





70th INTERNATIONAL ASTRONAUTICAL CONGRESS

21-25 October 2019 | Washington, D.C.

GENERAL PROGRAMME

Space: The Power of the Past, the Promise of the Future





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Please join us on 10/22 from 4:00 – 6:00 pm in booth #624 for networking and a beverage!

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The Blue Moon lunar lander & BE-7 engine have been in development for three years and can return humans to the Moon by 2024.

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TO ENDLESS POSSIBILITIES



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Welcome Messages 1

1.1 Message from the International Astronautical Federation

Dear IAC delegates,

It is my great pleasure, as President of the International Astronautical Federation – IAF, to welcoming you to the 70th International Astronautical Congress - IAC 2019, in Washington D.C., United States.

After traveling the world for nearly a century, it is here, in the beautiful and historical capital of the United States, that the IAC sets foot and marks 70 years of unremitting exchange and collaboration between worldwide space stakeholders and enthusiasts. Likewise, after being held in the United States in 1961, 1968, 1976, 1992 and 2002, what better city than Washington D.C. to come back for the celebration of the 50th anniversary of the Apollo 11 mission, a landmark for humankind. This important commemoration is fully reflected by this year's theme "Space: the Power of the Past, the Promise of the Future"; a theme which will lead us throughout the week to understand the international accomplishments and partnerships that have become the hallmarks of space exploration as well as what lies ahead for the future.

Within these pages, you will find details of the many Plenary Events, Global Networking Forum, Special Sessions and Technical Sessions where leaders of their respective fields address space science, technology, and policy issues. This sits alongside a rich programme of associated and social events. The IAC 2019 programme is tailored to address the interests of scientists, engineers, managers and lawyers, as well as students and young professionals.

Last but foremost, I would like to express my sincere gratitude to all the volunteers who made this IAC possible through their dedication and hard work. I count on each and every one of you to make the most of this week by networking, sharing and enjoying every moment.



Jean-Yves Le Gall

President International Astronautical Federation (IAF)

On behalf of AIAA, the U.S. space community, and Anchor sponsor Lockheed Martin, the Local Organizing Committee would like to welcome you to Washington, D.C., for IAC 2019!

The global space sector is vibrant—evolving and growing, and as we celebrate the fiftieth anniversary of humans setting forth to the stars we can take a moment during this year's IAC and truly be amazed at how far we have come. Space has become a global collaborative industry and the presentations, people, and private companies that you will engage with during this year's IAC will showcase all of the innovation occurring around the world to turn dreams of exploration into reality. As we look toward the next fifty years we can be proud and excited about the continuing expansion of countries and people who are engaging in space and the new science and technology our sector will continue to create. The future is ours to shape, limited only by our imagination and it starts with IAC 2019!

We hope you enjoy your visit to Washington, D.C., and take some time to explore the city. The Smithsonian museums, especially the National Air and Space Museum, are only blocks away from the IAC venue and free of charge. While you are on the National Mall you can stroll past the many monuments and also relax with a walk along the Potomac River. With Metro, the metropolitan subway and bus system that serves Washington, D.C., and the Virginia and Maryland suburbs, exploration is easy. And the city is full of unique dining options including many regional favorites as well as international cuisine from Asia, the Caribbean, and the Mediterranean.

Whether you are here to present technical work, network with your international colleagues, catch up on the latest developments in the global space industry, or simply to explore the city, we hope you enjoy your visit and leave with a sense of motivation, imagination, and energy to realize the "promise of the future" the event is highlighting.





Vincent C. Boles Co-Chair, IAC 2019 Local Organizing Committee, United States

Sandy Magnus Co-Chair, IAC 2019 Local Organizing Committee, United States











1.3 Message from the International Programme Committee (IPC) **Co-Chairs**

We are pleased to welcome you to the 70th International Astronautical Congress in Washington, D.C. It has been 17 years since the IAC was last held in the United States, and 27 since it was celebrated in the capital city. We are excited to welcome back the international space community for an edifying and enjoyable week of information, networking and social activity.

In preparing for the Technical Programme, Plenary Events, Highlight Lectures, Late-Breaking News, Special Sessions and Interactive Presentations, the International Programme Committee has selected an outstanding array of material that will satisfy even the most voracious appetite for meaningful and relevant information across a broad spectrum of topics, all supporting the Congress theme of "Space: The Power Of The Past, The Promise Of The Future." In addition, the IAF Global Networking Forum will provide even more opportunities to hear from some of the best and brightest of our space colleagues.

It is an auspicious time for the international space community. As we celebrate the significant accomplishments of the past none more emblematic than the first human footsteps on the lunar surface - we also look to a bright future in the realms of robotic and human exploration, continued and improved utilization of geosynchronous orbit, a dramatic expansion of low Earth orbit applications, further development of the ground infrastructure necessary to support it all, and much more. We also observe and applaud ever increasing "3G" diversity – generation, gender and geography – in all of these activities.

This growth was reflected in the record number of abstracts received for the Technical Programme, from 86 different countries, leading to a whopping 181 technical sessions comprised of over 2,000 oral presentations. Likewise, the number of proposals for Special Sessions also set a record. These sessions will offer key insight into new and emerging topics of particular interest to the space community that may also cut across and beyond disciplines traditionally represented. Also, there will be 40 screens available in a special area for Interactive Presentations, on display for the duration of the congress. Finally, the Plenary Events, Highlight Lectures and Late-Breaking News cover the full spectrum of space-related topics and will be available for all delegates to attend.

In addition to this very robust programme, there will be plenty of social activity and opportunity for networking. It promises to be a full and rewarding week!

Welcome to Washington, D.C.; we wish you an informative, fruitful and enjoyable IAC 2019!



Michael Lopez-Alegria IPC Co-Chair, Principal, MLA Space, LLC, United States



Saeed Al Mansoori IPC Co-Chair Senior Manager - Applications Development and Analysis Section, Mohammed Bin Rashid Space Centre (MBRSC) United Arab Emirates

1.4 Message from the Mayor of Washington D.C.





October 21, 2019

As Mayor of Washington, DC, it is my pleasure to welcome the International Astronautical Congress to Washington, DC.

our nation's capital.

As you gather to reflect on your past accomplishments to discuss issues of concern and prepare for the future, I thank each of you for your contributions.

our city unique.







This year marks the 50th anniversary of the first lunar landing and for decades, the space ecosystem has made tremendous advancements that have benefited all mankind. I applaud the efforts of the International Astronautical Federation (IAF) for sharing information and developments, in the latest advancements of the space ecosystem. I also thank the American Institute of Aeronautics and Astronautics for addressing the needs of a diverse aerospace community and for hosting this event in

I invite you to enjoy all that our city has to offer and encourage you to visit our museums, monuments, restaurants and diverse neighborhoods - all of which make

On behalf of the residents of Washington, DC, you have my best wishes for an enjoyable and productive event.

WELCOME	MESSAGES
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2 Organizers & Partner Organizations

2.1 Organizers

2.1.1 The International Astronautical Federation (IAF)

Created in 1951 to foster dialogue between scientists around the world, and to support international cooperation in all spacerelated activities, the IAF to this day continues to connect @II space people. The Federation is the world's leading space advocacy body with over 360 members, including all key space agencies, industries, societies, associations and institutes across 6 continents and 68 countries. Over 40 administrative and technical committees support the Federation in its mission to advance knowledge about space and to foster the development of space assets by facilitating global cooperation. At its annual International Astronautical Congress (IAC) and other thematic conferences, the IAF brings its multidisciplinary and international network to life.

International Astronautical Federation 100 Avenue de Suffren 75015 Paris, France

T: +33 1 45 67 42 60 W: <u>www.iafastro.org</u> E: <u>info@iafastro.org</u>

Connecting @ll Space People

Be part of the conversation @iafastro

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IAF Member Organizations 2019

A9C Capital	Bahrain
Access e.V.	Germany
Adriatic Aerospace Association	Croatia
Advanced Instrumentation and Technology Centre (AITC)	Australia
Aerojet Rocketdyne	United States
Aerospace Research Institute	Iran
Aexa Aerospace LLC	United States
Agence Spatiale Algérienne (ASAL)	Algeria
Agencia Espacial Mexicana (AEM)	Mexico
Agrupacion Astronautica Espanola	Spain
Airbus Defence and Space GmbH	Germany
Airbus Defence and Space Netherlands B.V.	The Netherlands
Airbus Defence and Space SA	Spain
Airbus Defence and Space SAS	France
Airbus Ltd.	United Kingdom
Alma Mater Studiorum - University of Bologna	Italy
American Astronautical Society (AAS)	United States
American Institute of Aeronautics and Astronautics (AIAA)	United States
Andøya Space Center	Norway
ArianeGroup SAS	France
Arianespace	France
Asher Space Research Institute (ASRI)	Israel



Black Engine Aerospace UG (haftungsbeschränkt)	Germany
Blue Origin LLC	United States
Brazilian Space Agency (AEB)	Brazil
Bryce Space and Technology	United States
Bulgarian Aerospace Agency	Bulgaria
California Polytechnic State University	United States
Canadian Aeronautics & Space Institute (CASI)	Canada
Canadian Space Agency	Canada
Canadian Space Commerce Association (CSCA)	Canada
Canadian Space Society	Canada
Center for Innovation in Aerospace Technology (CINAE)	Spain
Center for Planetary Science and Exploration. Western	Canada
University	
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 (FGUP 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 Teledetection Spatiale	Morocco
Centro de Investigacion y Difusion Aeronautico Espacial	Uruguay
(CIDA-E) China Head Aerospace Technology Co	China
Chinese Society of Astronautics (CSA)	China
CIRA Italian Aerosnace Research Centre	Italy
Colombian Space Agency	Colombia
Comision Nacional de Actividades Espaciales (CONAE)	Argentina
Commission d'Astronautique de l'Academie Roumaine	Pomania
Cosmoovport Acrospace Research Agency	Russian Endoration
Creatian Astronautical and Pocket Enderation (HAPS)	Croatia
	Australia
CSI (Contro English do Liègo)	Australia
	Australia
CVA (Community of Ariano Citics)	Australia
CVA (community of Ariane Cities)	France
	Cyprus
Cyprus Space Exploration Organisation (CSEO)	Cyprus
Czech Space Alliance	Czech Republic
Czech Space Office	Czech Republic
Danish Aerospace Company ApS	Denmark
Danish Astronautical Society	Denmark
Dassault Aviation	France
Deimos Space S.L.	Spain
Delft University of Technology	The Netherlands
Denel Spaceteq	South Africa
Department of Space Studies, University of North Dakota	United States
Deutsche Gesellschaft für Luft-und Raumfahrt, Lilienthal- Oberth e.V. (DGLR)	Germany
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)	Germany
Dnipropetrovsk National University	Ukraine
Dniprotekhservice, SPF, LLC	Ukraine
DTU Space	Denmark
Ecole Polytechnique Fédérale de Lausanne (EPFL)	Switzerland
Ecuadorian Civilian Space Agency (EXA)	Ecuador
Embry-Riddle Aeronautical University	United States
EMXYS (Embedded Instruments and Systems S.L)	Spain
Engineers Australia	Australia





- Enterprise Estonia
- EOS Data Analytics Inc.
- EUMETSAT
- EURISY
- Euro Space Center
- Euroconsult
- European Conference for Aero-Space Sciences (EUCASS) European GNSS Agency (GSA)
- European Organization for Nuclear Research (CERN)
- European Space Agency (ESA)
- European Space Policy Institute (ESPI)
- European Test Services (ETS) B.V.
- Eurospace
- Faculty of Aviation and Space Sciences, Necmettin Erbakan University Federal Aviation Administration Office of Commercial
- Space Transportation (FAA/AST) Finnish Astronautical Society
- Firefly Aerospace Inc.
- Flinders University
- Fraunhofer Alliance Space
- Friedrich-Schiller-Universität Jena
- Future Space Leaders Foundation
- G.A.U.S.S. Srl
- General Organization of Remote Sensing (GORS)
- Geo-Informatics and Space Technology Development Agency (GISTDA)
- German Aerospace Industries Association (BDLI) GIFAS
- GKN Aerospace Engine Systems
- Global Student Commercial Space Society (GSCSS)
- GMV Aerospace & Defence SAU
- GomSpace Aps
- Graz University of Technology (TU Graz)
- Gumush Aerospace & Defense
- HE Space
- Hermann-Oberth-Raumfahrt Museum e.V.
- Hermes Engineering
- High Technology Unit (UAT) Faculty of Engineering -UNAM
- Hungarian Astronautical Society (MANT)
- IABG Industrieanlagen Betriebsgesellschaft mbH IHI Aerospace Co, Ltd.
- Incomspace
- Indian Space Research Organization (ISRO)
- Indonesian National Institute of Aeronautics and Space (LAPAN) Infostellar
- Institut Français d'Histoire de l'Espace
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- Instituto Nacional de Pesquisas Espaciais (INPE)
- Instituto Nacional de Tecnica Aeroespacial (INTA)
- Instituto Tecnológico de Costa Rica (TEC)
- Intelligent Materials and Systems Lab, University of Tartu Estonia

- Estonia United States Germany France Belgium Cacch Republic Switzerland France Austria The Netherlands France Turkey
- United States
- Finland United States Australia Germany Germany United States Italy Syria Thailand
- Germany France Sweden United States Spain Denmark Austria Turkey Germany Bulgaria
- Mexico Hungary
- Germany Japan Mexico India
- Indonesia Japan France
- France Pakistan Brazil
- Mexico
- Colombia Brazil Spain Costa Rica

ORGANIZERS & PARTNER ORGANIZATIONS

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CONGRESS PRACTICAL NFORMATION

CONGRESS PROGRAMME

TUDENTS & YOUNG PROFESSIONALS EVENTS

ASSOCIATED EVENTS

OCIAL EVENTS

AWARDS

International Astronautical Congress 21–25 October 2019 | Washington, D.C

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International Association for the Advancement of Space Safety	The Netherlands
International Institute of Space Commerce	Isle of Man
International Lunar Observatory Association	United States
International Space Center - Space Park Israel Ashkelon	Israel
International Space University (ISU)	France
Internationaler Förderkreis für Raumfahrt – Hermann Oberth – Wernher von Braun e.V.	Germany
Intersputnik International Organization of Space Communications	Russian Federation
Invap S.E.	Argentina
Iranian Space Agency	Iran
ispace, inc	Japan
Israel Aerospace Industries. Ltd.	Israel
Israel Space Agency	Israel
Istanbul Technical University	Turkey
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
KBRwyle	United States
Kenya National Space Secretariat	Kenya
Khrunichev State Research & Production Space Center	Russian Federation
King Abdulaziz City for Science & Technology (KACST)	Saudi Arabia
Kongsberg Satellite Services AS	Norway
Korea Aerospace Industries, Ltd	Korea, Republic of
Korea Aerospace Research Institute (KARI)	Korea, Republic of
Korea Association for Space Technology Promotion (KASP)	Korea, Republic of
Korea Astronomy and Space Science Institute	Korea, Republic of
Kyiv Politechnic Institute (NTUU "KPI")	Ukraine
Kyushu Institute of Technology	Japan
LandSpace Technology Corporation Ltd.	China
Lavochkin Science and Production Association	Russian Federation
Law Offices of Sterns and Tennen	United States
Lithuanian Space Association (LSA)	Lithuania
Lockheed Martin Corporation	United States
Mars Planet	Italy
Max-Planck-Institute for Ornithology	Germany
McGill Institute for Aerospace Engineering (MIAE)	Canada
MDA Corporation	Canada
MEDES - IMPS	France
Microcosm, Inc.	United States
Mitsubishi Electric Corporation	Japan
Mitsubishi Heavy Industries, Ltd.	Japan
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National Aeronautics and Space Administration (NASA)	United States
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National Aerospace Agency (NASA) of Azerbaijan Republic	Azerbaijan

lational Oceanic and Atmospheric Administration NOAA)	United States
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orsk Astronautisk Forening	Norway
orthrop Grumman Corporation	United States
lorwegian Space Agency (NOSA)	Norway
lovespace	France
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lanet Labs Germany GmbH	Germany
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olish Astronautical Society	Poland
olish Space Agency (POLSA)	Poland
olitecnico di Milano	Italy
olitecnico di Torino	Italy
RATIAN LLC	Puerto Rico
ricewaterhouseCoopers Advisory (PwC)	France
roespaço-The Portuguese Association of Space ndustries	Portugal
roject Management Institute	United States
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linetiQ Space nv	Belgium
afael Advanced Defense Systems Ltd.	Israel
amirez de Arellano y Abogados, S.C. Law Firm	Mexico
HEATECH LTD	UK
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ocket Research Institute, Inc.	United States
omanian Space Agency (ROSA)	Romania
OSCOSMOS	Russian Federa
ovsing A/S	Denmark
UAG Space	Sweden
ussian Academy of Sciences	Russian Federa
.P. Korolev Rocket and Space Corporation Energia	Russian Federa
afran Aircraft Engines	France
amara National Research University (Samara University)	Russian Federa
apienza University of Rome	Italy
atrec Initiative	Korea, Republi
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ENER Ingenieria y Sistemas, S.A.	Spain
ergio Arboleda University	Colombia
ES	Luxemburg
haanxi Engineering Laboratory for Microsatellites	China
hamakhy Astrophysical Observatory	Azerbaijan
hoal Group	Australia
ierra Nevada Corporation	United States
IMEON Technologies	France
ingapore Space and Technology Association (SSTA)	Singapore
irius XM Radio	United States
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ODERN	France
olar MEMS Technologies S.L.	Spain
oletop Co Ltd	Korea. Republic of
outh African National Space Agency (SANSA)	South Africa
outh African Space Association (SASA)	South Africa
pace Canada Corporation	Canada
nace Center Houston	United States
nace Commercial Services Holdings (Ptv) I td	South Africa
nace Cooperative Inc	United States
nace Environment Research Centre Ltd. (SERC)	Australia
nace Elight Laboratory (SEL)	Canada
	United States
nace Generation Advisory Council (SGAC)	Austria
nace Industry Association of Australia	Australia
nace Policy Institute George Washington University	United States
nace Systems/Loral	United States
pace Systems/ Lorai	United States
pace Teuct	United Kingdom
	United States
paceExcess LLC	Poland
pacel onest	Mauritius
paceLand Annea	The Netherlands
paceneu	China
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tate Enterprise Production Association Kylvprylad	Ukraine
tate space Agency of Ukraine (SSAU)	Okraine
tellenbosch University	Turkov
The (Savullina Technologileri Munenisiik ve Ticaret A.S.)	lurkey
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wedish Society for Aeronautics and Astronautics	Sweden
wiss space office (SSO)	Swizerland
wissspace Association	Switzerland
	Estonia
AMSAI - The Society of Amateur Satellite Technologies f Turkey artu Observatory	Turkey
echno System Develonments S.R.I	Italy
echnology and Engineering Center for Space Utilization	China
hinese Academy of Sciences eledyne Brown Engineering	United States
elespazio S.p.A.	Italy
elespazio VEGA UK LTD	, United Kingdom
esat-Spacecom GmbH & Co. KG	Germany

