, and user communities across the wider space ecosystem. As a result, space activities provide an exceptional framework for observing the evolution of the Knowledge Management landscape. This landscape is currently being shaped by several major trends:

- The large-scale digitisation of societies and organisations, including cloud computing, collaborative platforms, intelligent search technologies, etc;
- The increasing presence of artificial intelligence, particularly generative AI, across a growing number of value-chain segments, with new opportunities for knowledge discovery, content generation, decision support, and organisational learning;
- The growing recognition of collective intelligence, communities of practice, expert networks, and tacit knowledge as essential resources for innovation, continuity, resilience, and effective collaboration.

The session will examine the main trends, innovations, concerns, and practical challenges currently encountered in Knowledge Management within organisations. It will consider how KM approaches can help organisations sustain and strengthen their ability to learn from experience, innovate across boundaries, retain critical expertise, and share knowledge more effectively. Particular attention will be given to the methods, tools, and organisational practices that enable knowledge sharing, collaboration, and more effective search and retrieval mechanisms. The session is expected to include case studies demonstrating how KM strategies have been applied in practice, what lessons have been learned, which barriers organisations have faced, and which innovative solutions or technologies have been adopted to address them.

Co-Chairs

- Ms. Roberta Mugellesi-Dow, *European Space Agency (ESA), United Kingdom*
- Dr. Jeanne Holm, University of California, *Los Angeles (UCLA), United States*

Rapporteur

- Dr. Daniel Galarreta, *retired from CNES, France*

D5.3. Prediction, Testing, Measurement and Effects of space environment on space missions

The space environment can have a significant impact on the performance, reliability, and long-term sustainability of space missions. It comprises a wide range of natural and mission-induced conditions, including high-energy radiation, plasma, atomic oxygen, planetary dust, extreme thermal cycling, vacuum, microgravity, micrometeoroids and orbital debris, as well as molecular and particulate contamination. These environmental factors introduce important constraints during the design and qualification phases and may represent substantial risks throughout the operational lifetime of a mission. For this reason, the assessment of both nominal and worst-case environmental conditions, together with the identification of appropriate mitigation, shielding, protection, and verification approaches, is essential to ensure mission success and system resilience. T
his session will address key aspects of the space environment and its effects on spacecraft and flight systems, with particular focus on space weather, plasma interactions, spacecraft charging, radiation effects, atomic oxygen, planetary dust, molecular and particulate contamination, plume-induced contamination effects and interactions, and combined environmental effects. Contributions may include flight measurements, investigations of underlying physical processes, prediction of nominal and worst-case conditions, ground-testing methodologies, flight experiments and lessons learned, modelling and simulation approaches, and the assessment of thermo-optical degradation effects on materials and systems.

Co-Chairs

- Dr. Teppei Okumura, *Japan Aerospace Exploration Agency (JAXA), Japan*
- Mr. Carlos Soares, *Boeing Integrated Defense Systems, United States*

D5.4. Cybersecurity in space systems, risks and countermeasures

Our social eco-system has become increasingly dependent on information technology, digital connectivity, and IoT solutions. This is particularly relevant to space missions, where the characteristics of the space environment can amplify threats and vulnerabilities. As a result, managing cyber-related risks and protecting missions against cyberattacks are growing priorities, requiring the identification and deployment of effective cybersecurity measures and solutions. The session will address a broad range of cybersecurity topics, including tools and methods for preventing and forecasting attacks, risk assessment, cyber intelligence, and the protection of systems, infrastructure, and data. It will also explore the development of space-enabled cybersecurity solutions and the secure use of satellite communications, Earth observation, and satellite navigation services. 3The session will consider practical approaches to mitigating cyber risks, raising awareness through targeted training campaigns, promoting information sharing and analysis, and identifying emerging areas for standardisation. Proposals are encouraged on new cybersecurity technologies and practices, including artificial intelligence-based tools to address evolving threats, quantum cryptography and quantum key distribution, and the use of big data analytics, artificial intelligence, and machine learning to analyse communications patterns and operational data. Emerging trends also include the development of cybersecurity test ranges and domain-specific certification schemes, which can support the identification of threats and vulnerabilities and enable the design of tailored solutions for different categories of space missions.

Co-Chairs

- Mr. Julien Airaud, *Centre National d'Etudes Spatiales (CNES), France*

- Mr. Stefano Zatti, *University of Rome "La Sapienza", Italy*

D6. IAF SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES

Coordinators

- Dr. Francesco Santoro, *Altec S.p.A., Italy*
- Dr. Gennaro Russo, *Associazione Italiana di Aeronautica e Astronautica (AIDAA), Italy*

D6.1. Commercial Spaceflight Safety and Emerging Issues

Topics for this session cover commercial space transportation and safety issues including human and robotic vehicles, reentry vehicles, in-space transportation vehicles, and regulations. Papers related to commercial space transportation are also encouraged on: policy and law; operations and training; best practices and standards; and pilot, crew and participant safety.

Co-Chairs

- Dr. Francesco Santoro, *Altec S.p.A., Italy*
- Dr. Gennaro Russo, *Associazione Italiana di Aeronautica e Astronautica (AIDAA), Italy*

Rapporteur

- Mr. Robert Veldhuyzen, *European Space Agency (ESA), retired, Netherlands (Kingdom of the)*

D6.2-D2.9. Sustainable Approaches and Impact of Space Transportation Solutions on Earth + Space Environment and on General Safety

This session is dedicated to the study of the impact of space transportation solutions on the earth and space environment and on the relevant safety aspects. This session can address methodologies for life cycle analysis, environmental impact mitigation and assessment, sustainability, and eco-design for space transportation. It will also address new and emerging technologies for space transportation systems to mitigate the impact on the earth and space environments, yet guaranteeing Space and Ground Safety.

Co-Chairs

- Ms. Shana Diez, SpaceX, *United States*
- Mr. Charles E. Cockrell Jr., *United States*

Rapporteur

- Dr. Francesco Santoro, *Altec S.p.A., Italy*
- Ms. Jillian Yuricich, *SpaceX, United States*

D6.3. Enabling safe commercial spaceflight: vehicles and spaceports

This session 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 location. Topics include: ground operations and launch site safety, air and spaceport facilities, runways, geography, air and space traffic, weather, population density, access to workforce and technical support, customer needs, regulations, and other areas. Papers are welcome from spaceports, airports, space transportation providers, support equipment providers, academia, commercial companies and governments.

Co-Chairs

- Dr. Francesco Santoro, *Altec S.p.A., Italy*
- Dr. Gennaro Russo, *Associazione Italiana di Aeronautica e Astronautica (AIDAA), Italy*

Rapporteur

- Mr. Robert Veldhuyzen, *European Space Agency (ESA), retired, Netherlands (Kingdom of the)*

CATEGORY E: SPACE AND SOCIETY

Interaction of space with society, including education, policy and economics, history, space security and law, and emerging ecosystems

E1. IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM
E2. 53RD STUDENT CONFERENCE
E3. 38TH IAA SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS
E4. 59TH IAA HISTORY OF ASTRONAUTICS SYMPOSIUM
E5. 36TH IAA SYMPOSIUM ON SPACE AND SOCIETY
E6. IAF BUSINESS INNOVATION SYMPOSIUM
E7. IISL COLLOQUIUM ON THE LAW OF OUTER SPACE
E8. IAA MULTILINGUAL ASTRONAUTICAL TERMINOLOGY SYMPOSIUM
E9. IAF SYMPOSIUM ON SECURITY, STABILITY AND SUSTAINABILITY OF SPACE ACTIVITIES
E10. IAF SYMPOSIUM ON PLANETARY DEFENSE AND NEAR-EARTH OBJECTS
E11. IAF SYMPOSIUM ON EMERGING SPACE ECOSYSTEMS
E12. IAF SYMPOSIUM ON THE SPACE ECONOMY VALUE CHAINS, MARKETS AND ECONOMIC SECURITY

Category coordinated by Pascale Ehrenfreund, *The George Washington University / COSPAR – AUSTRIA*

E1. IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM

Coordinators

- Mr. Remco Timmermans, International Space University (ISU), Luxembourg
- Mrs. Alina Vizireanu, International Space University (ISU), United Kingdom

E1.1. Lift Off: Primary and Secondary Education

This session focuses on space education and outreach initiatives designed for primary and secondary school learners (up to age 18), with an emphasis on early engagement, curiosity-driven learning, and the development of foundational

STEAM skills. Contributions may address age-appropriate curricula, informal and formal education programmes, classroom activities, extracurricular initiatives, and outreach efforts that introduce space-related concepts and careers. Presentations should highlight how programmes are structured to inspire interest in space, support skill development, and foster long-term engagement in STEAM subjects. Authors are encouraged to discuss approaches to measuring educational impact, adapting content for different age groups, and applying lessons learned across diverse educational settings.
This session also welcomes contributions focused on the professional development of primary and secondary school teachers, as well as pedagogical approaches, teaching resources, and educational methodologies that enhance space education at the pre-university level.

When submitting abstracts for this session, please:

• Clearly identify the connection to the session's described scope and to space.
• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
• Provide context describing the research and/or analysis you conducted in choosing the purpose of the activity, the intended audience, and the design of the activity.
• Include reference to quantitative or qualitative data gathered through evaluations, surveys or other means.
• If any theories are developed, please include information about the practical applicability of the information.
• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chair

- **Dr. Ozan Kara,** *Technology Innovation Institute (TII), United Arab Emirates*
- **Mr. Mark Gleeson,** *Victorian Space Science Education Centre, Australia*

Rapporteur

- **Mrs. Alina Vizireanu,** *International Space University (ISU), United Kingdom*

E1.2. Space for All: Promoting Inclusive Practices in Space Exploration

This session will highlight and provide examples of solutions via education, culture and outreach activities as well as Belonging, Accessibility, Diversity, Equity, Justice and Inclusivity (BADEJI, EDI, DEIA) protocols in the workplace, organisations and space agendas. Learnings and recommendations from the perspectives of professionals, scholars, experts, educators, artists and cultural institutions including museums, space agencies and non-profit organisations will be included. From code of ethics to pluralistic commitments towards achieving equity and accessibility, all relevant methodologies and formats are welcomed. This session is a showcase of demonstrated practices and/or experiential learning, and work presented should already have been implemented before the presentation.

When submitting abstracts for this session, please:
• Clearly identify the connection to the session's described scope and to space.

• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
• Provide context describing the research and/or analysis you conducted in choosing the purpose of the activity, the intended audience, and the design of the activity.
• Include reference to quantitative or qualitative data gathered through evaluations, surveys or other means.
• If any theories are developed, please include information about the practical applicability of the information.
• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chairs

- **Dr. Sandra Haeuplik-Meusburger,** *Technische Universität Wien (TU Wien), Austria*
- **Dr. Laszlo Bacsardi,** *Budapest University of Technology and Economics, Hungary*

Rapporteur

- **Mrs. Alina Vizireanu,** *International Space University (ISU), United Kingdom*

E1.3. On Track: Undergraduate Space Education

This session focuses on space education initiatives designed for undergraduate learners, with an emphasis on building foundational knowledge, skills, and early professional identity in the space sector. Contributions may address the design and delivery of undergraduate-level courses, experiential and project-based learning, internships, work placements, and outreach activities that support student engagement and retention.
Presentations should highlight how programmes are structured to introduce core concepts, develop transferable skills, and motivate students toward further study or entry into the space workforce. Authors are encouraged to discuss methods for evaluating educational impact, lessons learned from implementation, and how successful approaches have been adapted or scaled across undergraduate curricula.
This session also welcomes contributions on the professional development of undergraduate educators and on pedagogical approaches, teaching tools, and assessment methods that are particularly effective at the undergraduate level.

When submitting abstracts for this session, please:
• Clearly identify the connection to the session's described scope and to space.
• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
• Provide context describing the research and/or analysis you conducted in choosing the purpose of the activity, the intended audience, and the design of the activity.
• Include reference to quantitative or qualitative data gathered through evaluations, surveys or other means.

• If any theories are developed, please include information about the practical applicability of the information.
• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chairs

- Prof. Alejandro J. Roman Molinas, *Paraguayan Space Agency, Paraguay*
- Ms. Sona Guliyeva, *Politecnico di Torino, Italy*

E1.4. In Orbit: Postgraduate Space Education

This session addresses space education initiatives tailored to postgraduate learners, with a focus on advanced, specialised, and research-driven training aligned with professional and academic careers in the space domain. Contributions may include postgraduate course design, interdisciplinary or industry-linked projects, research training programmes, doctoral education, and advanced work placements.

Presentations should emphasise how programmes support deep technical expertise, independent research capability, innovation, and leadership development. Authors are encouraged to discuss programme structure, impact assessment, and how insights gained are informing the evolution of postgraduate curricula, research training models, or industry engagement strategies.

This session also invites contributions on the professional development of postgraduate educators and supervisors, as well as advanced educational methodologies relevant to postgraduate teaching, supervision, and mentoring.

When submitting abstracts for this session, please:
• Clearly identify the connection to the session's described scope and to space.
• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
• Provide context describing the research and/or analysis you conducted in choosing the purpose of the activity, the intended audience, and the design of the activity.
• Include reference to quantitative or qualitative data gathered through evaluations, surveys or other means.
• If any theories are developed, please include information about the practical applicability of the information.
• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chairs

- Ms. Olga Zhdanovich, *Modis, Netherlands (Kingdom of the)*
- Dr. Vera Mayorova, *Bauman Moscow State Technical University, Russian Federation*

Rapporteur

- Ms. Kaori Sasaki, *Japan Aerospace Exploration Agency (JAXA), Japan*
- Dr. Carol Christian, *STScI, United States*

E1.5. Enabling the Future: Developing the Space Workforce

This session focuses on strategies, programmes, and policies aimed at developing the current and future global space workforce, across industry, academia, government, and non-profit sectors. Contributions may address workforce challenges and opportunities, skills gaps, diversity and inclusion, career pathways, and emerging workforce needs driven by technological and market change.

Presentations may include formal professional development, training, certification, and accreditation programmes, as well as internal workforce development initiatives led by companies, agencies, non-profits, or partnerships. Authors are encouraged to discuss programme design, implementation, and impact, including evidence of effectiveness, scalability, and lessons learned for workforce development across the space ecosystem.

When submitting abstracts for this session, please:
• Clearly identify the connection to the session's described scope and to space.
• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
• Provide context describing the research and/or analysis you conducted in choosing the purpose of the activity, the intended audience, and the design of the activity.
• Include reference to quantitative or qualitative data gathered through evaluations, surveys or other means.
• If any theories are developed, please include information about the practical applicability of the information.
• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chairs

- Ms. Kathleen Coderre, *Lockheed Martin (Space Systems Company), United States*

Rapporteur

- Mrs. Alina Vizireanu, *International Space University (ISU), United Kingdom*

E1.6. Calling Planet Earth: Large Engagement and Communications Initiatives

This session highlights large-scale, strategic public engagement and communications initiatives that connect the general public with space activities outside the formal education system. Contributions should focus on programmes, campaigns, or platforms with demonstrated or projected reach in the tens of thousands to millions, and which are designed to achieve clearly defined engagement objectives.
Presentations should emphasise strategic planning, audience targeting, and measurable outcomes. Authors are expected to present objective assessments of impact, including quantitative and qualitative metrics, or to clearly describe robust evaluation frameworks where results are still forthcoming. Submissions should demonstrate

intentional design, evidence-based decision-making, and clear alignment between goals, methods, and outcomes.

When submitting abstracts for this session, please:
• Clearly identify the connection to the session's described scope and to space.
• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
• Provide context describing the research and/or analysis you conducted in choosing the purpose of the activity, the intended audience, and the design of the activity.
• Include reference to quantitative or qualitative data gathered through evaluations, surveys or other means.
• If any theories are developed, please include information about the practical applicability of the information.
• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chairs

- **Dr. Ozan Kara,** *Technology Innovation Institute (TII), United Arab Emirates*
- **Ms. Milica Milosev,** *Econnects, Serbia*

Rapporteur

- **Dr. Danilo Sakay,** *Brazilian Space Agency (AEB), Brazil*

E1.7. Sending out a Signal: Innovative Outreach and Communications Initiatives

This session focuses on non-traditional, experimental, and innovative outreach and communications approaches that engage the public in space activities outside the formal education system. Contributions may explore novel storytelling formats, emerging technologies, creative dissemination strategies, or engagement with new or underrepresented audiences.
Presentations should highlight what makes the initiative innovative, how audiences were reached or attracted (e.g. promotion, partnerships, platforms), and what outcomes were achieved or are expected. Authors should present evaluation results where available, or clearly articulate anticipated impacts and assessment methods for ongoing or planned initiatives.

When submitting abstracts for this session, please:
• Clearly identify the connection to the session's described scope and to space.
• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
• Provide context describing the research and/or analysis you conducted in choosing the purpose of the activity, the intended audience, and the design of the activity.
• Include reference to quantitative or qualitative data gathered through evaluations, surveys or other means.

• If any theories are developed, please include information about the practical applicability of the information.
• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chairs

- **Ms. Darcey Watson,** *The Andy Thomas Space Foundation, Australia*
- **Mr. Alev Sönmez,** *Fraunhofer Alliance Space, Germany*

Rapporteur

- **Ms. Gillian Chin,** *International Space University (ISU), France*

E1.8. Show Us Space: Demonstration of Hands On Education and Outreach

This session showcases hands-on, interactive education and outreach activities that teach and reinforce space-related and STEAM concepts through direct participant engagement. Contributions should demonstrate how tactile, experiential learning approaches support understanding, accessibility, and inclusion, particularly for diverse audiences. Presenters in this track are required to physically demonstrate their activity live during the session, actively engaging the audience. Submissions must therefore describe activities that are feasible for in-person demonstration at the conference venue. Proposals that cannot be demonstrated on site (e.g. Satellite hardware such as CubeSats) or that consist solely of a presentation without a hands-on component will not be accepted.

When submitting abstracts for this session, please:
• Clearly identify the connection to the session's described scope and to space.
• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
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• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chairs

- **Ms. Lyn Wigbels,** *American Astronautical Society (AAS), United States*
- **Ms. Valerie Anne Casasanto,** *NASA Goddard/University of Maryland, Baltimore County (UMBC), United States*

Rapporteur

- Mr. Alev Sönmez, *Fraunhofer Alliance Space, Germany*

E1.9. Space Culture: Public Engagement in Space through Culture and Art

This session will focus on the education and outreach activities of institutions such as museums, space agencies, non-profit organisations and individual contributions, which link space with culture, the arts and humanities. This session will specifically look at papers elaborating on new and original processes used in public engagement through culture and art. Presenters will be required to explain how their projects informed critical reflection and what mechanics in public engagement through culture and art were used to allow it. This session is co-organised by the SEOC and ITACCUS committees.

When submitting abstracts for this session, please:
• Clearly identify the connection to the session's described scope.
• Briefly describe what you will present, including results and evaluation of your work, if it has been completed, or a thorough description of the expected outcomes of the work.
• Include information about what makes your work unique, original or innovative and worth sharing with the international space community.
• State your work's goal, the intended audience, the measurable objectives that were set, and if the work is in planning or has already occurred.
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• Include reference to quantitative or qualitative data gathered through evaluations, surveys or other means.
• If any theories are developed, please include information about the practical applicability of the information.
• Consider that your audience is international and focus on what others working in the field can learn from your work. Include lessons learned, recommendations or other takeaway messages.
• Make sure that the abstract provides a coherent idea or narrative for someone unfamiliar with your work.

Co-Chairs

- Prof. Alissa J. Haddaji, *Massachusetts Institute of Technology (MIT), United States*
- Ms. Marlene Losier, *For All Moonkind Inc., United States*

Rapporteur

- Mr. Arno Geens, *Space Renaissance International, Belgium*
- Mrs. Sabine Heinz, *SRI International, Germany*
- Mrs. Alina Vizireanu, *International Space University (ISU), United Kingdom*

E2. 55th IAF STUDENT CONFERENCE

Co-Chair

- Prof. Emmanuel Zenou, *Institut Supérieur de l'Aéronautique et de l'Espace (ISAE), France*

Coordinators

- Prof. Franco Bernelli-Zazzera, *Politecnico di Milano, Italy*

- **Prof. Marco Schmidt,** *University Wuerzburg, Germany*

E2.1. Student Conference - Part 1

Undergraduate and graduate level students (no more than 28 years of age) present technical papers on any project in space sciences, industry or technology. These papers will represent the specific work of the author(s) (no more than two students). The students presenting in this session will compete in the 53rd International Student Competition. This session is NOT for team projects. Team project papers should be submitted to session E2.3. To accommodate for the different national education schemes, the distinction between undergraduate and graduate students is based uniquely upon the number of years of university education, as follows:

- undergraduate students: students who did their work within the 4th year at university level, for instance a Bachelor thesis.
- graduate students: students who did their work from the 5th year at university level, for instance a Master thesis.