Technology (NICT)





Thales Alenia Space France France Thales Alenia Space Italia Italy United States The Aerospace Corporation The Boeing Company United States The British Interplanetary Society The Chinese Aeronautical and Astronautical Society located in Taipei The Federal University of Technology, Akure (FUTA) The Fisher Institute for Air and Space Strategic Studies The Johns Hopkins University Applied Physics Laboratory United States The Korean Society for Aeronautical and Space Sciences The National Aerospace Educational Centre of Youth The Ohio State University College of Engineering The Planetary Society The Sergei Korolev Space Museum The University of Sydney TNO Tsinghua University TÜBITAK Turkish Aerospace Industries U.S. Geological Survey UAE Space Agency UK Space Agency Universiti Teknologi Mara (UITM) University of Adelaide University of Alabama in Huntsville University of Colorado, Colorado Center for Astrodynamics Research University of Naples "Federico II" University of South Australia University of the Western Cape University of Vigo Spain University POLITEHNICA of Bucharest - Research Center Romania for Aeronautics and Space University Wuerzburg UNSW Australia Valispace Victorian Space Science Education Centre Vieira de Almeida & Associados Vietnam National Space Center (VNSC) Virgin Galactic L.L.C Viterbi School of Engineering, USC VITO nv Von Karman Institute for Fluid Dynamics WEPA - Technologies GmbH WFB - Wirtschaftsförderung Bremen Wildcard Mavericks Ltd Women in Aerospace Europe (WIA-E) World Space Week Association Xovian Research & Technologies Pvt. Ltd Youth Network for Reform, Inc (YONER - LIBERIA) Yuzhnoye State Design Office ZARM Fab GmbH Zero2infinity Zhuhai Orbita Aerospace Science & Technology Co. Ltd

United Kingdom Taiwan, China Nigeria Israel Korea, Republic of Ukraine United States United States Ukraine Australia The Netherlands China Turkey Turkey United States United Arab Emirates United Kingdom Malaysia Australia United States United States Italy Australia South Africa

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IISL President

Kai-Uwe Schrogl

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European Space Agency (ESA),



Head of International Relations Italian Space Agency (ASI),

GENERAL COUNSEL Lesley Jane Smith Professor. Leuphana University Lüneburg, United Kingdom



Christian Feichtinge IAF Secretariat,



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Chinese Society of Astronautics

(CSA) and China Aerospace

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Blue Origin.

United States

Bruce Chesley

United States

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VP. Global Sales, Marketing &

VP: INDUSTRY RELATIONS

Senior Director of Strategy,

Space and Missile Systems

The Boeing Company,

VP: SOCIETIES AND

AND IAC EVOLUTION

Sapienza University of Rome,



United States

2.1.2 The American Institute of Aeronautics and Astronautics (AIAA)



The American Institute of Aeronautics and Astronautics (AIAA) is dedicated to shaping the future of aerospace. Nearly 30,000 engineers and scientists from 85 countries, and 95 corporate members strong, AIAA is the world's largest aerospace technical society and convenes forums; publishes books, technical journals, and Aerospace America; hosts a collection of 160,000 technical papers; develops and maintains standards; honors and celebrates achievement; and advocates on policy issues. AIAA members have professional growth opportunities, practical and compelling content at their fingertips, and unmatched benefits to assist their development.



AIAA is the preeminent publisher of aerospace journals and books and the agent for sparking great ideas and collaboration. The Institute's eight peer-reviewed journals provide a panoramic journey from yesterday's challenges through today's most important aerospace advances in research and development. The nearly 70 technical committees and over 20 committees on standards engage professionals from all aspects of the industry to achieve the multifaceted mission of shaping the future of aerospace.

American Institute of Aeronautics and Astronautics 12700 Sunrise Valley Drive, Suite 200 Reston, VA 20191, United States

Tel: +1 800-639-2422 E-mail: custserv@aiaa.org www.aiaa.org











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2.1.3 The Local Organizing Committee (LOC)



Sandy Magnus IAC 2019 LOC Co-Chair and Principal, AstroPlanetview, Inc.





Mary Snitch Senior Staff, Global S&T Organizations. Lockheed Martin

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American Astronautical

Carolyn Knowles

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IAC 2019 LOC Co-Chair



Kent Bress Director, Aeronautics and Cross Agency Support Division,



Anthony Tsougranis NASA Office of International and Interagency Relations

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NOAA Satellite and

Information Service

Specialist,

Bill Klanke

CEO & Publisher,

International Relations



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Explorers

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of State

Economic Officer

United States Department

George Nield

Commercial Space

Technologies, LLC

Charles Wooldridge Director, International and Interagency Affairs, NOAA Satellite and Information Service



Senior Associate Dean of Engineering, Professor and Neil Armstrong Chair, College of Engineering and John Glenn College of Public Affairs, The Ohio State University

2.2 Partner Organizations

2.2.1 The International Academy of Astronautics (IAA)

The International Academy of Astronautics (IAA) was founded in 1960 by Theodore von Karman. The Academy is an independent international community of leading experts committed to expanding the frontiers of space, the newest realm of human activity. To foster the development of astronautics, the Academy undertakes a number of activities, including the recognition of outstanding contributors through elections and awards. It also facilitates professional communication, develops and promotes new ideas and initiatives, engages the public, and fosters a sense of community among the members. The IAA is a unique nongovernmental independent organization established in 1960 and recognized by the United Nations in 1996.

It is an honorary society with an action agenda. With 1200 elected members and corresponding members from 87 nations, it works closely with space agencies, industry, the academic community and the national science and engineering academies to determine needs and objectives and to help shape policy and forge cooperation by means of studies, position papers, conferences and publications. The IAA has published nearly 60 studies to date and is engaged in the preparation of 40 others. The Academy also publishes the journal Acta Astronautica ranked 7th in the world and containing refereed papers and four book series. The Academy now organizes about 20 conferences per year and regional meetings focused on the development and promotion of new initiatives. This activity also includes, in cooperation with the International Astronautical Federation and the International Institute of Space Law, the traditional contribution to the International Astronautical Congress (IAC), where the Academy sponsors 13 Symposia. The Academy also continues to enjoy its participation in the COSPAR Assemblies by sponsoring and co-sponsoring symposia and the International Society for Photogrammetry and Remote Sensing (ISPRS) congress. Although the IAA has many connections to these and other similar organizations, it is distinctive as the only international Academy of elected members in the broad area of astronautics and space.

International Academy of Astronautics 6 rue Galilée 75016 Paris, France

Mailing address: P.O. Box 1268-16 75766 Paris Cedex 16, France

T: +33 1 47 23 82 15 F: +33 1 47 23 82 16 W: www.iaaweb.org E: sgeneral@iaamail.org







Curator. International Space Programs and Spacesuits, National Air and Space Museum. Smithsonian Institution



Ken Hodgkins Director. Office of Space and Advanced Technology, United States Department of States



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Olle Norberg (Sweden) Wu Meirong (China) 2.3 The International Institute of Space Law (IISL)

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

The purposes and objectives of the IISL include the promotion of further development of space law and expansion of the rule of law in the exploration and use of outer space for peaceful purposes, the holding of meetings, colloquia and competitions on juridical and social science aspects of space activities, the preparation or commissioning of studies and reports, the publication of books, proceedings, reports and position papers, and the cooperation with appropriate international organizations and national institutions in the field of space law.

The IISL holds an annual Colloquium at the International Astronautical Congress. During this Colloquium the Nandasiri Jasentuliyana Keynote lecture takes place, as well as a special session for Young Scholars. In addition the Institute organizes a variety of conferences on space law throughout the year in locations all over the world. It publishes an annual volume of IISL Proceedings with papers and reports of all activities during the year.

Since 1992, the IISL organizes the annual Manfred Lachs Space Law Moot Court Competition. The competition is based on a hypothetical space law case, written by IISL members, in which around sixty student teams from universities in North America, Europe, Asia Pacific and Africa participate. Members of the International Court of Justice judge the World Finals of the competition, making it unique in the world.

The IISL is an officially recognized observer at sessions of the United Nations Committee on the Peaceful Uses of Outer Space, and its Scientific & Technical and Legal Subcommittees.

Further information regarding the IISL can be found at <u>www.iislweb.org.</u>

International Institute of Space Law

E: info@iislweb.org W: www.iislweb.org Facebook: https://www.facebook.com/spacelaw Twitter: https://twitter.com/iisl space











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2.4 The Space Generation Advisory Council (SGAC)

The Space Generation Advisory Council in Support of the United Nations Programme on Space Applications is a global nongovernmental, non-profit (US 501(c)3) organization and network which aims to represent university students and young space professionals ages 18-35 to the United Nations, space agencies, industry, and academia. Headquartered in Vienna, Austria, the SGAC network of members, volunteers and alumni has grown to more than 15 000 members representing more than 150 countries.

SGAC was conceived at UNISPACE III in 1999, whereby states resolved, as part of the Vienna Declaration, "To create a council to support the United Nations Committee on the Peaceful Uses of Outer Space, through raising awareness and exchange of fresh ideas by youth. The vision is to employ the creativity and vigour of youth in advancing humanity through the peaceful uses space". SGAC holds Permanent Observer status at the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS) and regularly takes part in the annual meeting, as well as its Legal and Scientific and Technical Subcommittees. SGAC holds consultative status at the United Nations Economic and Social Council (UN ECOSOC), contributing to discussions on the role of space in achieving the UN Sustainable Development Goals.

SGAC works diligently to raise awareness among the next generation of space professionals on a global scale working together with the United Nations Office for Outer Space Affairs (UNOOSA) in promoting UN workshops and activities, and in supporting SGAC members to attend space conferences around the world. By hosting international, regional and local events, SGAC provides its members with opportunities to expand their knowledge of international space policy issues, think creatively about the future direction of humanity's use of space and engage with current leaders from space agencies, industry and academia. SGAC stewards the views and opinions of students and young professionals to ensure their creativity and vigour is employed for the advancement of humanity through the peaceful uses of outer space. Year-round project groups enable our members to further develop their thoughts on key topics of relevance to international space policy often resulting in technical papers, policy briefs and recommendations.

As a non-governmental, non-profit organization, SGAC relies on the sponsorship and support of governmental, non-governmental, and industry partners as well as private individuals. This support is administered to fund activities. In addition, SGAC runs scholarships with its partners to enable participation of SGAC members in various events around the world. Operation of SGAC relies on a global volunteer base. As a volunteer-run organization, SGAC believes in empowering its members and providing them with opportunities for professional development through roles in the SGAC team. The highest governing body of the organisation is the SGAC Executive Committee; a body comprised of elected and appointed members supported by industry leaders and young professionals.

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

Space Generation Advisory Council

SGAC % European Space Policy Institute Schwarzenbergplatz 6 A-1030 Vienna, Austria

E: info@spacegeneration.org W: www.spacegeneration.org Facebook: @spacegeneration Twitter: @SGAC





SPACE GENERATION ADVISORY COUNCIL

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Zihua Zhu Regional Coordinator Asia-Pacific

3 Washington D.C.

3.1 City Map











3.2 Ground Transportation

Once in the Washington Metropolitan area, public transportation options are plentiful, with a subway and bus system that services the entire region.

Subway and bus system - Metro

Each passenger needs a SmarTrip® farecard to enter and exit the Metro. The card can be reloaded with value and reused to pay Metrorail and Metrobus fares and parking fees at Metro-operated lots.

Buy a SmarTrip® farecard from a FARE VENDING machine at a Metrorail station. Add value to your card at a FARE VENDING or ADD VALUE machine in Metrorail stations, at select retail locations and on our website. Or buy one at over 200 retail locations or online at wmata.com. Online, you can also check your registered card's value, see where and when you used it last or report it lost or stolen.

Fares are based on when and how far you ride. Station to station fares are located on station manager kiosks and FARE VENDING machines. The machines accept cash, credit and debit cards. If you use cash, bring small bills; the machines only provide up to \$10 in change.

If you want one day of unlimited Metrorail rides, save money with a One Day Pass. Buy it from a FARE VENDING machine and load it onto your SmarTrip® card.

Metro Hours

Monday - Thursday - 05:00 - 23:30 Friday - 05:00 - 01:00 Saturday - 07:00 - 01:00 Sunday – 08:00 - 23:00

Last train times vary. To avoid missing the last train, please check the last train times posted in stations.

Metro Travel Tips

To avoid long lines at FARE VENDING machines after a major event or during weekday rush-hours, make sure you have roundtrip fare on your SmarTrip® farecard at the start of your trip.

The weekday rush-hour periods — before 09:30 and between 15:00 and 19:00 — are the most crowded. If possible, plan your trip to avoid those times. If you lose an item on a bus or train or in a station, please call Lost & Found at 202-962-1195 or visit our website.

Sign up for MetroAlerts at wmata.com and get timely, targeted Metro information sent right to your desktop or mobile device. You can also download the Metro D.C. app found for latest train information.

Other Ground Transportation

Taxis and ride-sharing services, such as Uber and Lyft, are also available for easy transit between the congress venue, special events, and hotels.

While most hotels are walking distance, IAC is offering shuttle services to Courtyard Mariott D.C./US Capital, Hampton Inn NoMa, and Homewood suites NoMa. All shuttles and transportation will pickup and drop-off at the L street entrance.

Rental Cars

If you'd like to rent a car while in Washington, D.C. there are a number of companies to choose from. Below are a few options.

Enterprise Rental Reservations – <u>www.enterprise.com</u>, 1-855-266-9289 Hertz Rental Reservations – www.hertz.com, 1-800-654-3131 Avis Rental Reservations - www.avis.com, 1-800-230-4898 If you do decide to rent a car, please stay on the right-hand side of the road. Also note that there is no parking at the convention center, however there are many parking garages nearby.

System Map

RD Red Line • Glenmont / Shady Grove Orange Line • New Carrollton / Vienna reen Line • Branch Ave / Greenbel ellow Line • Huntington / Greenbel



Other Ways to Get Around

There are several Capital Bikeshare locations within a few blocks of the convention center. Become a member or purchase a short-term pass to use their systems. The Capital Bike Share app is available. For more information, visit their website at www.capitalbikeshare.com.







3.3 Useful Information

About Washington D.C.

A leading international city with key decision makers, universities, and a mix of aerospace and technology firms, Washington, D.C., is the perfect site for IAC 2019. As the seat of U.S. government, the location guarantees that key policy- and decision makers will hear the message that space exploration and technology development are critical to humanity. Students and researchers from leading universities will be able to interact with key government and industry representatives, allowing for future collaboration opportunities.

From monuments and memorials to vibrant neighborhoods with character and charm, Washington, D.C., is certain to give attendees an experience to remember. Attendees will also enjoy all of the benefits of a world-class destination: excellent dining, iconic sites, unrivalled entertainment, and cultural attractions. We are confident Washington, D.C.'s status as an international gateway—we are home to over 160 embassies and consulates—will attract delegates from around the world and offers a perfect backdrop for a successful event.



Traveler's Guide

With AIAA Headquarters based just outside of Washington D.C., the staff is familiar with the many entertaining things to do in the city. The following is a short list of our staff's favorite places to visit for anyone attending IAC 2019.

- Smithsonian National Zoo It's not hard to fall in love with all of the animals at the Smithsonian National Zoo, particularly superstar pandas from China, Mei Xiang and Tian Tian, and their offspring Bei Bei.
- National Mall Wander in and out of the museums, all free of charge—plus take a spin on the carousel, or stroll among
 magnificent sculptures, all on the National Mall.
- Georgetown From shopping to top dining selections, Washington D.C.'s waterfront is a must-see on a nice fall day.
- Kennedy Center -- Nation's performing arts center, presenting the best music, dance, theatre, international, and children's programs in nine theaters and stages.

For more places to visit please check out the IAC 2019 website: www.iac2019.org/traveIDC/washington-dc-travelers-guide

Shopping

Washington, D.C. is home to a variety of stores, boutiques, gift shops and malls to find what you're looking for wile in the area for IAC 2019. No matter where you are in the city, you've got options - from independent storefronts, to one-of-a-kind boutiques, design stores, and national and international retail. The most sought-after places to go shopping in the city are places like - Georgetown, U Street, and City Center.

Dining

With the exception of fast food restaurants, reservations are highly recommended and should be booked in advance - particularly for groups of 5 or more. Most restaurants in D.C. are available for booking through OpenTable app or online. If you're looking for restaurant reviews, Yelp is a great source that can be found in an app or online.

Museums

Washington, D.C. is in a league of its own when it comes to world-class museums, many of which are free to visit. Wander the halls of the Smithsonian Institution museums, including the National Air and Space Museum were almost all space and aircraft on display are originals or the original backup craft. You can also explore cool off-the-Mall knowledge centers and discover groundbreaking exhibits and works of art right in the nation's capital.

African American Heritage Trail

You can also learn about the people and places that shaped Washington D.C. as you explore the African American Heritage Trail, Washington, D.C.. From Benjamin Banneker's essential role in the survey of the District, to the Reverend Dr. Martin Luther King, Jr.'s "I Have a Dream" speech at the Lincoln Memorial, you'll find the latest historical research and intriguing information.

The African American Heritage Trail, Washington D.C. identifies more than 200 sites that are important in local and national history and culture.



Tours

If you are looking to explore D.C. with an enlightening experience, a guided tour is a great option! USA Guided Tours will be providing tours of D.C.'s most famous monuments and attractions for those attending IAC 2019. For more information on available tours see the Tour Desk in the lobby for more information, or visit the tour website: usaguidedtours.com/iac-2019





Currency

ATMs in the United States are open 24 hours in the USA. If you require currency exchanged, Travelex Currency Services is located in Union Station (Red Line Metro). Email: rfx1980@travelexamericas.com Phone: 202-371-9220

Electricity

For USA there are two associated plug types, types A and B. Plug type A is the plug which has two flat parallel pins and plug type B is the plug which has two flat parallel pins and a grounding pin. USA operates on a 120V supply voltage and 60Hz.