If appropriate, faculty members that advised students during the preparation of their work can be listed as a co-author (never as a first author) and their status of advisors must be clearly indicated. Principle responsibilities for a submitted student conference paper fall with the student author/s and as such they must be listed first. The content of the paper should mainly reflect the contribution of the student. Faculty co-authors cannot present the paper or answer questions at the student conferences. The selection of the oral presentations is solely based on the submitted abstracts. We strongly recommend that you submit an abstract with an extensive description of your topic, including a detailed explanation of your contribution and the novelty of your work.

French, German, US and UK students submitting abstracts for the sessions E2.1 and E2.2 will be forwarded to the corresponding national competition coordinators. The following contact persons are available for more information:
For the French national competition: Emmanuel Zenou – emmanuel.zenou@isae-supaero.fr
For the German national competition: Marco Schmidt – marco.schmidt@uni-wuerzburg.de
For the US national competition – Merridith Kauten - merridithk@aiaa.org
For the UK national competition: Fabrizio Bernardini - iac_comp@bis-space.com

Paper accepted for the competition and the presentations will be evaluated along the following criteria: Technical Content, Originality, Practical Application, General Presentation, Knowledge of the Subject

ISEB Student Sponsorship Opportunities for IAC
Students from select countries may be eligible for financial support to attend the IAC through sponsorships offered by the International Space Education Board (ISEB) member agencies.
Participating countries include: Canada, USA, ESA's Member and Associate States, France, Japan, South Korea, Australia, South Africa, Egypt, and the United Arab Emirates.
To learn more about eligibility and how to apply, please visit the ISEB Student Sponsorship Opportunities page (https://iseb.space/student-sponsorship-opportunities/).

Co-Chairs

- **Prof. Franco Bernelli-Zazzera,** *Politecnico di Milano, Italy*
- **Prof. Emmanuel Zenou,** *Institut Supérieur de l'Aéronautique et de l'Espace (ISAE), France*

Rapporteur

- Dr. Ioana-Roxana Perrier, *Institute of Polytechnic Science and Aeronautics (IPSA), France*

E2.2. Student Conference - Part 2

Undergraduate and graduate level students (no more than 28 years of age) present technical papers on any project in space sciences, industry or technology. These papers will represent the specific work of the author(s) (no more than two students). The students presenting in this session will compete in the 53rd International Student Competition. This session is NOT for team projects. Team project papers should be submitted to session E2.3. To accommodate for the different national education schemes, the distinction between undergraduate and graduate students is based uniquely upon the number of years of university education, as follows:

- undergraduate students: students who did their work within the 4th year at university level, for instance a Bachelor thesis.
- graduate students: students who did their work from the 5th year at university level, for instance a Master thesis.
If appropriate, faculty members that advised students during the preparation of their work can be listed as a co-author (never as a first author) and their status of advisors must be clearly indicated. Principle responsibilities for a submitted student conference paper fall with the student author/s and as such they must be listed first. The content of the paper should mainly reflect the contribution of the student. Faculty co-authors cannot present the paper or answer questions at the student conferences.
The selection of the oral presentations is solely based on the submitted abstracts. We strongly recommend that you submit an abstract with an extensive description of your topic, including a detailed explanation of your contribution and the novelty of your work.
French, German, US and UK students submitting abstracts for the sessions E2.1 and E2.2 will be forwarded to the corresponding national competition coordinators. The following contact persons are available for more information:

For the French national competition: Emmanuel Zenou – emmanuel.zenou@isae-supaero.fr
For the German national competition: Marco Schmidt – marco.schmidt@uni-wuerzburg.de
For the US national competition - Merridith Kauten - merridithk@aiaa.org
For the UK national competition: Fabrizio Bernardini - iac_comp@bis-space.com

Paper accepted for the competition and the presentations will be evaluated along the following criteria: Technical Content, Originality, Practical Application, General Presentation, Knowledge of the Subject

ISEB Student Sponsorship Opportunities for IAC
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Participating countries include: Canada, USA, ESA's Member and Associate States, France, Japan, South Korea, Australia, South Africa, Egypt, and the United Arab Emirates.
To learn more about eligibility and how to apply, please visit the ISEB Student Sponsorship Opportunities page (https://iseb.space/student-sponsorship-opportunities/).

Co-Chairs

- Prof. Marco Schmidt, *University Wuerzburg, Germany*
- Dr. Ioana-Roxana Perrier, *Institute of Polytechnic Science and Aeronautics (IPSA), France*

Rapporteur

- **Prof. Emmanuel Zenou,** *Institut Supérieur de l'Aéronautique et de l'Espace (ISAE), France*

E2.3-GTS.4. Student Team Competition Global Technical Session

Undergraduate and graduate level student teams (students no more than 28 years of age) present papers on any subject related to space sciences, industry or technology. These papers will represent the work of the authors (three or more students). Students presenting in this session will compete for the Team Award.
If appropriate, faculty members that advised students during the preparation of their work can be listed as a co-author (never as a first author) and their status of advisors must be clearly indicated. Principle responsibilities for a submitted student conference paper fall with the student authors and as such they must be listed first. The content of the paper should mainly reflect the contribution of the students. Faculty co-authors cannot present the paper or answer questions at the student conferences.

The selection of the oral presentations is solely based on the submitted abstracts. We strongly recommend that you submit an abstract with an extensive description of your topic, including a detailed explanation of your contribution and the novelty of your work. Furthermore, a short description how your team worked together to achieve the project goal should be included.

Paper accepted for the competition and the presentations will be evaluated along the following criteria: Technical Content, Originality, Practical Application, General Presentation, Knowledge of the Subject.

ISEB Student Sponsorship Opportunities for IAC
Students from select countries may be eligible for financial support to attend the IAC through sponsorships offered by the International Space Education Board (ISEB) member agencies.
Participating countries include: Canada, USA, ESA's Member and Associate States, France, Japan, South Korea, Australia, South Africa, Egypt, and the United Arab Emirates.
To learn more about eligibility and how to apply, please visit the ISEB Student Sponsorship Opportunities page (https://iseb.space/student-sponsorship-opportunities/).

Co-Chairs

- **Prof. Emmanuel Zenou,** *Institut Supérieur de l'Aéronautique et de l'Espace (ISAE), France*
- **Prof. Franco Bernelli-Zazzera,** *Politecnico di Milano, Italy*
- **Mrs. Eleonora Lombardi,** *Fondazione E. Amaldi, Italy*

Rapporteur

- **Ms. Kathleen Coderre,** *Lockheed Martin (Space Systems Company), United States*

E2.4. Educational Pico and Nano Satellites

Joint session with IAF Space Universities Administrative Committee (SUAC). The session covers all aspects related to

educational small satellites.

Co-Chairs

- **Prof. Xiaozhou Yu,** *Dalian University of Technology (DUT), China*
- **Prof. Franco Bernelli-Zazzera,** *Politecnico di Milano, Italy*
- **Prof. Anna Guerman,** *Centre for Mechanical and Aerospace Science and Technologies (C-MAST), Portugal*
- **Prof. Igor V. Belokonov,** *Samara National Research University (Samara University), Russian Federation*

E3. 40th IAA SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS

Coordinators

- **Mr. Jacques Masson,** *European Space Agency (ESA), Netherlands (Kingdom of the)*
- **Dr. Bhavya Lal,** *RAND, United States*

E3.1. International Cooperation in Using Space for Sustainable Development: The "Space2030" Agenda and Beyond

With the growing societal impacts of space technology and its applications, the international community has shifted its attention to their contributions to the global sustainability and development agendas, in particular, the achievement of the Sustainable Development Goals (SDGs). In this context, the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) developed the "Space2030" agenda and its implementation plan, which were adopted by the United Nations General Assembly in 2021. This session provides an opportunity to discuss how international cooperation in space activities can effectively contribute to sustainable development, in particular, Space 2030 agenda and the SDGs. It also addresses how far we have already come in using space technology and its applications in support of the sustainable development, where we are still facing challenges and gaps, and what additional actions could be taken towards a sustainable future.

Co-Chairs

- **Dr. Ikuko Kuriyama,** *Japan Aerospace Exploration Agency (JAXA), Japan*
- **Dr. Werner R. Balogh,** *European Space Agency (ESA), France*

E3.2. The Future of Space Exploration and Innovation

Space exploration missions and plans have been emerging around the world, targeting different destinations from LEO, to the Moon and Mars, and with an increasing participation of new public and private actors. The session will focus on the current plans of future exploration missions of various space exploration stakeholders and will provide a forum to reflect on the trends and present the latest developments in the field.

Co-Chairs

- Mr. Marc Haese, *DLR, German Aerospace Center, Germany*
- Mr. Nicolas Peter, *European Space Agency (ESA), France*

Rapporteur

- Mr. Claudiu Mihai Taiatu, *International Space University (ISU), France*

E3.3. Advancing Space Markets, Ensuring Resilience, and Creating Value

The space ecosystem is undergoing rapid economic, industrial and strategic transformation through expanding commercial markets, creative business models, evolving public-private relationships, and growing dependencies on space infrastructure and applications. These are reshaping both the space ecosystem and global economic activity. This session invites thoughtful analysis of economic, industrial and policy research examining value creation across all aspects of space activities. Topics include measurement and valuation techniques; investment and finance perspectives; supply chains and industrial capacity; and national and regional economy development through space investments. Parallel to these topics is the role of economics in defense and national security and analyzing the economic aspects of the resilience of space assets and applications. Comparative perspectives from established and emerging space economies are particularly encouraged.
Submissions should address a clearly defined research question or analytical problem and explain its relevance to the space ecosystem. Abstracts should identify the evidence, data, case material or analytical framework used. The methodological approach, and a clear discussion of the results and applicability to issues of creating value in space activities should also be clearly explained. Primarily descriptive accounts of technologies, projects or markets should focus on their economic, industrial or policy relevance.

Co-Chairs

- Dr. Henry Hertzfeld, *Space Policy Institute, George Washington University, United States*
- Dr. Alessandro Paravano, *Politecnico di Milano, Italy*

Rapporteur

- Ms. Victoria Carter-Cortez, *Space Generation Advisory Council (SGAC), France*
- Prof. Michele Cristina Silva Melo, *Ideia Space, Brazil*

E3.4. Policy and Regulatory Approaches for Governing Safety, Security and Sustainability in Space

The space environment today involves a growing number of states, government consortia, and private sector entities with different strategic objectives and levels of economic and technological development. It is the responsibility of these actors to promote a secure, stable, and resilient environment in order to ensure uninterrupted access to space and security of space operations in Earth's orbits and beyond, especially as space systems now support day-to-day civilian and commercial life in many countries, enabling socioeconomic prosperity. A number of established spacefaring nations have developed national policies and strategies to address these concerns. At a multilateral level, a body of principles and rules governing space activities was established during the second half of the twentieth century. However, the rapid pace of the development, testing, and fielding of various launch technologies, as well as

on-orbit systems for terrestrial support and exploration of the cis-lunar orbit and beyond, brings unprecedented challenges to all space operators. It is the purpose of this session to seek to address them.