Congress Practical Information 4

4.1 Congress Venue Floor Plans

























4.2 Offices and Exhibition Opening Hours

Registration and Information/Tour Desk

Location: The Walter E. Washington Convention Center, East Salon Saturday 19 October, 13:00-18:00 Sunday 20 October, 08:00-18:00 Monday 21 October - Thursday 24 October, 08:00-16:00 Friday 25 October, 08:00-13:00

IAF Secretariat Office

Location: The Walter E. Washington Convention Center, Salon G Friday 18 October - Friday 25 October, 08:00-18:00

AIAA Secretariat Office

Location: The Walter E. Washington Convention Center, Salon H Friday 18 October - Friday 25 October, 08:00-18:00

IAA Secretariat Office

Location: The Walter E. Washington Convention Center, 208 AB Saturday 19 October - Friday 25 October, 08:00-18:00

Exhibition Hall

Location: The Walter E. Washington Convention Center, Hall D/E Monday 21 October, 11:00-18:00 Tuesday 22 October - Thursday 24 October, 09:00-18:00 Friday 25 October, 09:00-17:00

Barrier-Free Access to the Convention Center

Access and facilities for physically challenged people are provided throughout the venue. For more information visit the convention center website: www.dcconvention.com/Venues/ConventionCenter/ADAAccessibility.aspx

Lunar Lounge

Visit the Lunar Lounge located in the Exhibition hall commemorating the 50th Anniversary of the Lunar Landing. Take a little break from the activities and relax, recharge and refresh. The Lunar Lounge will offer phone charging capabilities and cash beverages throughout the day during exhibit hall hours.

Networking Lounge

Network with fellow IAC attendees in the Networking Lounge located on the L street bridge. The Networking Lounge is sponsored by:





NORTHROP GRUMMAN



Tour and Information Desk

Do you need information for IAC 2019 or want to schedule a local tour? Check out the staffed information/tour desk located in the registration area for all of your questions answered.

IAF Members' Lounge

Location: The Walter E. Washington Convention Center, 204 BC Sunday 20 October - Friday 25 October, 08:00-18:00

IISL Members' Lounge

Location: The Walter E. Washington Convention Center, 203 AB Sunday 20 October - Friday 25 October, 08:00-18:00

Press Centre

Location: The Walter E. Washington Convention Center, 103 A Sunday 24 October - Thursday 24 October, 07:00-19:00 Friday 25 October, 07:00-18:00

Speaker Preparation Room

Location: The Walter E. Washington Convention Center, Salon I Sunday 20 October, 14:00-18:00 Monday 21 October - Thursday 24 October, 08:30-18:00 Friday 25 October, 08:30-13:00

4.3 Registration

Registration fees:

Registration Description	Early Reg Before 30	gistration)/06/2019	Regular Re Before 21	egistration ./09/2019	On-Site Re After 22/	egistration /09/2019
	EURO	US DOLLAR	EURO	US DOLLAR	EURO	US DOLLAR
Delegate Non-Member (Standard)	1,150€	\$1,355	1,330€	\$1,570	1,400€	\$1,650
Delegate (IAF, IAA, IISL member)	900€	\$1,060	1,090€	\$1,285	1,215€	\$1,435
Retired person	540€	\$635	600€	\$710	665€	\$785
Young Professional	400€	\$470	470€	\$555	530€	\$625
Full-time Students	115€	\$135	130€	\$155	150€	\$175
Primary and Secondary Level Teachers	115€	\$135	130€	\$155	150€	\$175
Accompanying person	105€	\$125	115€	\$135	150€	\$175
Media	Free of	charge	Free of	charge	Free of	charge

Registration Categories:

- Delegate Non-Members (Standard) are full-paying Participants whom are not members of IAF, IISL, or IAA.
- Delegate Members are full-paying Participants who are employees or elected officers of an IAF member organization or who are current members of the IAA and the IISL. Membership to AIAA is not a qualification for this discount.
- Retired Persons are defined as no longer employed and full-time retired, (will be requested to provide a copy of their passport)
- Young Professionals will have to upload an ID card or passport as a proof of the 35 years of age limitation (that has to be valid at the time of the Congress)
- Students will be requested to upload a valid student card (that has to be valid at the time of the Congress)
- Primary and Secondary level Teachers must provide documentation from their organization to confirm they are educators of primary or secondary level.
- Maximum 1 per Full-paying Delegate, Retired, or Young Professional. Includes: Admission to the Exhibit Hall, Plenary Programme, the Opening Ceremony and the Welcome Reception. It DOES NOT include access to the Technical Programme.
- All requests will be reviewed by IAF staff; and submitting a request does not guarantee credentials will be granted. Once approved, press will have to upload a valid government- or company-issued Press Card/Press Credential or provide other documentation proving their status as "Working Press" or "Media" as part of the registration process. NOTE: Although credentialed press can access Technical Sessions as observers, they are forbidden to present papers.

Registration Inclusions:

The following is included in your IAC 2019 Registration:

- Congress badge
- Congress documentation
- Congress bag
- Admission to the exhibition halls
- · Admission to the Plenary Programme and Global Networking Forum (GNF)
- Access to the Technical Programme
- The Opening Ceremony and the Closing Ceremony
- 1 (one) Welcome Reception Ticket

All tickets and conference materials will be handed out to the participants upon check-in at the registration desk after full payment. Participants are requested to wear their congress badge at all times for identification and admittance to the conference rooms.



Accompanying Persons Accompanying Person is defined as a spouse, civil partner, translator or administrative assistant.

Accredited Press: Members of the press must submit a request for press credentials to cover IAC 2019 in Washington, D.C.



Congress WiFi 4.4

Network: IAC2019 Password: EXPLORATION

4.5 IAC 2019 Congress Bag

Beyond The Bag

The IAC 2019 Welcome Bag is more than an apparatus for carrying your items. The stylish design serves as tribute to the ingenuity and heroics of the people involved in accomplishing the historic Apollo 11 mission. The outside of the commemorative bag features an elongated eleven, while the inside reveals a launching rocket and moon, all constructed with space materials.

The design was conceived by the talented staff of artists and engineers at Aerothreads, an SBA-certifi ed HUBZone and Women-Owned Small Business (WOSB) founded in 2014 and located in College Park, Maryland. Aerothreads specializes in multi-layer insulation (MLI) blanket products for the aerospace industry.

DUNMORE Aerospace provided space materials as inserts for the rocket and moon appliqués on the bag. Dunmore is a manufacturer of engineered films, foils, and fabrics for aircraft and spacecraft applications.

The bag was manufactured by SewLab USA in their Baltimore, Maryland, factory. SewLab USA creates top quality products that are locally made and sustainably crafted.



BAG DESIGNED BY



MATERIALS PROVIDED BY



Congress Programme 5

5.1 Programmes at a Glance



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CONGRESS PROGRAMME

70 th International Astronautical Congress 21–25 October 2019 | Washington, D.C



Technical Sessions at a Glance

Date	21/10/2019	22/10/2019	22/10/2019	23/10/2019	23/10/2019	24/10/2019	24/10/2019	25/10/2019	25/10/2019
Time / Room Number	15:00-18:00	09:45-12:45	14:45-17:45	09:45-12:45	14:45-17:45	09:45-12:45	14:45-17:45	09:45-12:45	13:30-16:30
146B	A3.1	A3.2A	A3.2B	A3.3A	A3.3B	A3.4A	A3.5	A3.2C	A3.4B
146C	D2.1	D2.2	D2.3	D2.4	D2.5	D2.6	D2.7	D2.8 / A5.4	D2.9 / D6.2
150A	C1.1	C1.2	C1.3	C1.4	C1.5	C1.6	C1.7	C1.8	C1.9
150B	A6.1	A6.2	A6.3	A6.4	A6.5	A6.6	A6.7	8.9A	A6.9
151A	B3.1	B3.2	B3.3	B3.4 / B6.4	B3.5	B3.6 / A5.3	B3.7	A6.10 / B4.10	
151B	B4.2	B4.1	B4.3	B4.4	B4.5	B4.6A	B4.7	B4.8	B4.6B
152A	B5.1	E7.1	E7.2	E7.3	E7.4	E6.3		E7.5	E7.7
152B	C2.1	C2.2	C2.3	C2.4	C2.5	C2.6	C2.7	C2.8	C2.9
143A	C4.1	C4.3	C4.5	C4.2	C4.6	C4.7 / C3.5	C4.8 / B4.5A	C4.9	C4.10
143B	A1.1	A1.2	A1.3	C4.4	A1.4	A1.5	A1.6	A1.7	A1.8
143C	A2.1	A4.1	A4.2	A2.2	A2.3	A2.4	A2.5	A2.6	A2.7
145B	D1.1	D1.2	D1.3	A5.1	A5.2	D1.4A	D1.4B	D1.5	D1.6
147A	B1.1	C3.1	C3.2	B1.2	B1.3	B1.4	C3.3	C3.4	B1.5
144A	A7.1	E3.1	A7.2	E3.2	A7.3	E3.3	E3.4	E6.4	E3.6
145A	E5.1A	D5.1	E5.2	D5.2	E5.3	D5.3	E5.4	D5.4	E5.1B / E5.5
147B	E4.1	B2.8 / GTS.3	E6.1	E2.3 / GTS.4	E4.2	B4.9 / GTS.5	E4.3	B3.8 / GTS.2	E6.5 / GTS.1
144C	E1.1	E1.2	E1.3	E1.4	E1.5	E1.6	E1.7	B1.6	E1.9
144B	D4.1	D4.2	D4.3	D3.1	D3.2A	D4.4	D4.5	D3.2B	D3.4
140B	B6.2	E2.1	E2.2	E6.2	E2.4	B5.2	B6.3	B6.1	B5.3
140A	B2.1	D6.1	B2.2	B2.3	B2.4	B2.5	B2.6	B2.7	D6.3
ISZ				Not available				E1.8	
153						E.3.5 / E7.6			





TS

E1> E8	
Category E: Space & Society	

Category C: C1--> C4 Technology

Category D: D1--> D6 Infrastructure

Category A: Science A1--> A7 & Exploration

Category B: Applications B1--> B6



CIAL EVENTS

AWARDS

XHIBITION



5.2 Day-by-Day

Pre-Congress Schedule

Thursday 17 October

Space Generation Congress (SGC) (see page 142)

Friday 18 October

Space Generation Congress (SGC) (see page 142)

IAF Workshop with the support of the UN 27th Workshop on Space Technology for Socio-Econo "Ensuring Inclusiveness through Space-based Applie

Saturday 19 October

Space Generation Congress (SGC) and Gala Dinner (

Educators Professional Development Workshop (see

IAF Workshop with the support of the UN 27th Workshop on Space Technology for Socio-Econo "Ensuring Inclusiveness through Space-based Applie

Sunday 20 October

10th IAF International Meeting for Members of Parli

IAC Hosts Summit (see page 126)

Cross-Cultural Communications and Presentation W

YP IPMC Young Professionals Workshop (see page 10)

Young Professionals Networking Event (see page 103)

IAF Public Speaking & Presentation Skills Lab (see pa

IAF Workshop with the support of the UN 27th Workshop on Space Technology for Socio-Econo "Ensuring Inclusiveness through Space-based Applie

IAA Academy Day (see page 140)

12:30 – 13:15 Kick-off Press Conference (Room 206)





omic Benefits: cations and Space Exploration" (see page 129)	CONGRESS PRACTICAL INFORMATION
(see page 142)	ME
e page 116)	CONGRE
omic Benefits: cations and Space Exploration" (see page 129)	STUDENTS & YOUNG PROFESSIONALS EVENTS
iaments (see page 123)	
Vorkshop (see page 117)	
)	
age 128)	
omic Benefits: cations and Space Exploration" (see page 129)	



Main Congress Schedule

Monday 21 October

08:00 - 09:00	VIP Gathering b	pefore Opening	ceremony
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Location: The Walter E. Washington Convention Center - South Prefunction

09:00 – 11:00 Opening Ceremony

Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

This year's Opening Ceremony tells our collective, international story of limitless exploration and inspiration...of promise and discovery...of global community...collaboration and cooperation. It is an extraordinary narrative that has affected the lives of every human being on the planet in big ways and small. Our multi-layered theatrical production will portray this journey with bold imagery, video, and live performance, bringing to life the milestones that mark the power of the past and celebrate the promise of the future.

Master of Ceremony



Leon Harris News4 Anchor, United States

Welcome Addresses





James Bridenstine

Administrator, National Aeronautics and Space Administration

United States

(NASA)







Richard F. Ambrose Executive Vice President, Space. Lockheed Martin Corporation, United States

At the conclusion of the Opening Ceremony production we are pleased to welcome the Honorable Mike Pence, Vice President of the United States, to address IAC delegates.

Speaker:



INTRODUCTION: Daniel L. Dumbacher Executive Director. American Institute of Aeronautics and Astronautics (AIAA)

IAF World Space Award Ceremony



Commander Neil A. Armstrong,

The Apollo 11 crew will be awarded with the IAF World Space Award for: "Making an Unparalleled Impact on Space Exploration and on Human Civilization and for Earning their Place in the Pantheon of Human Achievement through their Heroic Feats during the Apollo 11 Mission in 1969 and their Subsequent Careers."

11:00 - 12:00 Official Opening of the Exhibition and VIP Tour

Location: The Walter E. Washington Convention Center - Exhibition Hall

12:00 – 13:00 L3Harris VIP Lunch (Upon Invitation Only)

Location: The Walter E. Washington Convention Center - South Prefunction

Sponsored by: L3Harris



Speaker:



Bill Gattle President Space & Airborne Systems. L3Harris. United States





The Honorable Mike Pence Vice President. United States

Command Module Pilot Michael Collins and Lunar Module Pilot Edwin E. (Buzz) Aldrin, Jr





13:15 – 14:45 Plenary 1: Heads of Space Agencies: Challenges and Opportunities in a **Changing Space Environment**



Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

Speakers:



Jim Bridenstine Administrator, (NASA), United States

S. Somanath

Space Centre,

India



Director, Vikram Sarabhai

Indian Space Research

Organisation (ISRO),

Sylvain Laporte President, (CSA), Canada







Hiroshi Yamakawa President, Japan Aerospace Exploration Agency (JAXA), Japan

Wu Yanhua (Invited) Vice Administrator, China National Space Administration (CNSA), China

MODERATOR Jean-Yves Le Gall President, Federation (IAF), France

Johann-Dietrich

Director General.

European Space Agency

Woerner

(ESA),

France



MODERATOR Pascale Ehrenfreund Incoming President, International Astronautical Federation (IAF), Austria

15:00 – 15:10 IAF Global Networking Forum (GNF) Opening



Location: The Walter E. Washington Convention Center – Grand Ballroom ABC

Welcome Addresses:



Jean-Yves Le Gall President, International Astronautical Federation (IAF), France

Gabriella Arrigo

Vice President for Science & Academic Relations and Global Networking Forum, International Astronautical Federation (IAF),

15:00 – 16:30 SpS – Get Ready to Protect Earth from Asteroids – Planetary Defense in Your Hands



Location: The Walter E. Washington Convention Center - Room 146A

15:00 – 18:00 Technical Sessions

No.	Title	Room
A1.1	Behaviour, Performance and Psychosocial Issues in Space	143B
A2.1	Gravity and Fundamental Physics	143C
A3.1	Space Exploration Overview	146B
A6.1	Space Debris Detection, Tracking and Characterization	150B
A7.1	Space Agency Strategies and Plans	144A
B1.1	International Cooperation in Earth Observation Missions	147A
B2.1	Advanced Technologies for Space Communications	140A
B3.1	Governmental Human Spaceflight Programs (Overview)	151A
B4.2	Small Space Science Missions	151B
B6.2	New Space Operations Concepts and Advanced Systems	140B
B5.1	Tools and Technology in Support of Integrated Applications	152A
C1.1	Mission Design, Operations & Optimization (1)	150A
C2.1	Space Structures I - Development and Verification (Space Vehicles and Components)	152B
C4.1	Propulsion System (1)	143A
D1.1	Innovative and Visionary Space Systems	145B
D2.1	Launch Vehicles in Service or in Development	146C
D4.1	Innovative Concepts and Technologies	144B
E1.1	Ignition - Primary Space Education	144C
E4.1	Memoirs, Organizational, Scientific and Technical Histories	147B
E5.1A	Space Architecture: Habitats, Habitability, and Bases	145A

15:15 – 16:00 Press Conference – Heads of Agencies

Location: The Walter E. Washington Convention Center - Room 206

The Heads of Agencies Press conference will give the audience (mainly press representatives) the opportunity to directly address the Heads of Agencies asking relevant and challenging questions.

Speakers:

- Jim Bridenstine, Administrator, National Aeronautics and Space Administration (NASA)
- Sergey Krikalev, Executive Director for Piloted Spaceflights,, State Space Corporation ROSCOSMOS •
- S. Somanath, Director, Vikram Sarabhai Space Centre, Indian Space Research Organisation (ISRO) ٠
- Johann-Dietrich Woerner, Director General, European Space Agency (ESA) ٠
- Hiroshi Yamakawa, President, Japan Aerospace Exploration Agency (JAXA)
- Wu Yanhua, Vice Administrator, China National Space Administration (CNSA) (Invited) •











Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

Organized by: Italian Space Agency (ASI)





Industrial Policy

Speakers:



Josef Aschbacher Director of Earth Observation Programmes and Head of ESRIN, European Space Agency (ESA). Italy

Affairs,

Planet,

Belgium

(ASI), Italv

MODERATOR

Agnieszka Lukaszczyk

Senior Director, European

Maria Cristina Falvella

Head of Strategy and Industrial Policy, Italian Space Agency



15:10 – 16:10 GNF – EO as a Pillar of the Space Economy and Perspectives of

Massimo Comparini CEO, e-GEOS, Italy

Omar Valdés

Czech Republic

Officer,

Market Development

European GNSS Agency,



Giovanni Sylos Labini Vice Chairman, European Association of Remote Sensing Companies, Italy

Global Networking

Forum

Meet, Share,

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Danielle Wood Director, Space Enabled Research Group, MIT Media Lab, United States

16:15 – 16:45 Press Conference – Introducing Aurora, an innovative Cloud-Based Mission **Control Software Suit**

Location: The Walter E. Washington Convention Center - Room 206

D-Orbit presents Aurora, a powerful cloud-based mission control software suite designed to control a single satellite or a complete constellation through a user-friendly, fully customizable control interface.