Co-Chairs

- **Dr. Peter Stubbe,** *German Aerospace Center (DLR), Germany*
- **Dr. Jana Robinson,** *The Prague Security Studies Institute, Czech Republic*

Rapporteur

- **Ms. Gina Petrovici,** *German Space Agency, Germany*

E3.5-E7.6. 41st IAA IISL Scientific Legal Roundtable: The Scientific/Legal Dimensions of the Human Presence in Outer Space

The rapid commercialization of space transportation systems where private entities are offering human passengers the option to experience outer space travel underlines the scientific-technological as well as legal-policy issues arising from the growing diversity and numbers of human activities in outer space.

Co-Chairs

- **Prof. Larry Martinez,** *International Institute of Space Law (IISL), United States*
- **Prof. Rene Laufer,** *Luleå University of Technology, Sweden*

Rapporteur

- **Dr. Nicola Rohner-Willsch,** *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*
- **Dr. Ivan Fino,** *Sant'Anna School of Advanced Studies, Italy*

E3.6. Value Beyond Cost: Productivity and Competitiveness in the Space Economy

As the space sector undergoes rapid industrialization, improvements in productivity are changing the economics of space activities. Advances in manufacturing methods, learning effects, economies of scale and scope, and new commercial business models are reducing costs and increasing production capacity. However, as space programmes become more complex and strategically important, cost alone is no longer sufficient to assess performance or guide investment decisions.

This session will explore the relationship between productivity, competitiveness, and value creation in the space sector. It will examine how industrial economics can improve affordability and efficiency, while also considering how governments, space agencies, and industry can measure value beyond cost through factors such as mission effectiveness, resilience, innovation, strategic autonomy, industrial development, and long-term societal and economic benefits.

The session will be divided into two parts. The first part will feature abstract presentations covering research, methodologies, and case studies. The second part will consist of a panel discussion bringing together representatives from Space Agencies and Industry to debate how future procurement, investment, and industrial policies should balance productivity, competitiveness, cost efficiency, and broader value creation.

Co-Chairs

- Ms. Christine Klein, *European Space Agency (ESA), France*
- Dr. Henry Hertzfeld, *Space Policy Institute, George Washington University, United States*

Rapporteur

- Ms. Karina Miranda Sanchez, *ESA, Netherlands (Kingdom of the)*

E4. 61st IAA HISTORY OF ASTRONAUTICS SYMPOSIUM

Coordinators

- Dr. A. Ingemar Skoog, *Germany*
- Dr. Otfrid G. Liepack, *National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States*
- Dr. Sandra Haeuplik-Meusburger, *Technische Universität Wien (TU Wien), Austria*
- Mr. Karlheinz Rohrwild, *Germany*

E4.1. Memoirs & Organisational Histories

Autobiographical & biographical memoirs of individuals who have made original contributions to the development & application of astronautics & rocketry. History of government, agencies, industrial, academic & professional societies & organisations long engaged in astronautical endeavors. This will include the entire spectrum of space history, at least 25 years old.

Co-Chairs

- Ms. Kerrie Dougherty, *Australia*
- Dr. Sandra Haeuplik-Meusburger, *Technische Universität Wien (TU Wien), Austria*
- Mr. Karlheinz Rohrwild, *Germany*

Rapporteur

- Prof. Klaus Schilling, *Zentrum für Telematik, Germany*
- Mr. Philippe Cosyn, *Independent scholar, Belgium*

E4.2. Organizational, Scientific and Technical Histories

The session will cover the history of space science, exploration, innovation & technology. Furthermore reflection on the cultural and socio-political impact are parts of it. This will include the entire spectrum of space history, at least 25 years old.

Co-Chairs

- Ms. Vera Pinto Gomes, *European Commission, Belgium*
- Dr. Sandra Haeuplik-Meusburger, *Technische Universität Wien (TU Wien), Austria*

Rapporteur

- Mr. Hannes Mayer, *Karl Franzens Universität Graz, Austria*
- Mr. Randy Liebermann, *United States*

E4.3. History of Poland and Eastern Europe Contribution to Astronautics

This Session will focus on the history of Poland and Eastern Europe in space, including topics on space programs, technical contributions, political influences and effects, space science activities, space architecture, and social and cultural influences. Contributions must address events that occurred at least 25 years ago.

Co-Chairs

- Mr. Karlheinz Rohrwild, *Germany*
- Dr. Otfrid G. Liepack, *National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory, United States*

Rapporteur

- Mr. Philippe Cosyn, *Independent scholar, Belgium*
- Mr. Steve Salmon, *The British Interplanetary Society, United Kingdom*

E5. 38th IAA SYMPOSIUM ON SPACE AND SOCIETY

Coordinators

- Prof. Olga Bannova, *University of Texas at San Antonio, United States*
- Mr. Randy Liebermann, *United States*

E5.1. Space Architecture: Habitats, Habitability, and Bases

Space Architecture integrates all topics related to designing and building human environments for use in space. The session welcomes papers in three areas: 1) research, design, prototype testing, manufacture, and operation of habitats for space and analog terrestrial environments; 2) how habitats influence human health, psychology, and efficiency, and requirements based on the “human factor”; 3) fabrication and construction of habitable complexes on planetary surfaces or in orbit and 4) human systems integration design implications.

Co-Chairs

- Prof. Olga Bannova, *University of Texas at San Antonio, United States*
- Prof. Anna Barbara Imhof, *Liquifer Systems Group (LSG), Austria*

Rapporteur

- Ms. Anne-Marlene Rüede, *Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland*
- Dr. Mich Lin, *Massachusetts Institute of Technology (MIT), United States*

E5.2. Is Space R&D Truly Fostering A Better World For Our Future?

This session solicits papers for a panel discussion focusing on the distinct benefits to society from products derived from space research and development (R&D). The goal of this session is to examine and discuss cases of both emerging and established goals, best practices, and associated outcomes of knowledge sharing, technology transfer, and technology commercialization programmes as they relate specifically to societal benefits. Presenters will identify distinctive ways their organizations are promoting the relevance of space R&D to diverse societies. Attendees will develop a broader awareness of how they can also identify and promote the benefits of space R&D in order to influence broader support of space R&D investments.

Panel Members are asked to introduce novel practices which:

- Increase attendee understanding of how innovations resulting from space R&D have changed, and will continue to change, the world.
- Promote productive thinking about optimizing space R&D investments in order to maximize societal benefits.
- Increase the understanding of technology transfer policies and practices for both space and non-space utilization.
- Demonstrate the correlation and synergies between technology transfer and STEM education for interdisciplinary space careers and technical entrepreneurship.
- Measurably demonstrate the impact of innovation derived from space R&D when transferred into new products, services and processes

Co-Chairs

- Prof. Olga Bannova, *University of Texas at San Antonio, United States*
- Ms. Nona Cheeks, *Retired NASA, United States*

Rapporteur

- Dr. Joseph Grant, *Retired NASA, United States*

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, or re-purposing space technology, materials or data independently or in direct exchange with the space sector. Today this important practice is branching into a several directions, ranging from performance, installation, video, or conceptual work situated in space or space analogous environments themselves, to commercial gallery contexts and the realm of participation and public engagement with science. This session addresses the practice of contemporary artists who have developed new ways to appropriate space for their work, the conceptual and practical foundations of their engagement, and the implications of this emerging aesthetic paradigm for both the fields of space and art. Submissions are welcome from artists and art

historians, and from space industry and space agency representatives as well as from the cultural sector facilitating or programming related -projects crossing over the increasingly blurred boundaries of creative practice.

Co-Chairs

- **Mr. Richard Clar,** *Art Technologies, United States*
- **Dr. Yuri Tanaka,** *European Organization for Nuclear Research (CERN), Switzerland*

Rapporteur

- **Dr. Tibor Balint,** *International Academy of Astronautics (IAA), United States*

E5.4. Space Assets and Disaster Management

This session will explore the role space assets can play in situations requiring disaster management and emergency response. Papers will discuss how space assets and applications can be brought to bear to assist with situation monitoring and assessment, shortening response times and mitigating impact on affected populations.

Co-Chair

- **Dr. Tibor Balint,** *International Academy of Astronautics (IAA), United States*

E5.5. Sharing Space Achievements and Heritage: Space Museums and Societies

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 after space industries. They include professional societies, space museums, space associations, non-profit organizations and other organizations interested in space activities. Some have a large membership of 10000 or more, others can be small; a few are already a century old, others are just being created. They exist in traditional and emerging space nations. Together they champion the interests of an impressive number of individuals and organizations connected to space. Space Museums are the visible face of space for most of the general public.

This symposium offers a podium for ideas and proposals to enhance the interaction between the organizations, their members and the Federation. Papers may address proposals to exchange experiences and best practices; sharing articles, exhibitions or educational material; novel ideas to help outreach to the general public, etc. Of particular interest are papers exploring ways to foster communication and collaboration and to develop mutual benefits amongst young societies, representatives of emerging space nations and museums within and outside the IAF family.

Co-Chairs

- **Mr. Jean-Baptiste Desbois,** *SEMECCEL Cité de l'Espace, France*
- **Mrs. Ines Prieto,** *SEMECCEL Cité de l'Espace, France*

E5.6. Simulating Space Habitation: Habitats, Design and Simulation Missions

This session covers all topics related to preparing for and simulating future extra-terrestrial habitats and its associated facilities. This includes lessons learned as well as experimental and concrete design proposals for future habitats,

either orbital or surface structures, from analog programs to XR solutions and other cutting-edge approaches. The session especially welcomes papers with an interdisciplinary wide-range focus relevant for future crewed missions. Themes may span across innovative technologies, architectural, interior and design approaches and elements, human factors, social-cultural dynamics of space missions, the legal and policy aspects of analog or future crewed missions, as well as the economics of such missions.

Co-Chairs

- **Prof. Anna Barbara Imhof,** *Liquifer Systems Group (LSG), Austria*
- **Dr. Sandra Haeuplik-Meusburger,** *Technische Universität Wien (TU Wien), Austria*

Rapporteur

- **Dr. Amit Srivastava,** *University of Adelaide, Australia*

E6. IAF BUSINESSES AND INNOVATION SYMPOSIUM

Coordinator

- **Ms. Nancy C. Wolfson,** *American Institute of Aeronautics and Astronautics (AIAA), United States*

E6.1. Space Entrepreneurship and Investment: The Practitioners' Perspectives

This session contains a broad spectrum of entrepreneurship, innovation, finance and investment presentations from the practitioner's perspective. Suggested topics suitable for this session can be at any level of analysis, including (from macroscopic to microscopic) the space sector, industries (e.g., propulsion), industry segments (e.g., chemical propulsion), individual firms, a portion of or a group of individuals within a firm, or an individual. Example entrepreneurship and innovation topics suitable for this session include descriptions related to entrepreneurship and innovation such as new market sectors, new businesses, new business plans, new projects, recent experiences of start-up companies. Suitable finance or investment topics apply to large programmes, new firms, the analysis methodologies of markets, or new developments in the finance and investment communities (including angel investors, venture capital organizations, and investment banks).