Speakers:

- Sergio Mucciarelli, Head of Sales, Software Solutions, D-Orbit •
- Renato Panesi, CCO, D-Orbit ٠



Location: The Walter E. Washington Convention Center – Grand Ballroom ABC

Organized by:

European Commission, DG for Internal Market, Industry, Entrepreneurship & SMEs



Speaker:



Elżbieta Bieńkowska Commissioner, Internal Market, Industry, Entrepreneurship & SMEs. European Commission, Belgium

16:45 – 18:15 SpS – ISS-Moon-Mars: Using Spaceflight Platforms to Study and Simulate Future Missions

Location: The Walter E. Washington Convention Center - Room 146A

16:50 – 17:35 GNF – Boeing and Energia: Search for New Forms of Sustainable Cooperation in Space

Location: The Walter E. Washington Convention Center – Grand Ballroom ABC

Organized by:

S.P. Korolev Rocket and Space Corporation Energia



Chris Ferguson Boeing Starliner Astronaut, The Boeing Company, United States

Business.



MODERATOR Lena De Winne Minister of Information and Communications,, ASGARDIA, Austria



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CONGRESS







SpS



Peter McGrath Global Sales and Marketing Director for the Space Exploration The Boeing Company United States



6lobal Networking Forum Maat, Share, C

Nikolay Sevastianov General Director,

RSC Energia, Russian Federation

CONGRESS

17:00 – 17:30 Press Conference – Spearheading the Moon Village Development: Briefing on the MVA Activities

Location: The Walter E. Washington Convention Center - Room 206

An overview of the recent activities of the Moon Village Association (MVA) will be presented, with particular emphasis on the Working Groups' progress and on the application of the Moon Village Principles developed by the Association earlier for evaluation of the Moon-related missions. There will be given news on the implementation of the Women on the Moon initiative and on the Moon Market development. Finally, latest announcements regarding the 3rd International Moon Village Workshop & Symposium (5-8 December 2019, Tokyo/Kyoto) will be made.

Speakers:

- Giuseppe Reibaldi, President, Moon Village Association (MVA) •
- John Mankins, Vice-President, Moon Village Association (MVA)
- Aline Decadi, Board of Directors Member, Education and Special Project Coordinator, Moon Village Association (MVA)
- Yoshifumi Inatani, Space Systems and Astronautics (ISAS)
- Oleg Ventskovsky, Board of Directors Member, Moon Market Development Manager, Moon Village Association (MVA)

17:30 – 18:30 Press Conference – Thales Alenia Space, Pioneering the Future of Space Exploration

Location: The Walter E. Washington Convention Center - Room 206

Thales Alenia Space has been deeply involved in space exploration for many years. What looked like science fiction as recently as the middle of last century is now very tangible. Thales Alenia Space has become a pivotal partner is some of the most impressive exploration missions across the Solar System. Furthermore, our expertise extends well beyond exploration. Countless times, we have contributed to exceptional scientific missions and are now looking to the future of space exploration, by capitalizing on our long experience to design and prepare upcoming missions into space.

The topics that will be discussed are:

From ISS to LOP-G

Aiming for the Moon and Mars

From static to dynamic space environment (Space rider – In Orbit Servicing)

Speakers:

- Walter Cugno, Vice President Domain Exploration and Science, Thales Alenia Space •
- Roberto Provera, Director New Initiatives and Innovation, Exploration and Sciences, Thales Alenia Space

17:40 – 18:10 GNF – 0G Summit: Mankind's Return to the Moon in the NewSpace Age



Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

Organized by:

Space Trust **Commercial Spaceflight Federation**







Namira Salim Founder & Executive Chairperson. Space Trust. United Kingdom

Speakers:



Margaret Kieffer Export Control and Interagency Liaison National Aeronautics and Space Administration United States



Ryan Whitley Director. Civil Space Policy, United States

National Space Council

President,

18:15 – 19:30 Plenary 2: Host Plenary: Evolving Apollo: The Next 50 Years in Human Spaceflight

Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

In the 50 years since Neil and Buzz walked on the Moon, humans have put aside the Cold War competition that sent them there to establish a permanent (so far) presence in space. The International Space Station is arguably the crowning political and engineering achievement of the post-Apollo age. It is feeding forward to the systems - and politics - that will be needed to continue mankind's expansion into the Solar System.

Today it seems likely humans will return to the lunar surface to stay, and to prepare for the next steps to Mars and beyond. A few governments got us this far, but there are a host of new international players with disparate capabilities eager to take a role. Our host plenary will examine the prospects for the next 50 years of human spaceflight, offering state-of-the-art commentary on the international cooperative roles of public and private players, what they may be able to achieve for society, and the pitfalls and STEM challenges that lie ahead.

Speakers:



Lisa Callahan Vice President and General Manager of Commercial Civil Space Lockheed Martin, United States



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Kevin O'Connell

Office of Space Commerce, U.S. Department of Commerce. United States



Bob Richards CEO. Moon Express, United States

MODERATOR

Eric Stallmer Commercial Spaceflight Federation. United States



Jeffrey Manber

United States



George Nield President. **Commercial Space** Technologies, LLC, United States

CONGRESS

International Astronautical Congress 21–25 October 2019 | Washington, D.C

MODERATOR

Ireland

Norah Patten

Scientist-Astronaut Candidate,

Irish Composite Centre



Frank Morring Former Senior Editor, Aviation Week and Space Technology, United States

19:30 – 21:30 IAC 2019 Welcome Reception

Location: The Walter E. Washington Convention Center - Exhibition Hall

have the opportunity to unwind after the first official day of the Congress.



Join Congress participants and partners for drinks, refreshments and networking. Held within the Exhibition Hall at

The Walter E. Washington Convention Center, guests will delight with the wonderful food and drinks on offer and

John and Adrienne Mars Smithsonian National Air and Space Museum.

Johann-Dietrich Woerner Director General, European Space Agency (ESA), France

Tuesday 22 October

07:00 – 08:00 Industry Breakfast Sponsored by Dynetics (Upon Invitation Only)

Location: The Walter E. Washington Convention Center - South Prefunction

Sponsored by: **Dynetics Technical Solutions**



Speaker:



Kim Doering Vice President of Space Systems. Dynetics Technical Solutions United States

08:00-08:30 IAF Excellence in Industry Award Ceremony and Fireside Chat

Location: The Walter E. Washington Convention Center - Grand Ballroom AB

The IAF Excellence in Industry Award recognizes an industry organization for outstanding and sustainable advancements in space, showing the merits of leadership in developing and executing landmark commercial and civil space missions and for being a role model for cooperation in the global space industry workforce.

For its first awardee, the IAF has selected Blue Origin for its significant and sustainable contribution towards enabling an enduring human presence in space through its New Shepard launch system and BE-3 liquid hydrogen rocket engine. Designed for human spaceflight and operational reusability, New Shepard has made 11 historic flights to space. These missions have long-term benefits destined to ignite a new era of commercial human access to space at a dramatically lower cost and with increased reliability.

To receive the award on behalf of Blue Origin, its founder Jeff Bezos, will take part in a fireside chat with IAF Incoming President, Pascale Ehrenfreund.

Introduction, Award Presentation & Moderation:

Jean-Yves Le Gall



President, International Astronautical Federation (IAF),

Bruce Chesley Relations,

Speaker:



Jeff Bezos Founder. Blue Origin, United States









Vice President for Industry International Astronautical Federation (IAF). United States



Pascale Ehrenfreund

Incoming President, International Astronautical Federation (IAF), Austria

CONGRESS ROGRAMIME



08:30 – 09:30 Plenary 3: The Long-Term Sustainability of Outer Space: Advancing the Space Economy and Sustaining Space Industry Through Solutions to Space Security Issue



Location: The Walter E. Washington Convention Center - Grand Ballroom AB

With the proliferation of space-related technology, knowledge, and expertise surging to meet the explosive global growth in supply and demand for goods and services, the cumulative value of space-related or space-dependent commerce and economic value also generates the need to address the critical issues related to space security. The democratization of space has led to a growing number of active spacecrafts and inactive objects in orbit. With the advent of mega constellations, this number is likely to double within the next decade increasing the probability of collisions and complicating space traffic management.

This plenary addresses the fact that humanity has become increasingly dependent on space capabilities and space-enabled services, thereby making commerce, the human condition, and "normal daily life" vulnerable to any significant disruption in the functioning of space assets. As such, space must be managed thoughtfully and protectively. Communications, Broadcast, Earth Observation, Navigation, Positioning, Timing, Weather Forecasting are all essentials of modern life and modern commerce, and of course are all now dependent on value that is being created by assets located in space.

The panel is composed by a group of leading experts who have dedicated their careers in industry and also government to advancing space technology for the protection and security of humankind. Given the extreme breadth and scope of this domain, including both the inputs and the outcomes affected by it, the panel will address the full spectrum of legal, policy, economic, and technical aspects of space security from a global perspective. International panellists representing both private and public space sector will discuss a spectrum of views on effective cooperation in space and the long-term sustainability of the space environment.

Speakers:



Jean-Loïc Galle President and CEO, Thales Alenia Space, France



Etienne Schneider Deputy Prime Minister and Minister of Economy and Space, The Luxembourg Government. Luxembourg





Daniel S. Goldberg



MODERATOR Fatih Ozmen Owner and CEO, Sierra Nevada Corporation,

United States

Scott Pace

United States

Executive Director.

National Space Council,

GNF INDUSTRY STREAM

Room: Grand Ballroom AB (AM) Room: Grand Ballroom A (PM)

09:40 – 09:50 GNF – Industry Story Telling Session: Virgin Galactic

Location: The Walter E. Washington Convention Center - Grand Ballroom AB

Organized by: IAF Industry Relations Committee (IRC)



Speaker:



George Whitesides

Eric Stallmer President, Federation. United States

09:45 – 11:15 SpS – Home Planet 2030 – The Role of Earth Observations in Studying **Our Planet**

Location: The Walter E. Washington Convention Center - Room 146A

09:45 – 12:45 Technical Sessions

No.	Title	Room
A1.2	Human Physiology in Space	143B
A3.2A	Moon Exploration – Part 1	146B
A4.1	SETI 1: SETI Science and Technology	143C
A6.2	Modelling and Risk Analysis	150B
B2.8-GTS.3	Space Communications and Navigation Global Technical Session	147B
B3.2	Commercial Human Spaceflight Programs	151A
B4.1	20th Workshop on Small Satellite Programmes at the Service of Developing Countries	151B
C1.2	Mission Design, Operations & Optimization (2)	150A
C2.2	Space Structures II - Development and Verification (Deployable and Dimensionally Stable Structures)	152B
C3.1	Solar Power Satellite	147A
C4.3	Propulsion Technology (1)	143A
D1.2	Space Systems Architectures	145B
D2.2	Launch Services, Missions, Operations, and Facilities	146C
D4.2	Contribution of Space Activities to Solving Global Societal Issues	144B
D5.1	Quality and safety, a challenge for traditional and new space	145A





Global

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GNF CULTURE & SOCIO-ECONOMIC STREAM Room: Grand Ballroom C



Commercial Spaceflight



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09:50 – 10:00 GNF – Industry Story Telling Session: Thales Alenia Space





Global

Networking Forum Meet. Share.

Location: The Walter E. Washington Convention Center – Grand Ballroom AB



D6.1

E1.2

E2.1

E3.1

E7.1

IAF Industry Relations Committee (IRC)



Speaker:



Donato Amoroso Deputy Director, Thales Alenia Space, Italv



Eric Stallmer **Commercial Spaceflight** United States



Location: The Walter E. Washington Convention Center – Grand Ballroom AB

Organized by:

IAF Industry Relations Committee (IRC)





Andrew Rush CEO & President, Made In Space, United States



FELATIONS

MODERATOR Eric Stallmer President, **Commercial Spaceflight** Federation. United States

Location: The Walter E. Washington Convention Center - Room 206

One year after the MILO Space Science Institute made its debut at IAC 2018, we are excited to announce the MILO Ambassador Program and additional mission opportunities for universities, space agencies, and other space focused organizations. As a

member of the Institute there are many benefits including, e-learning, workforce development in your country, and engagement with worldwide space programs. Build a payload, design a spacecraft, or test your instrument in space with guidance from engineers and scientists through international collaboration. Come hear more about our next mission opportunities.

Speakers:

- Lon Levin, President and CEO, GEOshare
- Lisa Callahan, Vice President and General Manager, Commercial Civil Space, Lockheed Martin ٠
- Jim Bell, Professor, ASU's School of Earth & Space Exploration and the Director, ASU's Space Technology and Science (NewSpace)
- Betsy Cantwell, Senior Vice President of Research and Innovation, University of Arizona ٠

10:10 – 10:20 GNF – Industry Story Telling Session: Arianespace

Location: The Walter E. Washington Convention Center - Grand Ballroom AB

Organized by:



Speaker:





President, Federation. United States

ELATION

10:20 – 10:30 GNF – Industry Story Telling Session: SpaceX

Location: The Walter E. Washington Convention Center - Grand Ballroom AB

Organized by:

IAF Industry Relations Committee (IRC)



Speaker:





President,









MODERATOR Eric Stallmer

Commercial Spaceflight Federation, United States









10:30 – 10:40 GNF – Industry Story Telling Session: Blue Origin



6lobal Networking

Forum

Location: The Walter E. Washington Convention Center - Grand Ballroom AB

Organized by:

IAF Industry Relations Committee (IRC)



Speaker:



Brent Sherwood Vice President Advanced Development Programs, Blue Origin, United States



MODERATOR Eric Stallmer President. **Commercial Spaceflight** Federation, United States





Organized by:

Speaker:

IAF Industry Relations Committee (IRC)



















11:15 – 12:15 Press Conference – Open for Business: The Trillion Dollar Space Economy

Location: The Walter E. Washington Convention Center - Room 206

Moderator:

Rob Meyerson, Executive Producer, ASCEND and Former President, Blue Origin ٠

Speakers:

- Tory Bruno, CEO, United Launch Alliance •
- Mary Lynne Dittmar, President and CEO, Coalition for Deep Space Exploration .
- Fred Kennedy, Former Director, Space Development Agency •
- Dan Dumbacher, Executive Director, AIAA ٠



Location: The Walter E. Washington Convention Center - Room: 146A

11:45 – 12:30 GNF – A Grand Tour of Global Space Policy Issues

Location: The Walter E. Washington Convention Center - Grand Ballroom AB

Organized by:

IAF Industry Relations Committee (IRC)



Speakers:



Bill Beckman Director for NASA Programs, Washington D.C. Operations Office, The Boeing Company, United States

SMEs, Belgium



Kai-Uwe Schrogl President, International Institute of Space Law (IISL),

Location: The Walter E. Washington Convention Center - South Prefunction

Sponsored by: The Boeing Company BOEING

Speakers:







United States





SpS – Global Launch SpaceBuzz: Launching Millions of Children into





Networking

Pierre Delsaux Deputy Director General for Internal Market, Industry,

Entrepreneurship and European Commission,

Jennifer A. Warren

Vice President, Technology Policy & Regulation, Civil & Regulatory Affairs. Lockheed Martin Government Affairs, United States



Marco R. Fuchs Chairman of the Management Board, OHB SF. Germany

MODERATOR

Brian Weeden Director of Program Planning, Secure World Foundation, United States

12:30 – 13:30 Industry Lunch Sponsored by Boeing (Upon Invitation Only)

KEYNOTE SPEAKER:

The Honorable

U.S. Representative, Oklahoma's 5th Congressional

House Science, Space & Technology Committee,

CONGRESS

International Astronautical Congress 21–25 October 2019 | Washington, D.C

12:30 – 13:30 SpS – Life's Journey Through the Universe

Location: The Walter E. Washington Convention Center - Room: 146A

13:30 – 14:30 Plenary 4: Inspiring by Leading: Building and Sustaining the Global Space Workforce for the Future



SpS

Location: The Walter E. Washington Convention Center - Grand Ballroom B

Given this year's IAC theme is "Space: The Power of the Past, the Promise of the Future", a discussion on the future of the global space workforce is critically important and relevant. The panel will explore one of the key challenges that the global space community is facing: the attraction and retention of young professionals across a spectrum of career fields to the space sector.

Today's dynamic space industrial community is seeing the interplay between large long-established corporations that had their origins since the beginning of space-faring activity, and a new generation of startups that is pushing the boundaries of space activities beyond those of traditional government-sponsored activity. The interplay of talent between these two communities is compelling, especially in light of generational knowledge transfer. Space engineering is as much art as science and technology, so how are lessons learned from past historical failures propagated into a diverse industrial workforce as standards and best practices to maximize mission success?

In addition, the nature of the workplace continues to change as we see movements such as "Industry 4.0" or the "Industrial Internet of Things (IIoT)" associated with new ways of learning, new design approaches, more digitization and more reliance on a highly networked computational environment. These movements are also having an impact on the global space workforce and should be discussed.

The challenge to the panel and the audience is to think about what is required to recreate and nurture an environment that will spawn future generations of space leaders. Each of the panelists represents a major global aerospace organization or entity, all continuously challenged with building and sustaining a space workforce equipped with skills to address future opportunities.