Co-Chairs

- **Mr. Joerg Kreisel, JOERG KREISEL International Consultant (JKIC),** *Germany*
- **Ms. Daria Stepanova,** *Germany*

Rapporteur

- **Prof. Michele Cristina Silva Melo,** *Ideia Space, Brazil*

E6.2. Government and Industry Perspectives on the Future of Space Commerce

This innovative session convenes experts from different sectors within the space industry and leaders from both the private sector and government agencies to explore their roles and emerging best practices that encourage the envisioning, building, and maturing of NewSpace trade and markets. 1. Therefore, we welcome submissions that

explore recent advancements in the commercialization of space, propose business models, define new markets, encourage diversification, sustainability, and attract private investment. This can include traditional space industry applications (satellite-based services encompassing Earth observation, navigation, and communications), and emerging opportunities such as settlements, destinations (i.e., private space stations), resource extraction (asteroid mining, debris commercialization), transportation, industrialization, new financing and insurance, and other sub-sectors. Also, consider: What government actions best encourage space commerce from an entrepreneurial and "government-as-enabler" viewpoint in an era of both constrained resources and major opportunities? Consider policies, regulations, public infrastructure, and other possible investments to bridge the gap between business and government objectives, fostering a more robust and sustainable space economy from a uniquely entrepreneurial perspective. 2. We welcome papers on the value and use of industry principles and how they could be best developed. How could/should they interact with government-driven principles such as the Artemis Accords or the UN Guidelines? This could influence entrepreneurial activities, including startups, medium and large businesses, and established and emerging markets. Address the challenges of bringing government and industry together, including balancing their objectives and obligations for the public interest with a company's business cycle and obligation to shareholders, maintaining healthy public-private boundaries, and building mutual trust. This session will open with an invited keynote speaker, followed by a panel of experts for a discussion and Q&A period, and will conclude with paper presentations.

Co-Chairs

- **Ms. Rose Croshier,** *National Oceanic and Atmospheric Administration (NOAA), United States*
- **Ms. Nancy C. Wolfson,** *American Institute of Aeronautics and Astronautics (AIAA), United States*
- **Mr. Jim Keravala,** *[unlisted], United States*

E6.3. Innovation: The Academics' Perspectives

This session will contain academic presentations, at any level of analysis, and on any aspect of entrepreneurship, innovation, finance, or investment, organization theory, investment, etc. Variance and phenomenological studies are encouraged. Qualitative, quantitative, or mixed methods approaches are all accepted. Academic domains of interest include strategic management, economics, leadership, innovation management, and all perspectives of organization theory (including organizational economics, cognition and interpretation, power and dependence, technology, learning, complexity and computation, institutions, networks, ecology, and evolution). At a minimum, submissions are expected to be at the level of working papers performed as part of any graduate degree programme (i.e., masters, doctoral, and post-graduate). This work can include theoretical and applied research.

Co-Chairs

- **Prof. Michele Cristina Silva Melo,** *Ideia Space, Brazil*
- **Prof.Dr. Andrea Cabello,** *University of Brasilia, Brazil*

Rapporteur

- **Ms. Nancy C. Wolfson,** *American Institute of Aeronautics and Astronautics (AIAA), United States*

E6.4-GTS.1. Entrepreneurship Around the World Global Technical Session

Entrepreneurship presents unique opportunities and challenges from country to country around the world. Some of the experiences of entrepreneurs transcend national and cultural borders, but some others do not. This session welcomes

papers and presentations which describe the barriers experienced by real entrepreneurs in their different countries and regions. A panel with industry experts from around the world will set the stage followed by a discussion which highlights the commonalities and unique characteristics of nation-specific entrepreneurial barriers as identified by the individual papers presented. This is a technical session co-sponsored by the IAF Space Entrepreneurship and Investment Committee (SEIC) and the IAF Workforce Development/Young Professionals Programme Committee, as part of the Global Technical Sessions – presenters can present in person at the IAC or from their home/work/university location."

Co-Chairs

- **Mrs. Eleonora Lombardi,** *Fondazione E. Amaldi, Italy*
- **Mr. Samuel Peterson,** *Embry-Riddle Aeronautical University Worldwide, United States*
- **Ms. Susana Fornies Rodriguez,** *ISAE - Institut Supérieur de l'Aéronautique et de l'Espace, France*
- **Ms. Nancy C. Wolfson,** *American Institute of Aeronautics and Astronautics (AIAA), United States*

E7. 70th IISL COLLOQUIUM ON THE LAW OF OUTER SPACE

Coordinators

- **Prof. Lesley Jane Smith,** *Leuphana University of Lüneburg/Weber-Steinhaus & Smith, Germany*
- **Dr. Catherine Doldirina,** *International Institute of Space Law (IISL), Italy*

E7.1. Young Scholars Session

This session is open for abstracts and papers from space lawyers under 35 years old. It welcomes contributions on any topic related to space law. It also features a regular, annual keynote presentation by a High level expert and diplomat in the field of international space law.

Co-Chairs

- **Dr. Merve ERDEM BURGER,** *Swiss Space Law Forum, Switzerland*
- **Ms. Nomfuneko Irene Majaja,** *Kenya Space Agency, Kenya*

Rapporteur

- **Shrawani Shagun,** *National Law University of Delhi, India*
- **Dr. Thomas Graham,** *Swinburne University of Technology, Australia*

E7.2. Lunar Governance

The session will discuss the UN Space Resources principles, the Artemis Accords, legal aspects of the Chinese lunar initiatives, and other issues arising from the expanding uses of the Moon, such as the use of nuclear power sources.

Co-Chairs

- **Ms. Joan Chesoni,** *Kenya*

- Prof. George (Georgios) D. Kyriakopoulos, *National and Kapodistrian University Of Athens, Greece*

Rapporteur

- Ms. Beyza Eravci, *University of Luxembourg, Türkiye*
- Dr. Giuliana Rotola, *Scuola Superiore Sant'Anna, Italy*

E7.3. Legal Challenges in Ensuring the Peaceful Use of Outer Space: Dual-Use Technologies and the Law

The session will address the interpretation of "peaceful use" of outer space, and the legal aspects of the restrictions on the deployment of weapons, anti-satellite operations, dual uses technologies, and military communications.

Co-Chairs

- Dr. OLAVO DE OLIVEIRA BITTENCOURT NETO, *Catholic University of Santos, Brazil*
- Dr. Upasana Dasgupta, *OP Jindal Global University, India*

Rapporteur

- Ms. Gurur Gaye Günal, *Günal Law Firm, Luxembourg*
- Mr. Gregory Radisic, The Centre for Space, *Cyberspace and Data Law, Canada*

E7.4. Rendezvous and Proximity Operations

The session will focus on the legal issues arising from rendezvous and proximity operations (RPO), including questions of authorization and supervision, due regard and non-interference, transparence and confidence-building measures, and space traffic coordination.

Co-Chairs

- Prof. Alissa J. Haddaji, *Massachusetts Institute of Technology (MIT), United States*
- Prof. Irmgard Marboe, *University of Vienna, Austria*

Rapporteur

- Mr. Anıl Akyol, *MoEP - Mars on Earth Project, Türkiye*
- Ms. Jingyi Liu, *Beijing Institute of Technology, Institute of Space Law, China*

E7.5. Orbital Data Centres and Future Space Infrastructure Governance

The session will explore governance challenges related to orbital data centres and future space infrastructure, including regulatory frameworks, jurisdiction, environmental impacts, cybersecurity, resource allocation, and the long-term sustainability of space activities.

Co-Chairs

- Prof. Mahulena Hofmann, *University of Luxembourg, Luxembourg*
- Ms. NAZLI CAN, *Istanbul Technical University, Türkiye*

Rapporteur

- Mr. Safwene El Khaira, *ECSL, France*
- Ms. Simona Spassova, *University of Luxembourg, Luxembourg*

E7.6-E3.5. 41st IAA IISL Scientific Legal Roundtable: The Scientific/Legal Dimensions of the Human Presence in Outer Space

The rapid commercialization of space transportation systems where private entities are offering human passengers the option to experience outer space travel underlines the scientific-technological as well as legal-policy issues arising from the growing diversity and numbers of human activities in outer space.

Co-Chairs

- Prof. Rene Laufer, *Luleå University of Technology, Sweden*
- Prof. Larry Martinez, *International Institute of Space Law (IISL), United States*

Rapporteur

- Dr. Nicola Rohner-Willsch, *Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany*
- Dr. Ivan Fino, *Sant'Anna School of Advanced Studies, Italy*

E7.7. Recent Developments in Space Law – National and Regional Space Legislation

The session will examine recent developments in national space legislation, and discuss regional initiatives, including the proposed European Space Act and the Digital Networks Act.

Co-Chairs

- Prof. Güneş Ünüvar, *University of Exeter, United Kingdom*
- Mr. Philippe Clerc, *Centre National d'Etudes Spatiales (CNES), France*

Rapporteur

- Ms. Theodora Liameti, *Eutelsat, France*

E8. IAA MULTILINGUAL ASTRONAUTICAL TERMINOLOGY SYMPOSIUM

Coordinators

- Prof. Susan McKenna-Lawlor, *Space Technology (Ireland) Ltd., Ireland*
- Dr. Tetsuo Yoshimitsu, *Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency, Japan*

E8.1. Multilingual Astronautical Terminology

This session, organized by the International Academy of Astronautics (IAA), will review the progress made in multilingual space terminology and its impact on international cooperation in space. Terminology is a key issue for a better understanding among people using various languages and dialects. Consecutive or simultaneous translation does not remove the risk of ambiguity during technical meetings and accuracy in terminology is essential during all phases of cooperation. The session will address issues such as standardization of definitions in space science and technology. The specific character of emerging space countries will also be discussed.

Co-Chairs

- Dr. Tetsuo Yoshimitsu, *Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency, Japan*
- Prof. Susan McKenna-Lawlor, *Space Technology (Ireland) Ltd., Ireland*

Rapporteur

- Mr. Fabrice Dennemont, *International Academy of Astronautics (IAA), France*

E9. IAF SYMPOSIUM ON SECURITY, STABILITY AND SUSTAINABILITY OF SPACE ACTIVITIES

Coordinators

- Prof. Serge Plattard, *University College London (UCL), United Kingdom*
- Mr. Stefano Zatti, *University of Rome "La Sapienza", Italy*

E9.1-A6.8. Policy, Legal, Institutional, Economic and Security Aspects of Debris Mitigation, Debris Remediation and STM

This session will address all non-technical aspects of debris mitigation, debris remediation and STM. Papers may focus on aspects of responsibility, liability and registration, on the role of bodies such as UNCOPUOS or IADC, as well as on insurance, financial incentives and funding. In addition, security-related aspects and the role of international cooperation in addressing these issues may be considered.

Co-Chairs

- Dr. David Spencer, *The Aerospace Corporation, United States*
- Prof. Serge Plattard, *University College London (UCL), United Kingdom*

- Dr. Tanja Masson-Zwaan, *International Institute of Air and Space Law, Leiden University, Netherlands (Kingdom of the)*
- Dr. Andrea Capurso, *LUISS Guido Carli University, Italy*

Rapporteur

- Dr. Emma Kerr, *Defence Science and Technology Laboratory (DSTL), United Kingdom*
- Ms. Victoria Samson, *Secure World Foundation, United States*

E9.2. Cyber-based security threats to space missions: establishing the legal, institutional and collaborative framework to counteract them

The increasingly pervasive network connectivity following the Internet explosion introduces a whole new families of cyber-security threats to space missions. To send commands to a spacecraft now you would not need to build a ground station, but you can penetrate from your home or office the existing ground infrastructures, bypassing their protection measures, from anywhere in the world.
The questions to be addressed in the session will span across the following issues:
- What is the interest of cyber-crime and cyber-activism with respect to space activities?
- How are aerospace organisations managing the ability to introduce the right level of security measures in the process to plan and develop new missions?
- What legal and protection framework is or has to be put in place to enable secure cooperation across corporate and international boundaries?
- How is knowledge about security threats captured, shared, and used to follow the evolution of cyber threats?
- Which ones of these specific threats are to be expected to target space missions, from the ground and from space?
- What is particularly to be expected from the cyber-space to target outer space?

Contribution are expected to focus on cyber-specific legislation, best practices, processes, collaboration methods between law enforcement and institutional partners, and any other aspects of the organization of space missions that are all constituting the formal components to keep a mission “cyber secure”.

Co-Chairs

- Mr. Julien Airaud, *Centre National d'Etudes Spatiales (CNES), France*
- Mr. Stefano Zatti, *University of Rome “La Sapienza”, Italy*

E9.3. Norms and Standards for Safe and Responsible Behaviour in Space

The rapid expansion and evolution of the global space arena is characterized by an increasing number and diversity of space actors and the emergence of new kinds of space systems, some of which involve very large constellations of satellites numbering in the thousands to tens of thousands, and also new kinds of space activities, such as on-orbit servicing, refueling, in-orbit assembly and manufacturing, active debris removal, and so on. With increasing congestion in the Earth’s orbital environment, these new kinds of space activities raise questions about the safety of space operations, particularly when contingency situations arise (such as conjunctions), or when spacecraft operate in close proximity to each other and there are no clear, widely accepted international standards or norms of behaviour. For this reason, it is important to identify and leverage best practices from government and industry to ensure safety of flight and safe rendezvous and proximity operations of spacecraft. These best practices may subsequently be codified as norms and standards for safe and responsible behaviour in space. This session is intended to be a forum to allow

practitioners to discuss and socialize the types of norms, standards and behaviours that would be conducive to the safety of space operations.

Co-Chairs

- **Dr. Peter Martinez,** *Secure World Foundation, United States*
- **Dr. Annamaria Nassisi,** *Thales Alenia Space Italia, Italy*

Rapporteur

- **Ms. Rachel Venn,** *Space Generation Advisory Council (SGAC), United Kingdom*

E9.4. Strategic Risk Management for Successful Space & Defence Programmes

The many benefits of space-based activities to the global economy, technology innovation, national defense, science, and exploration are only realizable if the use of space is secure and sustainable. Risk management plays a crucial role in establishing and maintaining this secure and sustainable use of space.
This session will explore how Enterprise Risk Management (ERM) frameworks can help space organizations (civil, government and military) manage interconnected strategic, operational, and compliance risks, promoting resilience, sustainability, and collaboration across sectors.

Abstracts would be welcome on the following topics:

1. Strategic Risk & Scenario Planning
- How global Geopolitical & Socio-Economic challenges (e.g., military conflicts, extreme weather events, etc.) shape ERM practices and long-term risk-based planning in space.
- Preparing for “black swan” events (e.g., space conflicts, space weather events, etc.) through ERM.
- Risks in Military Space Operations: Examining ERM’s role in national security space functions and its impact on security strategies.
- How to best make use of advances in new technologies development such as AI, quantum, etc. and what threats/opportunities to a secure world do they represent?

2. Insurance & Crisis Management Best Practices
- Integrating insurance and crisis management best practices with ERM frameworks

3. ERM for Public-Private Sector Collaboration
- Effective ERM frameworks for joint risk management between governments and private space entities.

Co-Chairs

- **Ms. Maria-Gabriella Sarah,** *European Space Agency (ESA), France*
- **Prof. Katarzyna Malinowska,** *Space Entrepreneurship Institute, Poland*
- **Mr. Christopher Geiger,** *Lockheed Martin Corporation, United States*

Rapporteur

- **Dr. Andrew Court,** *TNO, Netherlands (Kingdom of the)*

E9.5. Mitigating threatening actions in orbit: How to enhance and strengthen space security

There is growing concern about the vulnerability of space systems and services to efforts to disrupt, deny, degrade, destroy or otherwise interfere with them. This in turn has led to increased rhetoric from some countries about the need to prepare for future conflicts on Earth to extend into space and to accordingly carry out more aggressive policies,

postures, and capabilities.

This paper session will focus on space security issues and how wide ranging their effects can be on the sustainability of the space environment and spaceflight safety. This will discuss potential threats to space systems, services, and activities in terms of actions that are deliberately intended to be harmful but also those that can be inadvertently escalatory. It will promote strategies for reducing space threats, with the final goal of raising awareness of emerging security challenges, promoting information exchange, and exploring collaborative solutions for ensuring a safe, stable, and peaceful space environment for all.

Co-Chairs

- Ms. Victoria Samson, *Secure World Foundation, United States*
- Dr. Guoyu Wang, *Beijing Institute of Technology (BIT), China*

Rapporteur

- Ms. Agnieszka Lukaszczyk, *Hialtitude Space, Poland*

E10. IAF SYMPOSIUM ON PLANETARY DEFENSE AND NEAR-EARTH OBJECTS

Coordinators

- Mr. Alex Karl, *Space Applications Services, Belgium*
- Prof. Alissa J. Haddaji, *Massachusetts Institute of Technology (MIT), United States*

E10.1. Planetary Defense from Asteroids and Comets

This session will address all aspects of the hazards associated with the impact of asteroids and comets on Earth and their mitigation, covering these broad areas of interest:

1. An overview about the latest developments and mission summaries related to recent, ongoing or upcoming missions with a focus on planetary defense.
2. Advances in pre-impact determinations and prevention of impacts, such as discovery and characterisation, along with mission & campaign designs to deflect or disrupt a hazardous object.
3. Advances in preparation for impact, such as impact consequences & disaster management and response coordination on local and international levels.
4. General considerations such as the influence of legal, social and economic aspects on the decision to act by decision makers, the deflection methods used as well as public education and communication to various audiences

5. Lessons learned from other missions and endeavours that could benefit planetary defense and vice versa.

Co-Chairs

- **Mr. Alex Karl,** *Space Applications Services, Belgium*
- **Prof. Alissa J. Haddaji,** *Massachusetts Institute of Technology (MIT), United States*

E10.2. Informing Planetary Defense

This session will address all aspects that contribute towards informing future planetary defense, including:

1. Results from the first impact deflection test with DART (e.g., results, including ground-based observations regarding the orbital period change, physical characteristics of Didymos and Dimorphos, geology of the impact site, revised numerical modelling of DART impact, and Didymos' dynamics based on DART impact);
2. Results from NEO sample return missions, as well as perspectives regarding ongoing and future NEO missions;
3. Legal considerations that would contribute towards the decision to act; and
4. Any other transdisciplinary research that enhances our understanding to make better decisions and increase the likelihood of a successful mitigation of an asteroid or comet impact.

Co-Chairs

- **Prof. Alissa J. Haddaji,** *Massachusetts Institute of Technology (MIT), United States*
- **Mr. Alex Karl,** *Space Applications Services, Belgium*

E11. IAF SYMPOSIUM ON EMERGING SPACE ECOSYSTEMS

Coordinators

- **Mr. Matias Campos,** *Astralintu Space Technologies, Ecuador*
- **Mr. Ian Grosner,** *Brazilian Space Agency (AEB), Brazil*

E11.1. Connecting Emerging Space ecoSystems

This session will delve into holistic space ecosystem development, emphasizing the interconnectedness of research, education, policy, and industry. Sustainability will be a central theme, promoting responsible space practices and alignment with global sustainability.

Co-Chairs

- **Mr. Matias Campos,** *Astralintu Space Technologies, Ecuador*
- **Mr. Ian Grosner,** *Brazilian Space Agency (AEB), Brazil*

Rapporteur

- **Ms. Imane El Khantouti,** *MISI - MOROCCAN INITIATIVE FOR SPACE INDUSTRY, France*

E12. IAF SYMPOSIUM ON THE SPACE ECONOMY: VALUE CHAINS, MARKETS, AND ECONOMIC SECURITY

The Space Economy Symposium is the Congress's forum for understanding space as an interdependent sector of the overall economy. As space activity grows from a government-led enterprise in a small number of countries into a global and commercially-driven sector, the central questions have shifted from how large the space economy is to what it is for, who controls its inputs, and whether and how it can withstand disruption. Answering them takes evidence from economics, industrial analysis and finance, joined with the experience of agencies, industry and statistical institutions. Organized along the value chain, the symposium examines markets, business models and value creation; economic security, supply chains and industrial competitiveness, in a session developed jointly with the IAF Space Security Committee; market formation in emerging sectors such as cislunar activity and in-space servicing, assembly and manufacturing; the space economy in emerging and developing economies; and productivity and value beyond cost. A high-level panel and keynote session addresses one strategic question each year. The symposium is managed by the IAF Space Economy Committee, whose task forces on the cislunar economy, ISAM, and the measurement of the space economy supply research to the programme.