Speakers:



Karen Andrews Minister for Industry, Science and Technology, Australian Government. Australia

United States



Bob Smith CEO, Blue Origin,







Mobilization Assistant to the Chief of Staff, U.S. Air Force, United States

Pamela J. Lincoln





Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by: The Boeing Company



Speakers:



Chris Ferguson Boeing Starliner Astronaut. The Boeing Company,

United States

14:45 – 15:45 GNF – Alive in Space

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by: IAF Committee for the Cultural Utilisation of Space (ITACCUS)



Speakers:



Nelly Ben Hayoun SETI Institute, United Kingdom





Anna Sitnikova Moon Gallery, The Netherlands

Philosopher, Slovenia

14:45 – 16:15 SpS – EO+AI – The Game Changer in the Way We See the World

Location: The Walter E. Washington Convention Center - Room 146A



Juan De Dalmau

Clémentine Decoopman Executive Director, Space Generation Advisory Council (SGAC), Austria







Mark Mulqueen

Program Manager International Space Station Space and Launch Systems. The Boeing Company



MODERATOR Jim Chilton Senior Vice President Boeing Space and Lanch, The Boeing Company, United States



Michael Garrett

Jodrell Bank Centre for United Kingdom

Miha Tursic Waag Society,





Sitraka Rakotoniaina

Designer, Very Very Far Away (VVFA), United Kingdom

MODERATOR Aoife Van Linden Tol Director & Artist,

IAF Committee for the Cultural Utilisation of Space (ITACCUS), United Kingdom



CONGRESS ROGRAMME



14:45 – 17:45 Technical Sessions

No.	Title	Room	
A1.3	Medical Care for Humans in Space	143B	
A3.2B	Moon Exploration – Part 2	146B	
A4.2	SETI 2: SETI and Society	143C	
A6.3	Impact-Induced Mission Effects and Risk Assessments	150B	
A7.2	Science Goals and Drivers for Future Exoplanet, Space Astronomy, Physics, and Outer Solar System Science Missions	144A	
B2.2	Advanced Space Communications and Navigation Systems	140A	
B3.3	Utilization & Exploitation of Human Spaceflight Systems	151A	
B4.3	Small Satellite Operations	151B	
C1.3	Orbital Dynamics (1)	150A	
C2.3	Space Structures - Dynamics and Microdynamics	152B	
C3.2	Wireless Power Transmission Technologies and Application	147A	
C4.5	Propulsion Technology (2)	143A	
D1.3	Technologies to Enable Space Systems	145B	
D2.3	Upper Stages, Space Transfer, Entry and Landing Systems	146C	
D4.3	Space Elevator Critical Technology Verification and Validation Testing	144B	
E1.3	On Track - Undergraduate Space Education	144C	
E2.2	Student Conference - Part 2	140B	
E5.2	Is Space R&D Truly Fostering A Better World For Our Future?	145A	
E6.1	Entrepreneurship and Innovation: The Practitioners' Perspectives	147B	
F7.2	Dispute Settlement in Space Law: Are We Ready for the Commercial Challenge?	152A	

15:45 – 15:55 GNF – Industry Deep Dives: Small Satellites, Big Future: **Frequent and Reliable Launch on Electron**



TS

Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by:

IAF Industry Relations Committee (IRC)

Speaker:







MODERATOR Joe Landon Vice President of Advanced Programs Development for

Commercial Civil Space, Lockheed Martin. United States



Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by:

South African National Space Agency (SANSA) International Astronautical Federation (IAF)



Centre Royal de Télédéction Spatiale (CRTS) Centre National d'Études Spatiales (CNES)



Speakers:



Kirsten Armstrong GLEC 2019 Plenary

Group, France



Jean-Pascale Le Franc GLEC2019 IPC Co-Chair, Director of Planning, International Relations and Quality, Centre National d'Études Spatiales (CNES), France

South Africa

GLEC2019 IPC Co-Chair,

Nations, Federation (IAF), CEO.



Driss El Hadani Director General, Centre Royal de Teledetection Spatiale (CRTS), Morocco

CONGRESS

MODERATOR





Global Networking

Forum Meet. Share. C.





Kammy Brun

GLEC 2019 Plenary Moderator, Head of Global Business Development, China HEAD Aerospace



GLEC2019 IPC Co-Chair, Vice President for Developing Countries and Emerging International Astronautical

South African National Space Agency (SANSA),





David Kendall

GLEC 2019 Plenary Moderator, Former Chair, The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), Canada

Krystal Wilson

GLEC 2019 Plenary Moderator, Director of Space Applications Programs, Secure World Foundation, United States

CONGRESS



15:55 – 16:05 GNF – Industry Deep Dives: Incorporating the Moon into Earth's Economy

Global Networking (Å Forum Mant Share

Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by:

IAF Industry Relations Committee (IRC)



Speaker:



Founder & CEO, ispace. Japan





16:05 – 16:15 GNF – Industry Deep Dives: Making Space Sustainable for **Future Space Utilization and Exploration**



Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by: IAF Industry Relations Committee (IRC)



Speaker:





Robbie Schingler

Strategy Officer,

United States

Planet.

Co-Founder and Chief



Organized by:

Speaker:

16:15 – 16:25 GNF – Industry Deep Dives: Space Technology to the Power of Hundreds

Global Networking Forum Meet. Share. Conne



Location: The Walter E. Washington Convention Center - Room 146A

16:30 – 17:45 GNF – The IAF Startup Pitch Session

Location: The Walter E. Washington Convention Center – Grand Ballroom A

Organized by: IAF Industry Relations Committee (IRC)



Master of Ceremony:

ispace,

Luxembourg

Lynn Zoenen Global Affairs Manager,

Judges:



Lluc Diaz Innovation and Ventures Officer, European Space Agency The Netherlands

Boeing HorizonX, United States



Brooke Owens United States

Thomas Snitch

University,

United States

Director of Federal and

Government Programs

Bowling Green State





Location: The Walter E. Washington Convention Center - Grand Ballroom A



IAF Industry Relations Committee (IRC)







Joe Landon



Vice President of Advanced Programs Development for Commercial Civil Space,

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CONGRESS PROGRAMME

Christian Dommel Principal Strategist, Space and Connectivity,

Rolf Janovsky Predevelopment,

Xiaoming Yin Investment Manager, Lockheed Martin,





Co-Founder and Managing Partner, Starburst, United States

Van Espahbodi

Richard A. Leach

Chief Strategy Officer, International Space Station U.S. National Laboratory, United States



16:40 – 17:10 GNF – Leaving No-One Behind: Opportunities to Support Inclusiveness Through Space-Based Applications and Space Exploration. Presentation of Results of the 27th Workshop on Space Technology for Socio-Economic Benefits

Location: The Walter E. Washington Convention Center - Grand Ballroom C

Organized by:

United Nations Office for Outer Space Affairs (UNOOSA) International Astronautical Federation (IAF)





Christian Feichtinger





Danielle Wood

MIT Media Lab,

United States

Space Enabled Research

Director

Group,







Shirish Ravan Senior Programme Officer, United Nations Office for Outer Space Affairs (UNOOSA). Austria

Global

Forum

Networking

MODERATOR Director,

United Nations Office for Outer Space Affairs (UNOOSA), Austria

17:00 - 17:30 Press Conference – GK Competition for a free launch of 1U CUBSAT Announcement

Location: The Walter E. Washington Convention Center – Room 206

The International Astronautical Federation (IAF) and GK Launch Services are summing up the results of an exclusive competition for the free launch of 1U CubeSat with the GK Launch Services' first commercial mission in the second guarter of 2020. IAF member organizations went in for the competition announced in April 2019. Its goal is to support initiative space projects of young university teams. The winner will get the opportunity to launch a 1U CubeSat for free.

Speakers:

- Jean-Yves Le Gall, President, International Astronautical Federation (IAF)
- Gabriella Arrigo, Vice President, Science & Academic Relations and Global Networking Forum, International Astronautical . Federation (IAF)
- Otto Koudelka, Chairman, International Astronautical Federation (IAF) Space Universities Administrative Committee (SUAC) ٠
- Tatiana Tischenko, Director International Cooperation Departement, State Space Corporation ROSCOSMOS
- Dmitry Loskutov, CEO, Glavkosmos
- Alexander Serkin, CEO, GK Launch Services

Moderator:

Christian Feichtinger, Executive Director, International Astronautical Federation (IAF) •



Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by:

Singapore Space and Technology Association (SSTA)





OPENING PRESENTATION Jonathan Hung Founder & President. Singapore Space and Technology Association (SSTA), Republic of Singapore

Speakers:



Tan Kong Hwee Executive Director, Capital Goods, Singapore Economic Development Board. Republic of Singapore





Amal Chandran Executive Director, Capital Goods. Singapore Economic Development Board **Republic of Singapore**

Highlight Lecture 1: MARSIS: the Successful Search for Liquid Water 18:00 - 19:00 on Mars

Location: The Walter E. Washington Convention Center - Grand Ballroom B

The recent finding of evidences of the presence of liquid water in the depths of the Martian South Polar Layered Deposits occurs after almost a decade of analysis of the data produced by the two sounding Italian lead radar around Mars. The case for Mars is intriguing due to the role that water has surely played in the shaping of the present aspect of the planet, and for the role that the presence of water had for the possible insurgence of life forms. Water, liquid or as ice, is a central element for the future of Mars exploration being the main resource needed in the case of the human exploration. Sounding radars are now considered the best technology to assess remotely the presence, amount and nature of water ice also under the Martian surface. Radars are key instruments for the present and future of planetary exploration.

Speaker:



Enrico Flamini Former Chief Scientist, Italian Space Agency (ASI), Italy

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Simonetta Di Pippo







Lynette Tan Executive Director. Singapore Space and Technology Association

Republic of Singapore



Harris Chan Weng Yip Chief Technology Officer / Chief Digital Officer, ST Engineering, **Republic of Singapore**





18:00 – 20:00 ISEB Networking Night (Upon Invitation Only)

Location: Crystal City Hilton, Crystal Ballroom

19:30 – 21:30 Young Professionals Networking Event (restricted to Young Professionals)

Location: The Walter E. Washington Convention Center - 207 AB

Wednesday 23 October

07:00 – 08:30 IAF IDEA "3G" Diversity Breakfast

Location: The Walter E. Washington Convention Center - South Prefunction

As an important element of the IAF "3G" Diversity Day the IAF welcomes all delegates to the IAF IDEA "3G" Diversity Breakfast sponsored by Jet Propulsion Laboratory (JPL).

The event will be opened with a welcome by the IAF President, Jean-Yves Le Gall followed by an introduction from Moderator Mary Snitch, the Special Advisor to the IAF President (Diversity Initiatives). Larry D. James, Deputy Director of JPL, will speak on behalf of JPL and share an exciting video with the audience. Furthermore, the event will feature a 3-person panel with Rukmini Roy, Rosemary Davidson and Rachael McKee – 3 female engineers currently in their degree program or very recently graduated. During the panel discussion the three women will address the important question of "What would you do to improve the diversity of the Engineering Workforce?"

Sponsored by:

Jet Propulsion Laboratory



Programme:

07:00 – 07:05	Welcome Jean-Yves Le Gall, President, International Ast
07:05 – 07:10	Moderation and Introduction to IAF "3G" Div Mary Snitch, Special Advisor to the IAF Pro Astronautical Federation (IAF), United States
07:10 - 07:20	Presentation by Sponsor Larry D. James, Deputy Director, Jet Propulsion
07:20 - 07:40	Panel discussion <i>"What would you do to improve the diversity o</i>
	• Rukmini Roy, Aerospace Engineering Stud United States

• Rosemary Davidson, Graduate Student, Massachusetts Institute of Technology, United States

tronautical Federation (IAF), France

versity Breakfast resident (Diversity Initiatives), International

on Laboratory (JPL), United States

of the Engineering Workforce?"

dent, Georgia Institute of Technology,

























Company, United States

Astronautical Federation (IAF), United States

Concluding Remarks

07:50 - 08:30 Networking

07:40 - 07:50

08:30 – 09:30 Plenary 5: Heads of Emerging Agencies

Location: The Walter E. Washington Convention Center - Grand Ballroom B

Emerging countries have awakened to the realisation and appreciation of the impact that space science and technology can make in addressing its socio-economic challenges. However, the benefits of these services have accrued to these countries indirectly, as a consumer of services and products provided by multi-national companies and inter-governmental agencies. While some of these products and services have traditionally helped to serve the social and economic needs of the emerging countries, the level of self-reliance and self-sufficiency has been gradually increasing. Thus, the technology maturity levels and ambitions of emerging countries have been growing to the point of finding global relevance, which is demonstrated by the increasing number of international collaboration initiatives between developed nations and emerging countries.

• Rachael McKee, Business Development Analyst, Lockheed Martin Space Systems

Mary Snitch, Special Advisor to the IAF President (Diversity Initiatives), International

In this respect, emerging countries present a significant growth potential, especially given their nascent technology readiness levels compared to other developed and space enabled regions of the world.

Speakers:



Acting Director General and ČEO, National Space Research and Development Agency (NASRDA), Nigeria



United Arab Emirates Space Agency (UAESA). United Arab Emirates







(UNOOSA),

Valanathan Munsami CEO, South African National Space Agency (SANSA), South Africa



PE



GNF SPACE EXPLORATION STREAM Room: Grand Ballroom A

GNF – The Evolving Role of the Public Procurement 09:40 - 10:40 Authorities Becoming an Anchor Customer in Large Space **Related Programmes**

Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by: European Space Agency (ESA)



Speakers:



Stéphane Israël Arianespace, France

CEO, United States



Philippe Pham SVP Head of Earth Observation, Navigation and Science. Airbus Defence and Space, France





RAPPORTEUR Karina Miranda Sanchez Head of the Industrial Audit European Space Agency (ESA),

Luxembourg

09:40 – 10:40 GNF – SGAC – LSA SpaceGen Entrepreneurs

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by: Space Generation Advisory Council (SGAC) Luxembourg Space Agency (LSA)







Chris Nie Space Generation Congress 2019 Manager, Space Generation Advisory Council (SGAC), Austria

CONGRESS





GNF DIVERSITY STREAM Room: Grand Ballroom C





Acquisitionpro, LLC,

Robbie Schingler Co-Founder and Chief Strategy Officer,





Eric Morel de Westaaver

Director of Industry, Procurement and Legal Services, European Space Agency (ESA), France

MODERATOR

Pieter van Beekhuizen Senior Consultant, Bexperience, The Netherlands





CONGRESS
International Astronautical Congress 21–25 October 2019 | Washington, D.C

Speakers:



Étienne Schneider Deputy Prime Minister and Minister of Economy. The Luxembourg Government,





Oniosun Temidayo Isaiah

Managing Director,

Space in Africa,

Nigeria

Peter Platzer CEO, Spire Global, United States

Joost van Oorschot Founder and CEO, Maana Electric, The Netherlands



Pete S. Worden Executive Director Breakthrough Initiatives, United States

William Crowe

High Earth Orbit Robotics,

CEO,

Australia





MODERATOR Gary Martin Senior Advisor, Luxembourg Space Agency (LSA). Luxembourg

SpS

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09:45 –11:15 SpS – Space Traffic Management: Working Together to Enhance Safety and Sustainability

Location: The Walter E. Washington Convention Center - Room 146A

09:45 – 12:45 Technical Sessions

No.	Title	Room
A2.2	Fluid and Materials Sciences	143C
A3.3A	Mars Exploration – Missions Current and Future	146B
A5.1	Human Exploration of the Moon and Cislunar Space	145B
A6.4	Mitigation - Tools, Techniques and Challenges	150B
B1.2	Future Earth Observation Systems	147A
B2.3	Fixed and Broadcast Communications	140A
B3.4-B6.4	Flight & Ground Operations of HSF Systems - Joint Session of the IAF Human Spaceflight and IAF Space Operations Symposia)	151A
B4.4	Small Earth Observation Missions	151B
C1.4	Orbital Dynamics (2)	150A
C2.4	Advanced Materials and Structures for High Temperature Applications	152B
C4.2	Propulsion System (2)	143A
C4.4	Electric Propulsion	143B
D2.4	Future Space Transportation Systems	146C
D3.1	Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and Development	144B
D5.2	Knowledge Management for Space Activities in the Digital Era	145A

E1.4	In Orbit - Postgraduate Space Education	144C
E2.3-GTS.4	Student Team Competition	147B
E3.2	50 years after Apollo 11: The future of space exploration and innovation	144A
E6.2	Finance and Investment: The Practitioners' Perspectives	152A
E7.3	National Space Legislation – Harmonisation and Enforcement	152A

10:00 – 11:00 Press Conference – Smithsonian's National Air and Space Museum & ispace: Preserving the History & Pioneering the Future of Private Lunar Exploration

Location: The Walter E. Washington Convention Center - Room 206

The National Air and Space Museum is planning a new exhibition, scheduled to open in 2024, that will feature artifacts from the emerging commercial space sector. The growth of commercial space activity in recent years, and the possible future growth of commercial activities in space from tourism to lunar prospecting and asteroid mining, could reshape our social and economic relationship to space. On October 23, ispace, the managing company of HAKUTO, a Google Lunar XPRIZE Competition finalist, will make a special donation to the museum that will be included in the new exhibition. Come join this handover event to see the donation before it is prepared for display.

Speakers:

- Ellen Stofan, John and Adrienne Mars Director, National Air and Space Museum .
- Takeshi Hakamada, Founder & CEO, ispace •

10:45 – 11:35 GNF – Lessons from Business Women in the Space Industry - Positive Tales from a Journey Through a Male Dominated Industry

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by:





Disrupting Space LLC



Speakers:



Lisa Johnson System Engineer, Loft Orbital, United States





IAF Technical Committee









Agnieszka Lukaszczyk Senior Director, European



Ann-Sofie Schreurs Senior Scientist and Possum Alumni. United States

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Forum

MODERATOR

Disrupting Space LLC,

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10:50 – 11:50 GNF – Forming, Storming, and Norming the Future Lunar **Exploration Enterprise**



Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by:



Clive Neal

United States

MODERATOR

The Aerospace

Corporation,

Carlos Mariscal, CEO, Dereum

Pavlo Tanyasuk, CEO, Spacebit

John Thornton, CEO, Astrobotic Technology Inc.

United States

Project Overview

Location: The Walter E. Washington Convention Center - Room 206

Edward Swallow Senior Vice President

Professor.



Speakers:



Bretton Alexander Vice President, Government Sales & Strategy, Blue Origin, United States

University of Notre Dame,



(ESA).

The Netherlands

Rob Chambers Director of Human Spaceflight Strategy and Business Development, Lockheed Martin, United States



Press Conference – Astrobotic and SpaceBit Lunar Mission Contract Signing and

Ronnie Nader, Chairman, GRULAC, International Astronautical Federation (IAF) and COO, Equadorian Civilian Space Agency

Marshall Smith Director of Human Lunar Exploration Program. National Aeronautics and Space Administration (NASA), United States

SpS

Libby Jackson

United Kingdom

Human Exploration

. Programme Manager,

UK Space Agency (UKSA),

SpS – Futures Past and Present: Space Architecture in Imagination and 11:30 - 13:00 Reality

Location: The Walter E. Washington Convention Center - Room 146A





11:45 – 12:30 GNF – NASA YP Town Hall

Location: The Walter E. Washington Convention Center - Grand Ballroom C

Organized by: IAF Workforce Development-Young

Professionals Programme Committee



Speaker:

(WD-YPP)



Jim Bridenstine Administrator, National Aeronautics and Space Administration United States

United States

12:00 – 12:30 GNF – To the ISS, the Moon, Mars – and then some: A 360° Discussion on Humanity's Exploration of Our Solar System and Beyond

Location: The Walter E. Washington Convention Center – Grand Ballroom A

Organized by: Airbus Defence and Space



Speakers:



Juan Carlos Cortés Head of Space, Large Research Infrastructures and Dual Programs, Center of Development for Industrial Technology





Oliver Juckenhoefel Senior Vice President **On-Orbit Services and** Exploration, Airbus Defence and Space, Germany

(ESA), France

MODERATOR



Johannes von Thadden Senior Vice President and Head of Business Growth Space Systems, Airbus Defence and

Space. Germany



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(EXA)

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11:15 - 12:00







MODERATOR Jackelynne Silva Martinez Aerospace Engineer Mission Planning Operations,

NASA Johnson Space Center,



Athena Coustenis

Director of Research, Centre National de la Recherche Scientifique

David Parker

Director of Human and Robotic Exploration, European Space Agency





Steve Lindsey

Vice President of Space Exploration Systems and Former Nasa Astronaut, Sierra Nevada Corporation, United States

John Thornton

CEO, Astrobotic Technology, Inc United States

CONGRESS



12:30 - 13:30 IAF "3G" IDEA – Excellence in "3G" Diversity Award Luncheon (Upon Invitation Only)

Location: The Walter E. Washington Convention Center - South Prefunction

The IAF Excellence in "3G" Diversity Award recognizes IAF member organizations (industry, government, academia) worldwide for outstanding contributions to the fostering of "3G" (Geography, Generation, Gender) Diversity within the space sector.

This Luncheon is dedicated to the award ceremony for the IAF Excellence in "3G" Diversity Award. At the IAC 2019 this award will be given to the UAE Space Agency.

وكالة الإمارات للفضاء UAE SPACE AGENCY



The United Arab Emirates Space Agency, the first national space agency in the region, was established in 2014, and is responsible for organizing, regulating, and supporting the national space sector under federal law. This includes the oversight and funding of space missions such as the UAE's Emirates Mars Mission's Hope Probe, the region's first Arab and Islamic interplanetary mission. The primary goals of the UAE Space Agency are to contribute significantly to the diversification of the national economy, enhancing the UAE's international standing in space-related fields, and issuing policy and laws for the space sector. Space sector capacity building programmes and raising awareness of space sciences and STEM fields develop the next generation of Emiratis for leadership in the space sector.

Programme:

12:35 - 12:40

12:40 - 12:45

12:45 - 13:05

13:05 - 13:30

12:30 – 12:35	Welcome
	Jean-Yves Le Gall, President, International Astronautical Federation (IAF), France

Introduction of the IAF Excellence in "3G" Diversity Award

Minister of State for Higher Education and Advanced Skills

Astronautical Federation (IAF), United States

Award Ceremony and Photo

Chairman, UAE Space Agency

United Arab Emirates

Networking

Presentation by the Award winner

UAE Space Agency represented by:

His Excellency Dr. Ahmad Belhoul Al Falasi,

Mary Snitch, Special Advisor to the IAF President (Diversity Initiatives), International









Location: The Walter E. Washington Convention Center – Grand Ballroom B

Since the earliest civilizations, two questions have driven humanity's curiosity: where do we come from, and are we alone? Europa, an ocean moon of Jupiter, can provide some keys to help answer those fundamental questions. There is liquid water on Europa, and there is lots of it: about twice as much water as on Earth itself, encased within an ice shell. The Europa Clipper Mission, NASA's next outer planet flagship mission, will explore Europa to investigate whether it harbors conditions suitable for life. The NASA Jet Propulsion Laboratory (JPL) leads the Europa Clipper mission in partnership with the Johns Hopkins University Applied Physics Laboratory (APL). This session will discuss the scientific mysteries of Europa, engineering challenges, teaming approach, and outreach for Europa Clipper.

Europa. What will we find when we get there? We have some good ideas. We will test those ideas. Come and learn about this rousing mission!

Speakers:



Jennifer Dooley Europa Clipper Project Systems Engineer, NASA Jet Propulsion Laboratory (JPL). United States





Bill Nye The Planetary Society, United States

Scientist.



Space

Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by:

Speakers:

Association of Space Explorers (ASE) Virgin Galactic IAF Human Spaceflight Committee









Greg C. Johnson Senior Vice President of New Blue Origin, United States









Plenary 6: Europa Clipper: Making a Mission to Understand Our Place

Karen Kirby

Europa Clipper Deputy Project System Engineer, Johns Hopkins University Applied Physics Laboratory

United States

Robert Pappalardo Europa Clipper Project NASA Jet Propulsion Laboratory (JPL), United States

Head of the Astronaut Office, Virgin Galactic, United Kingdom



Commercial Spaceflight Federation, United States

Thomas J. Magner

Manaaer. Johns Hopkins University Applied Physics Laboratory (APL), United States

MODERATOR

Telecommunications Manager,

Dipak Srinivasan

Europa Clipper Johns Hopkins University Applied Physics Laboratory, Advisorv Board. The Planetary Society, United States













MODERATOR

Michael Lopez-Alegria Former NASA Astronaut & President, Association of Space Explorer (ASE), United States

Panellists:



Future Astronaut, Principle Scientist. Southwest Research Institute. United States







Beth Moses Chief Astronaut Instructor, Virgin Galactic, United States



Ron Rosano

Future Astronaut, Virgin Galactic, United States







SpS

ΤS

E1.5 Enabling the Future - Developing the Space Work E2.4 Educational Pico and Nano Satellites E4.2 History of US Contribution to Astronautics Post V E5.3 Contemporary Arts Practice and Outer Space: A N E7.4 Space Traffic Management: From Space Situation Surveillance and Tracking to developing Rules of

14:45 – 15:45 GNF – Industrializing the Solar System – Launching the OffWorld Industrial Robotics Workforce Program

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by: OffWorld, Inc.

Speaker:



Jim Keravala OffWorld, Inc., United States

14:45 – 16:15 SpS – Young Minds Meet Space Leaders: Words Into Action

Location: The Walter E. Washington Convention Center - Room 146A

14:45 – 17:45 Technical Sessions



15:55 – 16:55 GNF – ECOSYSTEM for Sustainable Space Exploration – Involving New Space, Non-Space Players

Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by: Japan Aerospace Exploration Agency (JAXA)

JAXA

Speakers:



Alexander MacDonald Senior Economic Advisor, National Aeronautics and Space Administration United States

George Sowers Professor, Colorado School of Mines, United States

ispace.

Japan

lanan

CONGRESS









force	144C
	140B
/WII	147B
Aulti-Disciplinary Approach	145A
al Awareness and Space the Road	152A



Global

Forum

Networking

Takahiro Nakamura Director and COO,



Naoki Sato

Chair, International Space **Exploration Coordination** Group (ISECG), Japan

MODERATOR Koichi Wakata Vice President, Japan Aerospace Exploration Agency (JAXA),

CONGRESS



Goals 2030 Agenda

Location: The Walter E. Washington Convention Center - Grand Ballroom C

CONGRESS

Organized by:

Space Generation Advisory Council (SGAC) European Space Agency (ESA)



Ganiyu Ishola Agbaje Executive Director, African Regional Centre for Space Science & Technology Education (ARCSSTE-E), Vigeria



Davide Petrillo Space Generation Congress 2019 Deputy Manager, Space Generation Advisory Council (SGAC), Austria



15:55 – 16:55 GNF – Space Supporting the UN Sustainable Development





esa

MODERATOR Isabelle Duvaux-Béchon Head Member States Relations & Partnerships Office, European Space Agency (ESA),

Senior Programme Officer,

United Nations Office

for Outer Space Affairs

Shirish Ravan

(UNOOSA),

Austria

France

16:00 – 17:15 Press Conference – Artemis Supplier Panel and Space Flight Awareness Award Presentation

Chris Lee

Chief Scientist / Head of

UK Space Agency (UKSA),

Science Programme,

United Kingdom

Location: The Walter E. Washington Convention Center - Room 206

When American astronauts set foot on the moon's surface in 2024, large and small companies across the United States can say they helped to make it possible. More than 3,800 businesses in all 50 states, and others around the world, produce critical elements and tools for the NASA Artemis missions that will return humans to the moon – this time to stay – and then on to Mars.

At this media event, representatives from five U.S. suppliers will discuss their roles in building NASA's Space Launch System rocket, Orion spacecraft, and Exploration Ground Systems. The 20-minute briefing and 20-minute Q&A will be followed by a NASA astronaut's presentation of Space Flight Awareness Awards to two of the suppliers.

Speakers:

- Victor Alfano, Senior Director, Strategic Programs: NTS
- Kevin Bowling, Senior Vice President, Major Tool & Machine
- John Couch, Vice President, Futuramic ٠
- Wayne Cross, President and CEO, Crossworks Technologies
- Gina Prieto, Director, Key Accounts, Smiths Interconnect ٠

16:30 – 18:00 SpS – The Future of Space Operations Across Industries

Location: The Walter E. Washington Convention Center - Room 146A





Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by: German Aerospace Center (DLR)



Speakers:



Jim Armor Chair Executive Committee and Former Major General U.S. Air Force, Consortium for Execution of Rendezvous and Servicing Operations CONFERS), United States



Bernd Sommer Head of Space Automation and Robotics, German Aerospace Center

CEO, JKIC, Germany

17:05-17:50 GNF – We Are Going, and The Technologies to Get Us There

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by:

American Institute of Aeronautics and Astronautics (AIAA)



Speakers:



Jennifer Edmunson Geologist, In-Space Manufacturing Engineer, Jacobs Corporation, United States

Naoki Sato Chair, Japan



Nikki Werkheiser Program Executive, Game Changing Development Program National Aeronautics and Space Administration United States



SpS



Global Networking

Forum







Daniel Nölke PSA & DLR Delegate. PERASPERA Program, European Commission H2020. Germany

MODERATOR Joerg Kreisel



International Space **Exploration Coordination** Group (ISECG),

MODERATOR

Associate Administrator, National Aeronautics and Space Administration



George Sowers

Professor, Colorado School of Mines, United States

CONGRESS



18:00 – 18:45 Highlight Lecture 2: The Challenge of Exploring Our Sun – the 60-Year HLL **Odyssey to Parker Solar Probe**

Location: The Walter E. Washington Convention Center – Grand Ballroom B

Parker Solar Probe is humankind's first mission to venture to the Sun and unlock the mysteries of the corona. Launched in 2018, and built by JHUAPL for NASA, this mission is the culmination of a 60-year quest to build a spacecraft and instruments capable of exploring the searing temperatures and radiation of the corona, and investigate the processes that drive the solar wind. While a mission to the Sun has been a science priority since 1958, it was not a possibility until recently due to the extreme radiation environment close to the Sun. Parker and its instruments will come within 3.8 million miles (6.16 million kilometers) to the Sun, more than seven times closer than any spacecraft has come before. Initial data from the instruments has revealed previously unobserved processes in the near-solar region; highlights of the first major scientific findings will be presented at IAC.

Speaker:



Division Director, Heliophysics Division, Science Mission Directorate, National Aeronautics and Space Administration (NASA). United States

Nicola J. Fox



Thomas Zurbuchen

Associate Administrator, National Aeronautics and Space Administration (NASA), Science Mission Directorate. United States

19:00 - 19:45 Highlight Lecture 3: Monitoring Coastal Waters from Space – Highlighting the Chesapeake Bay Region – Dramatic Advances Enable Better Understanding and Protection of these Vital Ecosystems, and their Immense Coastal Populations and Infrastructure

Location: The Walter E. Washington Convention Center - Grand Ballroom B

Earth's coasts play an ever-increasing role in the economy of nations, ecology of oceans and health of both. Nearly 40% of the world's human population lives within 100 km of a coast, and coastal waters are critically important for fisheries, aquaculture, recreation, transportation and tourism. Yet, the coastal waters are under severe stress. This meeting of fresh water, salt water and land thus becomes a vital junction of ecologic and economic policy, public safety and climate. All must be balanced for a healthy ecosystem, economy and society. Advances in our ability to monitor coastal areas from space, and effectively use that information for policy making, public safety, infrastructure protection, coastal and ecosystem management is critical to achieve the healthy balance. Highlighting the Chesapeake Bay area surrounding Washington D.C., this session will show how Earth Observations from space are advancing to meet information needs to address coastal challenges for societal benefit

Speaker:



Neil Jacobs Assistant Secretary of Commerce for Environmental Observation and Prediction, performing the duties of Under Secretary of Commerce for Oceans and

Atmosphere. National Oceanic and Atmospheric Administration (NOAA), United States

MODERATOR

Smith

France

Laurence Monnoyer-Environmental and Climate Adviser to the President of CNES, Centre National d'Études Spatiales (CNES),

WELCOME REMARKS Jean-Yves Le Gal President.

HLL

Centre National d'Études Spatiales (CNES), France

19:30 – 23:00 German Night (Upon Invitation Only)

Location: Smithsonian American Art Museum, Luce Foundation Center, 8th and F streets, NW, Washington, D.C. 20004

20:00 – 22:00 Young Professionals Networking Event (restricted to Young Professionals)

Location: The Walter E. Washington Convention Center - Room 207 AB









Thursday 24 October

08:30 - 09:30 Plenary 7: 10th Anniversary Next Generation Plenary: "Harnessing Citizen Science for the Future of Earth Observation"



Location: The Walter E. Washington Convention Center - Grand Ballroom B

In the field of Earth Observation, citizen science complements and assists with satellite, aerial or ground-based image interpretation and classification; it provides in-situ data for calibration and validation activities; and integration of satellite and citizen observations can fill data gaps. Moreover, science and technology continues to be of great interest to the worldwide public. Citizen science provides a pathway for outreach initiatives and engages the public's interest and ingenuity. The role of citizen science in Earth Observation has revealed trends in applications, covering a diverse set of fields including weather, climate change, sustainable development, air quality monitoring, vector-borne disease monitoring, food security, flood, drought and natural perils' monitoring, and land cover and land-use change, among other topics.

In line with the 70th IAC theme, "Space: The Power of the Past, the Promise of the Future", the Next Generation Plenary panelists will share their ideas and work in innovatively incorporating crowdsourcing and citizen science into traditional workflows for the future of Earth Observation. The panelists will also address how they envision addressing challenges associated with new technology trends, data quality and the formulation of policies that will facilitate their work.

Speakers:



Avid Roman Gonzalez Senior Member Institute of Electrical and Electronics Engineers, Peru



Caroline Juang Ph.D. Student. Columbia University, United States

Ufuoma Ovienmhada

Space Enabled Research

Graduate Student,

MIT Media Lab,

United States

Group.



Fabiana Milza COO and Co-Founder, IceKing GmbH, Austria

Jorge Nicolás-Alvarez Ph.D. Student, CommSensLab, Universitat Politècnica de Catalunya, Spain



MODERATOR Masami Onoda Director, Washington D.C. Office, Japan Aerospace Exploration Agency (JAXA),

United States



MODERATOR Kristin Wegner



GNF LEGAL AND POLICY STREAM Room: Grand Ballroom A

09:40 - 10:40	GNF – The Future Lunar Ecosystem
	for Non-Space Industries

Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by: ispace



Speakers:



Dan Hendrickson Vice President Business Development, Astrobotic, United States

Group, Division Japan



Craig Tibbets Venture Lab Chief, NGK Sparks. United States

09:40 – 10:40 GNF – Space Museums and Science Centres: Heritage and

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by:

Chinese Society of Astronautics (CSA) Space Museums and Science Centres Committee





INTRODUCTION Yiran Wang Vice President. Chinese Society of Astronautics (CSA), China





GNF DEVELOPMENT STREAM Room: Grand Ballroom C

and its Business Potential



Takeshi Morita Director Business Strategy

Business Creation Strategy Department, Innovation

Japan Airlines Co., Ltd.,



Takahiro Nakamura COO and Director, ispace, Technology Inc., Japan

Education in a Fast Changing World





CONGRESS

International Astronautical Congress 21–25 October 2019 | Washington, D.C

Speakers:

Jean Baptiste Desbois CEO, Cité de l'Espace, France



Mingzhu Zhang Director, International Relations Division. China Academy of Space Technology (CAST), China





Ellen Stofan

United States

Director.

John and Adrienne Mars

Smithsonian National Air

SpS

ΤS

and Space Museum,

MODERATOR Ines Prieto International Affairs, SMC Committee, Cité de l'Espace, France

09:45 – 11:15 SpS – The Immortal Spaceship: A Discussion on the Use Cases and **Value of Persistent Platforms**

Location: The Walter E. Washington Convention Center - Room 146A

09:45 – 12:45 Technical Sessions

No.	Title	Room
A1.5	Radiation Fields, Effects and Risks in Human Space Missions	143B
A2.4	Science Results from Ground Based Research	143C
A3.4A	Small Bodies Missions and Technologies (Part 1)	146B
A5.3-B3.6	Human and Robotic Partnerships in Exploration - Joint session of the IAF Human Spaceflight and IAF Exploration Symposia	151A
A6.6	Post Mission Disposal and Space Debris Removal (2)	150B
B1.4	Earth Observation Data Management Systems	147A
B2.5	Advanced Satellite Services	140A
B4.6A	Generic Technologies for Small/Micro Platforms	151B
B4.9-GTS.5	Small Satellite Missions Global Technical Session	147B
B5.2	Integrated Applications End-to-End Solutions	140B
C1.6	Attitude Dynamics (2)	150A
C2.6	Space Environmental Effects and Spacecraft Protection	152B
C3.5-C4.7	Joint Session on Advanced and Nuclear Power and Propulsion Systems	143A
D1.4A	Space Systems Engineering - Methods, Processes and Tools (1)	145B
D2.6	Future Space Transportation Systems Verification and In-Flight Experimentation	146C
D4.4	Strategies for Rapid Implementation of Interstellar Missions: Precursors and Beyond	144B
D5.3	Space Environment and effects on space missions	145A
E1.6	Calling Planet Earth - Space Outreach to the General Public	144C
E3.3	Space Economics from Apollo to Tomorrow	144A
E6.3	Innovation: The Academics' Perspectives	152A
E3.5-E7.6	34 th IAA / IISL Scientific-Legal Roundtable: Mega Constellations and Microsatellites: challenges, including registration and liability	153

10:45 – 11:35 GNF – Space Traffic Management is Needed Now! IAA, IISL, and IAF Join Their Forces to Propose Long Term Sustainability of Space Operations

Location: The Walter E. Washington Convention Center – Grand Ballroom A

Organized by:

International Institute of Space Law (IISL) International Academy of Astronautics (IAA) International Astronautical Federation (IAF)



Speakers:



Christopher Bonnal International Academy of Astronautics (IAA), Space Debris Committee

Group, France

Corinne Jorgenson IAA Member, Advancing Space Consulting

Japan

10:45 – 11:25 GNF – Towards a Formal African Space Programme

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by: South African National Space Agency (SANSA)



Speakers:



Retired Space Expert,

and ČEO, (NASRDA), Nigeria











Diane Howard Executive Secretary, International Institute of Space Law (IISL), United States



Seishiro Kibe Senior Advisor, Japan Aerospace Exploration Agency (JAXA),



Moriba Jah Associate Professor, The University of Texas at Austin. United States

Kai-Uwe Schrogl

President, International Institute of Space Law (IISL), France



Jonathan Angulu

Acting Director General National Space Research and Development Agency



Valanathan Munsami

CEO, South African National Space Agency (SANSA), South Africa

CONGRESS ROGRAMME

International Astronautical Congress 21–25 October 2019 | Washington, D.C



CONGRESS



Tidiane Ouattara

(AUC),

Ethiopia

Space Science Expert,

African Union Commission

Asanda Sangoni Space & Stakeholder . Liaison Specialist. South African National Space Agency (SANSA), South Africa



11:30 – 12:15 GNF – Martian and Lunar Analogues

Location: The Walter E. Washington Convention Center - Grand Ballroom C

Organized by: Mars Planet



MARS PLANET



INTRODUCTION Antonio Del Mastro President, Mars Planet. Italy

Speakers:



George Danos Chair of the Analogue Project, Moon Village Association (MVA), Cyprus

Bernhard Rebele

Mechatronics,

(DLR),

Germany

Research Engineer at the

Institute of Robotics and

German Aerospace Center

Commerce





Austria

Robert Zubrin Mars Society, United States



Maria Antonietta Perino Head of Advanced Exploration Unit. Thales Alenia Space, Italy

Mohamed Bayoumy Abdel Kader Zahran

11:45 – 12:35 GNF – The Mars/Moon Generation Lawyers: A Discussion of the Legal Framework Taking NASA Back to the Future

Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by: National Aeronautics and Space Administration (NASA), Office of General Counsel



Speakers:





Agreements, Center, United States

12:20 – 12:50 GNF – 4th International Space Forum at Ministerial Level – The **Mediterranean Chapter**

Location: The Walter E. Washington Convention Center - Grand Ballroom C

Organized by:

Italian Space Agency (ASI) International Astronautical Federation (IAF)



Speakers:



Stamatios M. Krimigis Counselor on Space, Minister of Digital Governance of Greece.