Coordinators

- Dr. Bhavya Lal, RAND, United States;
- Ms. Charlotte Mathieu, European Space Agency (ESA), France;

CATEGORY G: GTS. GLOBAL TECHNICAL SYMPOSIUM

The Global Technical Symposium (GTS) is designed to offer a modern and eclectic platform at the IAC for sharing technical content to an open minded audience on-site but also online! Jointly organized by associated technical committees and the Workforce Development-Young Professional Programme Committee, these sessions are similar to the conventional technical sessions in terms of abstract selection and paper submissions. However, in addition to the on-site presentation of the technical papers, these sessions are also broadcast online. Authors are allowed to present remotely or on-site, and participants are also allowed to listen to the session from the comfort of their homes or at their workplaces in addition to the IAC venue. The IAF hopes that this approach will enable more students and young professionals without the ability to join IAC on-site to contribute to discussion at the IAC.

GTS.1. ENTREPRENEURSHIP AROUND THE WORLD GLOBAL TECHNICAL SESSION
GTS.2. HUMAN SPACEFLIGHT GLOBAL TECHNICAL SESSION
GTS.3. SPACE COMMUNICATIONS AND NAVIGATION GLOBAL TECHNICAL SESSION
GTS.4. STUDENT TEAM COMPETITION
GTS.5. SMALL SATELLITE MISSIONS GLOBAL TECHNICAL SESSION

Coordinated by Eleonora Lombardi, *Fondazione E. Amaldi — ITALY*

Coordinator

- Mrs. Eleonora Lombardi, *Fondazione E. Amaldi, Italy*

GTS.1-E6.4. Entrepreneurship Around the World Global Technical Session

Entrepreneurship has different characteristics that differ from country to country around the world. Some of the challenges that entrepreneurs face transcend national and cultural borders, but some others do not. This session welcomes papers and presentations that describe the barriers experienced by real entrepreneurs in their different countries and regions around the world. A summary discussion will identify the commonalities and unique characteristics of nation-specific entrepreneurial barriers as identified by the presenters. This is a technical session co-sponsored by the IAF Entrepreneurship and Investment Committee (EIC) and the IAF Workforce Development/Young Professionals Programme Committee, as part of the Global Technical Sessions – presenters can present in person at the IAC or from their home/work/university location.

Co-Chair

- **Mrs. Eleonora Lombardi,** *Fondazione E. Amaldi, Italy*

GTS.2-B3.9. Human Spaceflight Global Technical Session

The Human Space Endeavours Global Technical Session is targeting individuals and organizations with the objective of sharing best practices, future projects, research and issues for the future of Human Space Endeavours for sub-orbital, LEO and BEO. This is a Global session co-sponsored by the Human Space Endeavours Committee and the Workforce Development/Young Professionals Programme Committee.

Co-Chairs

- **Mr. Guillaume Girard,** *Zero2infinity, Spain*
- **Ms. Andrea Jaime,** *Isar Aerospace Technologies GmbH, Germany*

GTS.3-B2.8. Space Communications and Navigation Global Technical Session

This is a hybrid (virtual and in person) session that targets a global audience where developments in a wide range of satellite communication and space-based PNT (position, navigation, timing) topics are presented and discussed. Communication topics include fixed, mobile, broadcasting, and data relay technologies and services. Space-based PNT topics include sensors, systems, architectures, applications, and services. Topics ranging from Earth orbit to interplanetary space can be addressed. Authors are welcome to either present their work in person at the conference or remotely via the IAF's online platform.
This session offers authors the unique opportunity to directly engage an audience beyond just the on-site attendees and is co-sponsored by the Space Communications and Navigation Committee and the Workforce Development/Young Professionals Programme Committee.

Co-Chairs

- **Dr. Eric Wille,** *ESA, Netherlands (Kingdom of the)*
- **Dr. Joshua Critchley-Marrows,** *ArkEdge Space Inc., Australia*
- **Mrs. Eleonora Lombardi,** *Fondazione E. Amaldi, Italy*

Rapporteur

- **Mr. Alvin Michael Mulumba,** *International Space University (ISU), France*
- **Mr. Manish Saxena,** *Indian Space Research Organization (ISRO), India*

GTS.4-E2.3. Student Team Competition Global Technical Session

Undergraduate and graduate level student teams present papers on any subject related to space sciences, industry or technology. These papers will represent the work of the authors (three or more students). Students presenting in this session will compete for the Hans von Muldau Team Award.
The selection of the oral presentations is solely based on the submitted abstracts. We strongly recommend that you submit an abstract with an extensive description of your topic, including a detailed explanation of your contribution and the novelty of your work. Furthermore, a short description of how your team worked together to achieve the project goal should be included.
The guidelines for the student competition will be distributed from the session chairs to the authors after abstract acceptance.

Co-Chairs

- **Prof. Emmanuel Zenou,** *Institut Supérieur de l'Aéronautique et de l'Espace (ISAE), France*
- **Ms. Andrea Jaime,** *Isar Aerospace Technologies GmbH, Germany*

Rapporteur

- Ms. Kathleen Coderre, Lockheed Martin (Space Systems Company), United States

GTS.5-B4.9. Small Satellite Missions Global Technical Session

The Small Satellite Missions Global Technical Session (GTS) is a collaboration between the International Academy of Astronautics (IAA) Small Satellite Missions Symposium and the International Astronautical Federation (IAF) Workforce Development/Young Professionals Programme Committee. This session is unique in that it allows for sharing of information on a global scale with presenters and audience both at the IAC venue and online at their home/work/university locations.
Abstracts are solicited regarding operational missions or mature proposals for small satellite systems and related topics. These must have clear relevance on an international scale or at a business level, and must also provide young professionals a taste of what the space sector has to offer. Where possible, abstracts should have a wide interest in the community and should include transferable knowledge or lessons learned. Abstracts highlighting ingenuity or innovation are preferred. Examples include space missions utilizing small satellites that address specific new societal, scientific or commercial challenges, or novel technologies that have the potential to revolutionize space missions and/or enable their access to space. Papers are to describe the specific need, the small satellite approach that addresses this need, the benefits of this approach and the use of space technology, and demonstrate that other non-space approaches provide inferior solutions.
Papers from, or directed at the young professional community are preferred. This session will be accepting submissions for oral presentations only.

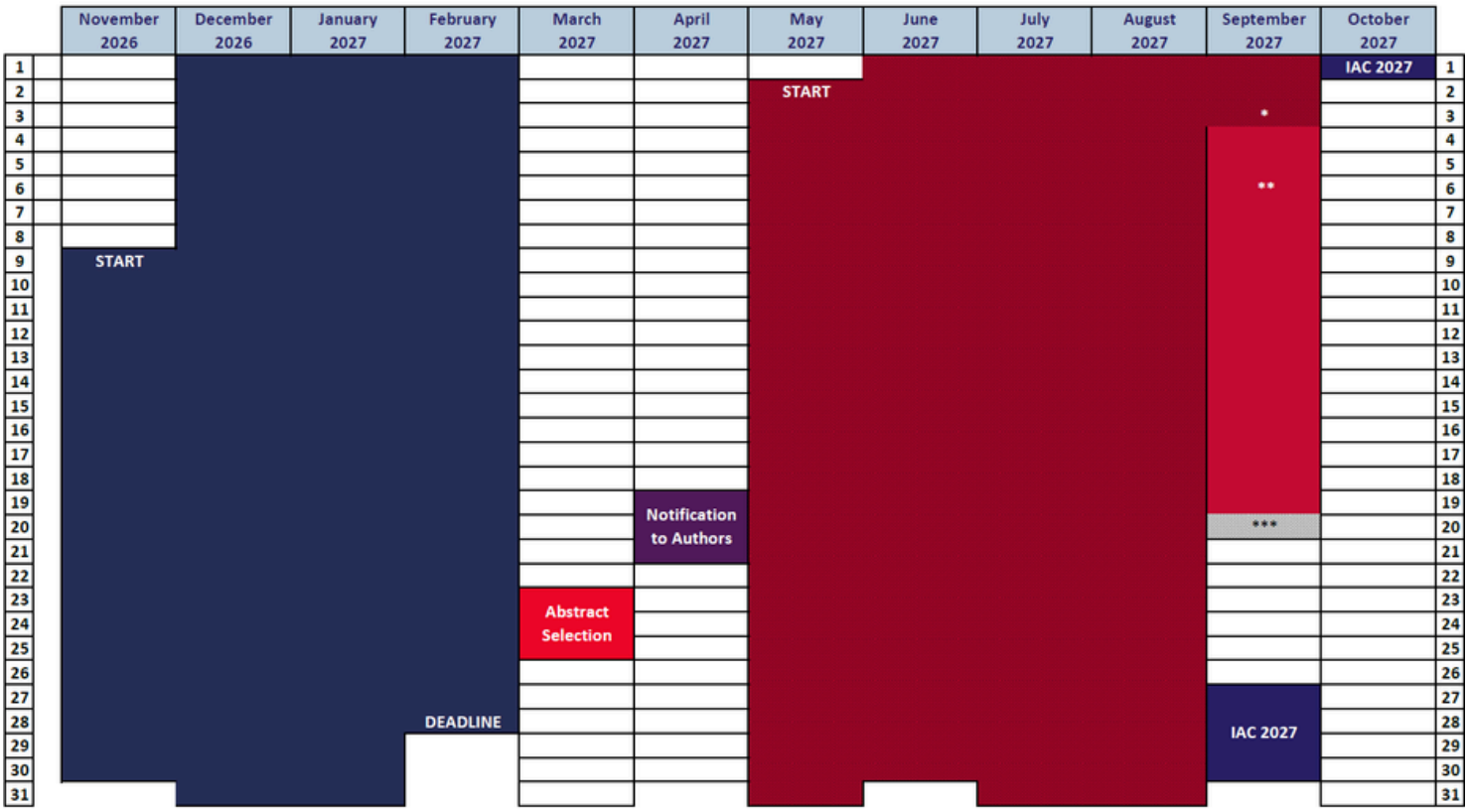
Co-Chairs

- Dr. Matthias Hetscher, *DLR (German Aerospace Center), Germany*
- Mr. Norbert M.K. Lemke, *OHB System AG - Oberpfaffenhofen, Germany*
- Mr. LIKHIT WARANON, *Geo-Informatics and Space Technology Development Agency (Public Organization), Thailand*

Rapporteur

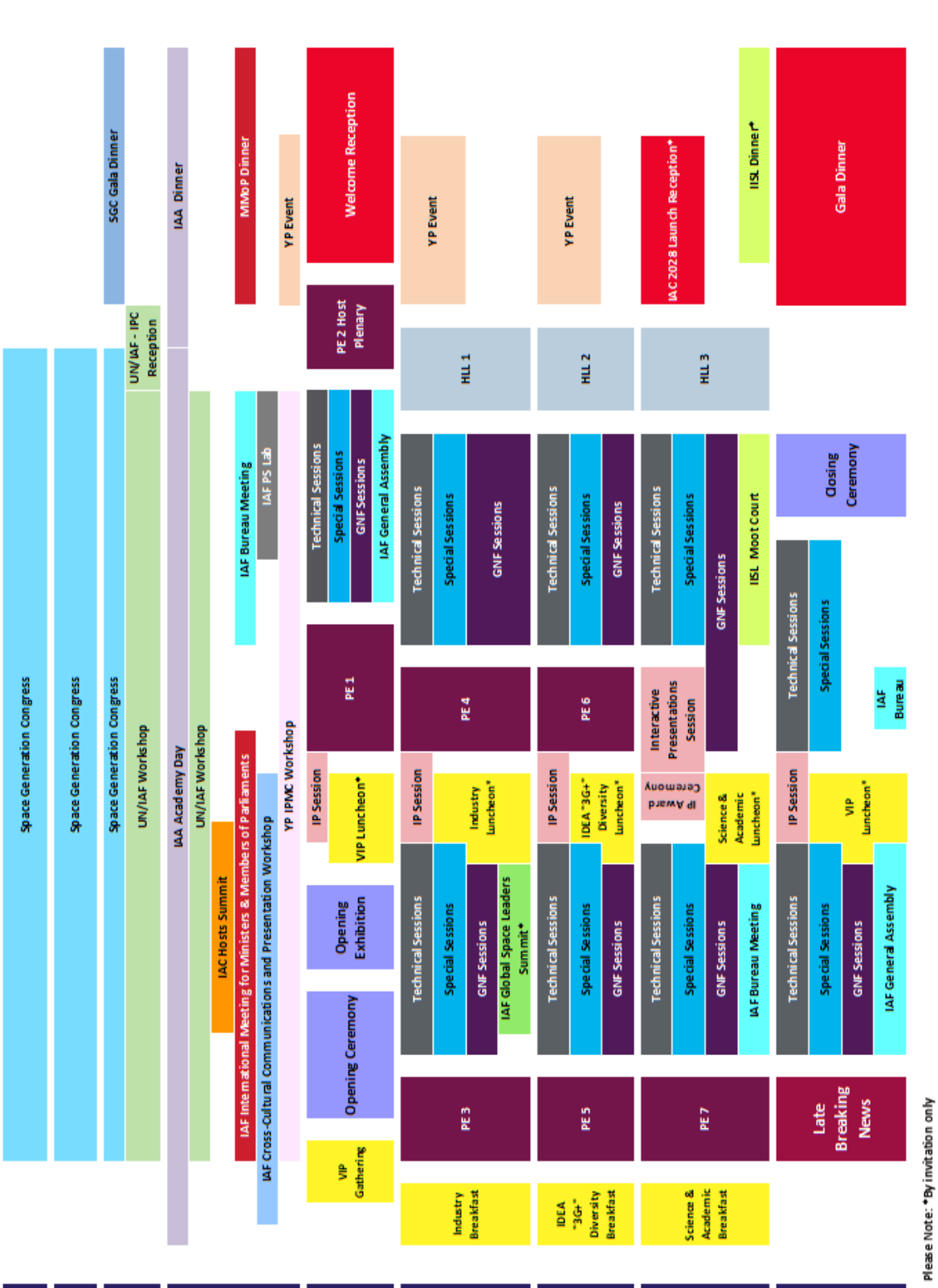
- Mr. Alex da Silva Curiel, *Surrey Satellite Technology Ltd (SSTL), United Kingdom*
- Prof. Victoria Barabash, *Luleå University of Technology, Sweden*

9. IAC 2027 Call for Papers Deadlines



Abstracts Submission Period	-> 28 February 2027
Abstract Selection Period	-> 23-25 March 2027
Notification to Authors	-> 19-21 April 2027
* Registration of Presending Authors Deadline	-> 3 September 2027
** IP Publication Deadline	-> 6 September 2027
*** Paper Submission Deadline	-> 20 September 2027
Congress Dates	-> 27 Sep - 1 Oct 2027

10. Preliminary IAC 2027 at a Glance



11. Instructions for 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 LaTeX box 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: https://iafastro.directory/iac/account/login/
- 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 you presentation preference: oral presentation only, interactive presentation only, oral or interactive.
- 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 2027 to deliver and present the paper is assured.

Note: An abstract can be submitted to only one Technical Session and duplicates will be discarded.

Abstract Selection

Submitted abstracts will be evaluated by the Session Chairs on the basis of technical quality and relevance to the session topics.

Prospective authors should certify that the paper was not presented at a previous meeting. Selected abstracts may be chosen for eventual oral or interactive 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 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 screens. Authors will be assigned a specific screen number and will have a dedicated slot during which they will have the opportunity to engage in interactive discussion with other Congress attendees.

Additional Information

Preliminary versions of the IAC proceedings will be available to participants at the Congress electronically. More information about the IAF Digital Library is available on the IAF website: *https://dl.iafastro.directory/*

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@iislweb.org.

Guidelines for ethical and responsible AI use for IAC abstracts

- We value originality, uniqueness and high-quality science at IAC.
- Use of AI is authorized to improve the readability and language of the IAC abstract work being produced, such tools can be used for content structure and improvement in texts.
- AI tools shall not be used for performing key authoring tasks such as producing scientific work and recommendations. Authors are responsible for carefully reviewing and editing the abstract to avoid incorrect, incomplete, or biased content.
- When submitting abstracts, authors must disclose the reasons for using AI and AI-assisted technologies, and a statement will appear in the published abstract.

DEADLINES

Abstract Submission: **28 February 2027**

Paper Submission: **20 September 2027**

Interactive Presentation Submission: **6 September 2027**

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

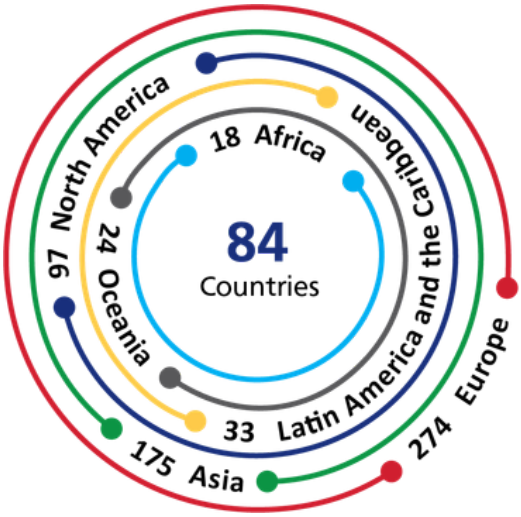
QUESTIONS

Abstract submission and/or oral presentations: support@iafastro.org

Interactive presentations: ipsupport@iafastro.org

Join the IAF, the World's Leading and Most Diverse Space Advocacy Body





Become an IAF Member

- Submit the Application Form on https://www.iaf-membership.org/
- Participate in the IAF Committees in charge of defining the Technical Programme
- Propose to host a Plenary Event during the IAC
- Propose a Global Networking Forum (GNF) Event to showcase your organization's latest achievements or to discuss the most interesting topics about Space
- Participate and vote in the General Assembly and nominate IAF Officers
- Contact: membership@iafastro.org

1 Connect to the IAF Membership Platform, complete the Application, and upload the requested documents

2 We will review your application and ask in case of missing information.

3 Once reviewed, your application will be recommended by the **IAF General Counsel**.

4 **Final approval** by the IAF General Assembly during the IAC.

Connecting @ll Space People
for a sustainable future

IAC 2027
POZNAN
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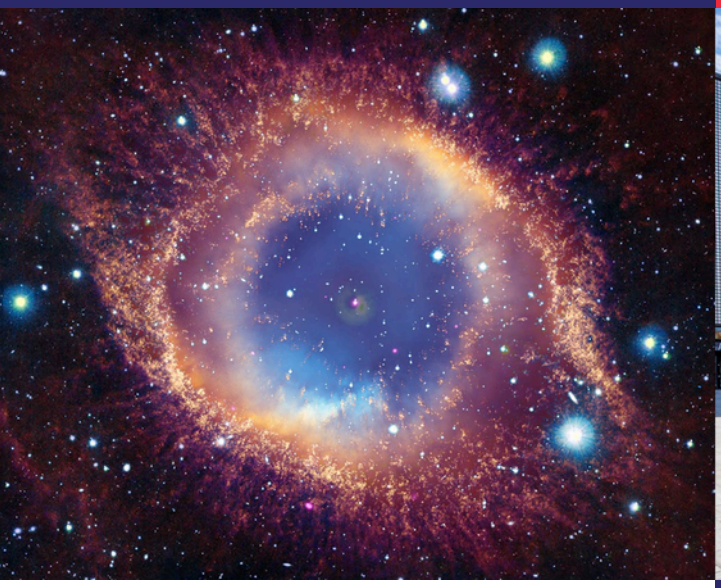
IMPORTANT DATES

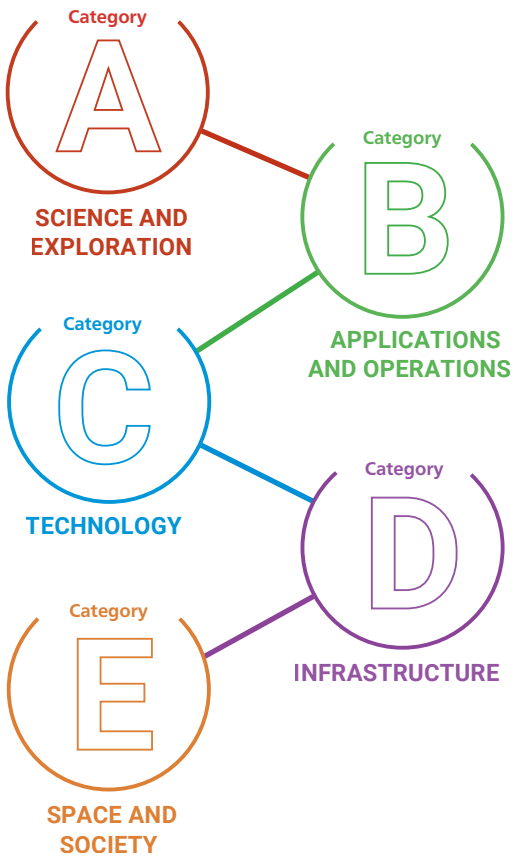
Abstract Submission from
9 November 2026 to **28 February 2027**





Submit your abstract for an oral or interactive presentation.

Abstracts must fit into one of the following IAC categories:



QUESTIONS

support@iafastro.org

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

TECHNICAL PROGRAMME TP TS IP

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