President, France





Location: The Walter E. Washington Convention Center - Room 146A





11:30 – 13:00 SpS – Planetary Protection for the Future: Science, Exploration, and

SpS

Barbara Imhof

Mahama Ouedraogo

African Union Commission

Director,

(AUC),

Ethiopia



Forum

Global

(AF

President,

Egvpt

National Authority for

Sciences (NARSS),

Remote Sensing & Space















Attorney, International Law, National Aeronautics and Space Administration (NASA).

United States

MODERATOR Jessica Deihl

Attorney, Space Act NASA Goddard Space Flight





Christine Pham

Attorney, Human Exploration and Operations. NASA Ames Research Center. United States

MODERATOR

Lisette Washington Attorney, Contracts, National Aeronautics and Space Administration (NASA). United States





Jean-Yves Le Gall International Astronautical Federation (IAF).



Giorgio Saccoccia

President, Italian Space Agency (ASI), Italy

CONGRESS



Santo Marcello Zimbone Rector. University Mediterranea of Reggio Calabria, Italy

MODERATOR

Gabriella Arrigo Head of International Relations, Italian Space Agency (ASI) Vice President, Science & Academic Relations and Global Networking Forum International Astronautical Federation (IAF), Italv

12:30 - 13:30 AIA VIP Luncheon: The Future of Government and Commercial Space **Partnerships**

Location: The Walter E. Washington Convention Center - South Prefunction

Sponsored by:

Aerospace Industries Association (AIA)



Speaker:



Mike French Vice President for Space Systems Aerospace Industries Association (AIA), United States

12:40 – 13:30 GNF – Spaceports: Gateway to a Global Space Economy

Organized by: Commercial Space Technologies, LLC





Location: The Walter E. Washington Convention Center - Grand Ballroom A

Speakers:







Australia







Dan Hicks

United States

CEO,



Former ESA Astronaut &



Global

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12:55 – 13:20 GNF – Global Navigation Satellite System (GNSS) Market: What's Next for Industries, Applications and the User Community

Location: The Walter E. Washington Convention Center - Grand Ballroom C

Organized by: European GNSS Agency (GSA)



Speaker:



12:45 – 13:15 Interactive Presentations Award Ceremony and Cocktail Reception

Location: The Walter E. Washington Convention Center - Exhibition Hall, IP Area

The Interactive Presentation Award Ceremony and cocktail reception, held on the fourth day of IAC, is the mustattend event of the Congress!

The Ceremony will present the 5 category winners among all the presenters, Members of the International Programme Committee and delegates. The prize-giving ceremony will kick-off the Interactive Presentation session and will include a cocktail reception to meet and celebrate the winners. The interactive presentations will begin following the ceremony at 13:15. The Interactive Presentation session aims at stimulating discussions concerning the contribution. The presenters will be available throughout the session in order to answer questions and have scientific exchanges with the participants of the Congress, and they have indicated other times during the Congress in which they can provide additional presentations. Do not miss out on this great opportunity to meet with the presenters and make new connections.

Please note that this event is open to all IAC participants.

13:15 – 14:45 Interactive Presentations Session

Location: Room: The Walter E. Washington Convention Center – Exhibition Hall, IP Area

No.	Symposium
A1.IP	IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM
A2.IP	IAF MICROGRAVITY SCIENCES AND PROCESSES SY
A3.IP	IAF SPACE EXPLORATION SYMPOSIUM
A4.IP	48th IAA SYMPOSIUM ON THE SEARCH FOR EXTRA
A5.IP	22nd IAA SYMPOSIUM ON HUMAN EXPLORATION
A6.IP	17th IAA SYMPOSIUM ON SPACE DEBRIS
A7.IP	IAF SYMPOSIUM ON FUTURE SPACE ASTRONOMY
B1.IP	IAF EARTH OBSERVATION SYMPOSIUM



82



INTRODUCTION Jolanda Van Eijndthoven Deputy Head of Unit for EU Satellite Navigation Programme (Galileo and EGNOS) Legal & Institutional, European Commission, Belgium

MPOSIUM

TERRESTRIAL INTELLIGENCE (SETI) – The Next Steps OF THE SOLAR SYSTEM

AND SOLAR-SYSTEM SCIENCE MISSIONS



CONGRESS PROGRAMME











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Meet, Share, Co

IAF HUMAN SPACEFLIGHT SYMPOSIUM

IAF SPACE OPERATIONS SYMPOSIUM

IAF ASTRODYNAMICS SYMPOSIUM

IAF SPACE PROPULSION SYMPOSIUM

IAF SPACE POWER SYMPOSIUM

IAF SPACE SYSTEMS SYMPOSIUM

IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM

32nd IAA SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS

13:25 – 14:25 GNF – Space Sustainability Rating: Addressing the Orbital

17th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE

17th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT

52nd IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES

26th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM

30th IAA SYMPOSIUM ON SPACE AND SOCIETY

IISL COLLOQUIUM ON THE LAW OF OUTER SPACE

Location: The Walter E. Washington Convention Center - Grand Ballroom C

IAF BUSINESS INNOVATION SYMPOSIUM

IAF MATERIALS AND STRUCTURES SYMPOSIUM

B2.IP

B3.IP

B4.IP

B6.IP

C1.IP

C2.IP

C3.IP

C4.IP

D1.IP

D2.IP

D3.IP

D4.IP

D5.IP

E1.IP

E3.IP

E5.IP

E6.IP

E7.IP

Space Enabled Reseach Group (MIT Media Lab) European Space Agency (ESA) World Economic Forum (WEF)

CEO,

Speakers:

Organized by:



Technology, United States Nikolai Khlystov Lead, Aerospace Industry,

Carissa Christensen

Bryce Space and

Challenge





MODERATOR Minoo

Rathnasabapathy Research Engineer, Space Enabled Reseach Group (MIT Media Lab), United States



(ESA),

France

Simonetta Di Pippo

esa



WORLD

ECONOMIC FORUM

> Vice President, Lockheed Martin,

Moriba Jah Associate Professor, The University of Texas





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Forum

Meet. Share.



lennifer A. Warren Technology Policy & Regulation, Civil & Regulatory Affairs,

14:20 – 15:20 GNF – Governance of Space Activities – Comparative Studies on National Space Policy and Law

Location: The Walter E. Washington Convention Center - Grand Ballroom A

Organized by: University of Tokyo







Lecturer, Policy, Japan



Yuri Takaya Visitina Researcher Institute for Future Initiatives University of Tokyo, Laboratory, Japan



Hideaki Shiroyama

Professor, Graduate School of Law and Policy / Graduate School of Public Policy, University of Tokyo, Japan

14:35 – 15:05 GNF – Making Lunar Missions Accessible, a New Approach to Planetary Exploration

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by: Spacebit



Speaker:



Pavlo Tanasyuk Founder and CEO, Spacebit. United Kingdom



MODERATOR









Graduate School of Public

University of Tokyo,

Quentin Verspieren Researcher. Intelligent Space Systems

University of Tokyo,





Mukund Kadursrinivas Rao

Chief Executive, NIAS Centre for Spatial Analytics and Advanced GIS (C-SÁG), India

Frans von der Dunk

Professor. Harvey and Susan Perlman Alumni, College of Law, University of Nebraska, United States

CONGRESS





Global Networking Forum

International Astronautical Congress 21–25 October 2019 | Washington, D.C

14:45 – 15:05 IAF IDEA "3G" Diversity Keynote

Location: The Walter E. Washington Convention Center - Room 147B

Keynotes As a valuable addition to the IDEA programme, the IAC 2019 will feature on Thursday 24 October a Keynote by Rhoda Shaller Hornstein on "A Girl in the Man-on-the-Moon Program: Camaraderie and Discrimination in the Apollo Era". Mary Snitch, Special Advisor to the IAF President (Diversity Initiatives), will welcome and introduce this special Keynote Session with Rhoda Shaller Hornstein, the recipient of the IAF Distinguished Award in 2016.

Rhoda Shaller Hornstein reported for duty 51 years ago to the NASA Goddard Space Flight Center. As an entry level Aerospace Technologist, her role in Apollo 11 was to operate the Goddard Real Time System to record radar data from the tracking sites and use this data to update the orbit and send out acquisition messages. Rhoda Shaller Hornstein's fondest memory of the Apollo program, especially Apollo 11, was that, with less than one year of Government service, she had the opportunity to work among the "giants" of NASA and experience firsthand the "Apollo Mentality" that guided her through 46 years at NASA. She also experienced the highs of camaraderie and the lows of discrimination. The camaraderie lasted one year until a manager asked why she was not pregnant. Thus, began the discrimination, more specifically gender harassment. This Keynote addresses how the "girl" accommodated both behaviors through the lens of the "Apollo Mentality" during her NASA career.

Programme:

14:45 - 14:50 Welcome and Introduction

Mary Snitch, Special Advisor to the IAF President (Diversity Initiatives), International Astronautical Federation (IAF), United States



SpS

14:50 - 15:10 Symposium Keynote

"A Girl in the Man-on-the-Moon Program: Camaraderie and Discrimination in the Apollo Era"

Rhoda Shaller Hornstein, Retired, National Aeronautics and Space Administration (NASA), United States

14:45 – 16:15 SpS – Using Open Space Data in Developing Countries

Location: The Walter E. Washington Convention Center - Room 146A

14:45 – 17:45 Technical Sessions

No.	Title	Room
A1.6	Astrobiology and Exploration	143B
A2.5	Facilities and Operations of Microgravity Experiments	143C
A3.5	Solar System Exploration including Ocean Worlds	146B
A6.7	Operations in Space Debris Environment, Situational Awareness	150B
B2.6	Space-Based Navigation Systems and Services	140A
B3.7	Advanced Systems, Technologies, and Innovations for Human Spaceflight	151A
B4.7	Constellations and Distributed Systems	151B
B6.3	Mission Operations, Validation, Simulation and Training	140B
C1.7	Guidance, Navigation & Control (1)	150A

C2.7	Space Vehicles – Mechanical/Robotic/Thermal/Fluidic Systems	152B
C3.3	Advanced Space Power Technologies	147A
C4.8-B4.5A	Joint Session between IAA and IAF for Small Satellite Propulsion Systems	143A
D1.4B	Space Systems Engineering - Methods, Processes and Tools (2)	145B
D2.7	Small Launchers: Concepts and Operations	146C
D4.5	Space Resources: Technologies, Systems, Missions and Policies	144B
E1.7	New Worlds - Non-Traditional Space Education and Outreach	144C
E3.4	Assuring a Safe, Secure and Sustainable Environment for Space Activities	144A
E4.3	"Can you believe they put a man on the moon?" The Apollo Program.	147B
E5.4	Space Assets and Disaster Management	145A

15:30 – 16:30 GNF – Artemis: Enabling Lunar Exploration

Location: The Walter E. Washington Convention Center – Grand Ballroom A

Organized by: Lockheed Martin

LOCKHEED MARTIN





Joe Landon

15:45 – 16:30 GNF – EU Space: Trends for the Future

Location: The Walter E. Washington Convention Center – Grand Ballroom C

Organized by:

European Union External Action Service

Speakers:



Head of EEAS Space Task European Union External Action Service,

Belgium



Jean-Luc Bald First Secretary for Space, Delegation of the European Union to the United States of America, United States







Vice President of Advanced Programs Development for Commercial Civil Space, Lockheed Martin United States



MODERATOR

Lisa Callahan Vice President and General Manager of Commercial Civil Space, Lockheed Martin, United States

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EXTERNAL ACTION

Pierre Delsaux

Deputy Director General for Internal Market. Industry. Entrepreneurship and SMEs, European Commission,



Krzysztof Kanawka CEO, Blue Dot Solutions, Poland

16:00 – 17:00 Press Conference – Ahead of Space19+, the Ministerial Council of the European Space Agency, ESA Director General Jan Woerner meets the Press

Location: The Walter E. Washington Convention Center - Room 206

Learn more about the ESA Director General's vision on Europe's ambition for future space activities and the Agency's role in the future international cooperation. The Director General will provide an update on his Space19+ Programme Proposal which will be discussed during the ESA Council meeting at Ministerial level scheduled for 27 and 28 November 2019 in Sevilla, Spain

Speaker:

Jan Woerner, Director General, European Space Agency (ESA)



18:00 – 19:15 IAF World Space Award Highlight Lecture

Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

The Apollo 11 crew will be awarded with the World Space Award for Making an Unparalleled Impact on Space Exploration and on Human Civilization and for Earning their Place in the Pantheon of Human Achievement through their Heroic Feats during the Apollo 11 Mission in 1969 and their Subsequent Careers.

18:30 –20:00 Yuri's Night @ IAC 2019, a space dance party! (Must purchase ticket)

Location: The National Union Building in downtown DC (just a few blocks from the Convention Center!)

19:00 – 22:30 IAC 2020 Launch Reception

Location: The Walter E. Washington Convention Center - South Prefunction

Friday 5 October

08:30 – 09:00 Late Breaking News 1: OSIRIS-REx Dancing with Asteroid Bennu

Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

On June 12, 2019, NASA's OSIRIS-REx spacecraft performed another significant navigation maneuver-breaking its own world record for the closest orbit of a planetary body by a spacecraft. The maneuver placed the spacecraft in an orbit 680 meters (2,231 feet) above the surface of asteroid Bennu. The previous record—also set by the OSIRIS-REx spacecraft—was approximately 1.3 kilometers (0.8 miles) above the surface. After months grappling with the rugged reality of asteroid Bennu's surface, the team leading NASA's first asteroid sample return mission has selected four potential sites for the OSIRIS-REx spacecraft to "tag" its cosmic dance partner in a close reconnaissance. The top site and backup will be selected in December 2019 for rehearsals in preparation for a touch and go (TAG) maneuver to collect at least 60g of rocks to return to Earth in 2023 for decades of scientific study.

Speaker:

HLL



Kenneth Getzandanner Flight Dynamics Manager, OŠÍRIS-ŔEx NASA Goddard Space Flight Center. United States

09:00 – 09:30 Late Breaking News 2: Introduction to the United Arab Emirates **Astronauts Program**

Location: The Walter E. Washington Convention Center – Grand Ballroom ABC

The Session will highlight the objectives and long-term plans of the UAE Astronauts Program. It will talk about the different phases of the program starting from program establishment and official announcement, followed by the process to select and train the first astronaut corps, and finally the plans for launching the first astronaut to the International Space Station (ISS).

The LBN will focus on the 1st mission of the UAE astronaut "Hazzaa Al Mansoori" to the International Space Station on the Soyuz MS-15 spacecraft from 25th Sep to 3rd Oct, 2019. The mission plan including the 16 scientific experiments conducted during and after the mission, education and outreach activities as well as live public events will be presented during the LBN session. In addition, the results and outcomes of the experiments and lessons learned from first mission will be shared with the international community in this session.

The Session will also talk about the role of ISS partners in developing the mission activities and supporting the selection and training of the first astronaut candidates. Additionally, it will show the successful model of cooperation, collaboration and engagement of the ISS partners in all aspects of the mission including launch, space and ground segments. Mission operations and coordination mechanism performed between UAE Operations Support center and ISS Mission Control Centers will be also presented. Finally, MBRSC will be sharing with the international space community the plans for having a long term and sustainable Astronaut program. And it will talk about initial timeline and plans for the following missions.











International Astronautical Congress 21–25 October 2019 | Washington, D.C

Speakers:

Hazzaa Al Mansoori Astronaut, UAE Space Agency (UAESA). United Arab Emirates





Assistant Director General for Science and technology/ Astronaut Program UAE Space Agency United Arab Emirates

Sultan Al Neyadi UAE Backup Astronaut UAE Space Agency (UAESA). United Arab Emirates

ΤS



Location: The Walter E. Washington Convention Center - Room 146A

10:20 – 12:00 IAF IDEA "3G" Diversity Public Day

Location: The Walter E. Washington Convention Center – The Launch Site, Booth 3008, Hall D & E

Organized by:

Women of Aeronautics and Astronautics (WoAA)



On Friday 25 October the IAC will feature a Panel and Roundtable with the Women of Aeronautics and Astronautics (WoAA) on the topic of: "The First Woman on the Moon: The Women Who Are Working to Get Us There". The Women of Aeronautics and Astronautics (WoAA) is a new committee within the American Institute of Aeronautics and Astronautics (AIAA), with a mission to provide support, empowerment, and networking opportunities for women and other minorities in the aerospace field, primarily focusing on university students. WoAA aims to provide outreach to primary and secondary school students, provide technical development opportunities for university students and working professionals, and support members throughout their careers.

Elena Feichtinger, IAF Manager for the Diversity Programme, will welcome the female space role models who are breaking barriers in the aerospace industry around the world. They will introduce themselves and tell their stories. The second half of the session will feature interactive roundtables, allowing for attendees to dialogue with speakers and brainstorm in small groups about how we can build a diverse aerospace workforce.

Programme:	
10:20 – 10:25	Welcome and Introduction Elena Feichtinger, Manager for the Diversity F Federation (IAF), France
10:25 – 10:50	Keynote Presentation
10:50 - 11:25	Women of Aeronautics and Astronautics (Wo
10:50 - 11:25	Presentation about Women of Aeronautics a
11:30 - 12:00	Breakout Sessions



Adnan Al Rais Senior Director Remote Sensing Dept/UAE Operations Support Center Manager, **UAE Space Agency** (UAESA), United Arab Emirates

09:45 – 12:45 Technical Sessions

No.	Title	Room
A1.7	Life Support, habitats and EVA Systems	143B
A2.6	Life and Microgravity Sciences on board ISS and beyond (Part I)	143C
A3.2C	Moon Exploration – Part 3	146B
A5.4-D2.8	Space Transportation Solutions for Deep Space Missions	146C
A6.10-B4.10	Joint Small Satellite/Space Debris Session to Promote the Long-Term Sustainability of Space	151A
A6.8	Policy, Legal, Institutional and Economic Aspects of Space Debris Detection, Mitigation and Removal (Joint Session with IAF Space Security Committee)	150B
B1.6	50 years of Earth observation: The contribution to sustainable development goals and plans for the future	144C
B2.7	Near-Earth and Interplanetary Communications	140A
B3.8-GTS.2	Human Spaceflight Global Technical Session	147B
B4.8	Small Spacecraft for Deep-Space Exploration	151B
B6.1	Ground Operations - Systems and Solutions	140B
C1.8	Guidance, Navigation & Control (2)	150A
C2.8	Specialised Technologies, Including Nanotechnology	152B
C3.4	Space Power System for Ambitious Missions	147A
C4.9	Hypersonic Air-breathing and Combined Cycle Propulsion	143A
D1.5	Lessons Learned in Space Systems: Achievements, Challenges, Best Practices, Standards.	145B
D3.2B	Systems and Infrastructures to Implement Sustainable Space Development and Settlement - Technologies	144B
D5.4	Cyber-security threats to space missions and countermeasures to address them	145A
E1.8	Hands-on Space Education and Outreach	ISZ
E6.4	Strategic Risk Management for Successful Space & Defence Programmes	152A
E7.5	Space Mining: National Authority? International Authority? Both?	152A

Programme, International Astronautical

oAA) Panel

and Astronautics (WoAA)







SpS





GNF PUBLIC DAY

Room: Grand Ballroom ABC

09:45 – 10:45 GNF – From the Moon to Mars NASA's Artemis Programme

NASA

Location: The Walter E. Washington Convention Center – Grand Ballroom ABC

Organized by:

(NASA)

Speaker:

10:50 – 12:20 GNF – IAF – ASE Astronauts Event

Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

Organized by:

International Astronautical Federation (IAF) Association of Space Explorers (ASE)

National Aeronautics and Space Administration

Jim Bridenstine Administrator,

(NASA), United States

National Aeronautics and Space Administration

Speakers:



Hazzaa Al Mansoori Astronaut. UAE Space Agency (UAESA). United Arab Emirates,



European Astronaut, Professor, Institute of Space Systems, University of Stuttgart, Germany



MODERATOR Leland Melvin Space Administration

Former NASA Astronaut, National Aeronautics and (NASA). **United States**





Sergey Krikalev Cosmonaut and Executive Director for Piloted Spaceflights, ROSCOSMOS, **Russian Federation**









Global Networking Forum

Meet, Share, Connec

Global Networking

Forum Meet Share C



11:30 – 12:30 SpS – Launch Tower Not Necessary: Could Responsive Launch **Revolutionize Spaceport Infrastructure Needs?**

Location: The Walter E. Washington Convention Center - Room 146A

12:45 – 13:45 SpS – Transforming Future Mission Design Through In-Space Manufacturing

Location: The Walter E. Washington Convention Center - Room 146A

13:30 – 16:30 Technical Sessions

No.	Title
A1.8	Biology in Space
A2.7	Life and Microgravity Sciences on board ISS and beyond (Part II)
A3.4B	Small Bodies Missions and Technologies (Part 2)
A6.9	Orbit Determination and Propagation
B1.5	Earth Observation Applications, Societal Challenges and Economic Benefits
B4.6B	Generic Technologies for Nano/Pico Platforms
B5.3	Satellite Commercial Applications
C1.9	Guidance, Navigation & Control (3)
C2.9	Smart Materials and Adaptive Structures
C4.10	Propulsion Technology (3)
D1.6	Cooperative and Robotic Space Systems
D2.9-D6.2	The Apollo program and the rockets that took humanity to the moon
D3.4	Space Technology and System Management Practices and Tools
D6.3	Enabling safe commercial spaceflight: vehicles and spaceports
E1.9	Space Culture – Public Engagement in Space through Culture
E3.6	Economics of Procurement in Space Contracting
E5.1B	Space Architecture: Habitats, Habitability, and Bases
E6.5-GTS.1	Entrepreneurship Around the World
E7.7	Remediation of Space Debris: A Fundamental Legal Challenge?









TS

Room 143B

143C 146B

150B

147A

151B

140B

150A 152B

143A

145B 146C

144B 140A

144C

144A

145A

147B

152A



CONGRESS



13:30 – 14:30 GNF – The Science-Fiction Continuum



SpS

ΤS

Location: The Walter E. Washington Convention Center - Grand Ballroom ABC

OAIAA

Organized by:

American Institute of Aeronautics and Astronautics (AIAA)

Speakers:



Ariel Ekblaw Founder and Lead, Space Exploration Initiative, MIT Medial Lab, United States

Space History Department, Smithsonian National Air and Space Museum. United States

MODERATOR Margaret Weitekamp Curator and Department

Chair





Art Dula Trustee. Heinlein Prize Trust, United States

14:00 – 15:00 SpS – Interstellar Probe: Humanity's First Deliberate Step into the Galaxy by 2030

Location: The Walter E. Washington Convention Center - Room 146A

15:00 – 16:30 Technical Sessions

No. Tit	tle	Room	
E5.5 Sha	aring space achievements and heritage: space museums and societies	145A	

16:45 - 17:45 Closing Ceremony

Location: The Walter E. Washington Convention Center – Grand Ballroom ABC

The Closing Ceremony provides a formal end to the activities of the IAC. There will be a video summary of the week's highlights, presentation of awards, and at the end of the ceremony, the Congress flag will be handed over to the next host country - United Arab Emirates.

Master of Ceremony:

Minoo Rathnasabapathy Vice President for Education and Workforce Development, International Astronautical Federation (IAF), France

19:00 - 23:00 Gala Dinner

Location: Stephen F. Udvar-Hazy Center, National Air and Space Museum, 14390 Air and Space Museum Pkwy, Chantilly, VA 20151

The IAC Gala Dinner will be held on Friday, October 25 at the Stephen F. Udvar-Hazy Center, National Air and Space Museum. Shuttle transportation will be available from the Washington Convention Center (L Street Entrance). Shuttles will leave at 18:00 and start returning to the Washington Convention Center at 22:30.













5.3 Meetings Schedule

Time	Event	Room
Friday 18 Octo	ber 2019	
08:00 - 19:00	Space Generation Congress	Off-site
09:00 - 17:00	27 th IAF Workshop Supported by the UN	Room 152B
Saturday 19 O	ctober 2019	
08:00 - 12:30	IAA Lunar Farside Meeting	Room 143C
10:00 - 13:00	IAA Space Debris Committee Meeting	Room 143B
10:00 - 12:00	IAF Finance Committee	Room 102A
12:00 - 13:00	IAA Commission Plenary Meeting	Room 143A
12:30 - 15:30	IAF Space Exploration Committee	Room 149B
13:00 - 16:00	IAA Commission 1	Room 143A
13:00 - 16:00	IAA Commission 2	Room 143B
13:00 - 16:00	IAA Commission 3	Room 143C
13:00 - 16:00	IAA Commission 4	Room 144A
13:00 - 16:00	IAA Commission 5	Room 144B
13:00 - 16:00	IAA Commission 6	Room 145C
13:00 - 14:30	IPC Steering Group Meeting – Session I	Room 156
14:00 - 16:00	IAF Next Generation Coordination Committee (NGCC)	Room 204A
15:00 - 16:30	IAF Technical Activities Committee	Room 102A
16:15 - 17:30	IAA Scientific Activities Committee meeting (SAC)	Room 149B
17:00 - 18:30	IPC General Meeting	Room 207AE
Sunday 20 Oct	ober 2019	
09:00 - 12:15	IAA Academy Day – Part 1	Room 146B
09:00 - 12:00	IAF Space Education and Outreach Committee (SEOC)	Room 102B
12:00 - 13:00	IAF Global Workforce Development Subcommittee	Room 102B
13:00 - 17:00	IAF Earth Observation committee and GEOSS subcommittee	Room 141
13:30 - 14:30	IAA Regular Meeting	Room 146B
14:00 - 16:00	IAF Commercial Spaceflight Safety Committee	Room 153
14:00 - 17:00	IAF Workforce Development-Young Professionals Programme Committee (WD-YPP)	Room 204A
14:00 - 18:00	IAF Astrodynamics Committee (Session I)	Room 209A
14:00 - 18:00	IAF Materials and Structures Committee	Room 209B
14:00 - 17:00	IAF Bureau Meeting – Session 1	Room 102B
14:45 - 17:15	IAA Academy Day – Part 2	Room 146B
15:00 - 17:00	IAA Board of Trustees	Room 140A
15:00 - 17:00	IAF Space Transportation Committee	Room 156
15:00 - 17:00	IAF Space Propulsion Technical Committee	Room 148
16:00 - 18:00	IAF Human Spaceflight Committee	Room 149A
17:00 - 18:00	IAF Committee for the Cultural Utilisation of Space (ITACCUS) - Session 1	Room 141
18:00 - 19:00	ESL/YSL Meeting	Room 153
18:00 - 20:00	IAA Dinner	Off-site
19:00 - 20:00	YP Networking Event: IAF Opportunities	207AB

Time	Event	Room
Monday 21 Oc	tober 2019	
08:00 - 09:00	HoA Preparatory Meeting	Room 149B
11:00 - 13:00	IAF Space Communications and Navigation Committee (SCAN)	Room 102A
11:00 - 12:30	IAF Space Systems Committee	Room 153
12:30 - 14:30	Joint IAF and IAA Space Life Sciences Meeting	Room 156
12:30 - 13:00	IISL Board of Directors	Room 148
13:00 - 13:30	IAA Study Group 2.18	Room 153
14:00 - 17:00	IAF Space Power Committee	Room 102B
14:30 - 16:00	SG 6.17 Multicultural Foundations and Influences of Human Space Exploration	Room 153
15:00 - 17:00	IAF General Assembly Meeting	Room 207AE
15:30 - 17:30	IAF Space Economy Committee	Room 102A
16:00 - 17:30	IAA Study Group 3.27	Room 153
18:00 - 19:00	IAF Microgravity Sciences and Processes Committee	Room 102A
Tuesday 22 Oc	tober 2019	
08:00 - 09:45	IAF Space Operations Committee (SOC)	Room 149A
08:00 - 18:00	IAF Nomination Committee	Room 101
08:00 - 18:00	IAF Congress and Symposia Advisory Committee (CSAC) Meeting	Room 209B
09:00 - 11:00	IAF Space Education and Outreach Committee (SEOC)	Room 148
09:30 - 11:30	IAF Space Astronomy Technical Committee (SATC)	Room 141
10:00 - 12:00	IAF Entrepreneurship and Investment Committee (EIC)	Room 149A
10:00 - 12:00	GRULAC Meeting	Room 153
10:00 - 12:00	IAF Committee on Space Security	Room 209A
11:30 - 13:30	IAA Study Group 3.26	Room 149B
11:30 - 16:00	IISL Moot Court Semi-Finals 1	Room 102A
11:30 - 16:00	IISL Moot Court Semi-Finals 2	Room 102B
12:00 - 13:30	IAA Study Group 4.21	Room 153
13:00 - 14:00	IAA Small Satellite Missions Program	Room 156
14:00 - 15:30	IAF Committee on Integrated Applications	Room 149B
14:30 - 16:00	IAF Committee for Liaison with International Organisations and Developing Nations (CLIODN)	Room 148
15:30 - 17:00	IAF Knowledge Management for Space Organisations (KMTC)	Room 149B
18:00 - 21:00	AIAA Space Automation and Robotics Technical Committee (SARTC)	Room 149B
19:30 - 20:30	YP Networking Event: Industry Panel on the Moon	Room 207AB
Wednesday 23	October 2019	
08:00 - 18:00	IAF Nomination Committee	Room 101
08:00 - 18:00	IAF Congress and Symposia Advisory Committee (CSAC) Meeting	Room 209B
09:00 - 12:00	IAA SETI Permanent Committee Meeting	Room156
10:00 - 11:30	IAF Honours and Awards Committee (HAC)	Room 141
10:00 - 11:30	IAF Working Group on Emerging Countries	Room 149B
11:00 - 12:30	IAF Committee on Near Earth Objects	Room 102B
13:00 - 17:00	UAE Workshop	Room 202A
13:30 - 15:30	IAA Study Group 3.28	Room 153
14:00 - 16:00	IAF Student Activities Subcommittee	Room 141







AWARD

KHIBITION



Event

Time

14:00 - 15:30	IAF Space Societies Committee (SSC)	Room 102B
15:30 - 17:00	IAF Space Museums and Science Centres Committee	Room 102B
Thursday 24 Oct	ober 2019	
07:00 - 09:30	IAF Grulac and AIAA Nuclear and Future Flight Propulsion Technical Committe	Room 156
07:30 - 08:15	IAF/IISL/IAA Presidents Breakfast	Off-site
09:00 - 11:00	World Space Week Association Board of Directors	Room 149A
09:45 - 12:30	IAF Bureau Meeting – Session 2	Room 102B
10:00 - 11:00	Space Universities Administrative Committee (SUAC)	Room 149B
12:15 - 14:15	IAA History Committee Meeting	Room 149B
13:30 - 15:00	IAF Industry Relations Committee	Room 102A
14:00 - 19:00	IISL Moot Court Finals	Off-site
15:00 - 17:00	IPC Steering Group Meeting – Session II	Room 156
15:00 - 17:00	IAF Enterprise Risk Management (ERM) Committee	Room 148
16:00 - 17:30	IAA Study Group on CubeSat Interface 4.26	Room 209A
16:30 - 19:00	IAF Astrodynamics Committee (Session II)	Room 141
17:00 - 18:30	IAF Committee for the Cultural Utilisation of Space (ITACCUS) - Session 1	Room 148
19:30 - 22:00	IISL Dinner	Off-site
Friday 25 Octobe	er 2019	

Room

Friday 25 October 2019		
09:30 - 13:30	IAF General Assembly Meeting – Session 2	Room 207AB
14:00 - 15:00	IAF Bureau Meeting – Session 3	Room 102B

6 Students and Young Professionals Events

6.1 Students Events

6.1.1 International Space Education Board (ISEB) Student Programme

Dear Student Delegates:

I'm excited to welcome you to the 70th International Astronautical Congress (IAC), to be held in our nation's capital, Washington, D.C. As this year's Chair of the International Space Education Board (ISEB), I'm pleased to highlight the student program--carefully crafted to inspire our future space leaders, engineers, scientists, and innovators from around the world!

NASA's recent celebration of the 50th Anniversary of the first human landing on the moon inspires us to look forward to returning to the moon, and this time with our international partners. Together, we will inspire the Artemis Generation.

The 2019 ISEB Cohort will include approximately 70 students. You have the opportunity to hear from space leaders and other special guest speakers; participate in research-related activities; and extend your professional network. For the first time, local students will experience two days of STEM engagement and the Educator Professional Development Workshop will be a global event. In addition, there will be a live college broadcast that will target undergraduate and graduate students in the United States and abroad. This event will allow the IAC to reach beyond the Congress venue.

On behalf of the ISEB, I extend our appreciation to the International Astronautical Federation and the Local Organizing Committee for their outstanding support. We look forward to our participants experiencing a rewarding and memorable Congress. Sincerely,

Michael A. Kincaid

Chair, International Space Education Board Associate Administrator for STEM Engagement National Aeronautics and Space Administration (NASA)

International Space Education Board (ISEB) Student Programme

Saturday 19	October: IAF Educators Professional D Washington Convention Cen
08:30 - 17:00	Educator Professional Development Workshop
Sunday 20 O	ctober: Crystal City Hilton/Commonwe
08:00 - 12:00	Pre-Orientation
13:00 - 13:50	STEM Engagement Training - ISEB Students
14:00 - 15:00	ISEB Heads of Education (HoE) Welcome and Ir
15:00 - 18:00	Cultural Awareness Workshop
16:30 - 17:30	ISEB Founding Members Executive Session
18:00 - 19:30	ISEB Reception



Development Workshop – Walter E. hter, Room 202B

.

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ntroductory Session

Idents & Young Rofessionals Events



Monday 21	October: Walter E. Washington Convention Center	Thursday 2	4 October: Walter E. Washingt
09:00 - 10:30	IAC Opening Ceremony	08:30 - 09:30	Plenary 7
11:00 - 13:00	Lunchtime Sessions	09:45 - 12:45	Technical Sessions
	International Student Zone (ISZ) (FSA/CSA/VSSEC/KABI/LIAE)	09:45 - 10:00	Arrival of Middle School Students
	(Open to All Students)	10:00 - 11:30	STEM Engagement - Middle School
13:30 - 15:00	IAC Plenary 1	10:00 - 11:30	Exhibits Tour - Middle School Stud
15:00 - 18:00	Technical Sessions	11:30 - 11:45	Lunch (Room 207 AB)
16:30 - 17:30	ISEB HOA Interactive Session (ISZ)	11:45 - 12:30	Astronaut Panel
18:15 - 19:30	Plenary 2	12:45 - 14:45	STEM Engagement - Middle School
19:30 - 22:00	IAC Reception	12:45 - 14:45	Exhibits Tour - Middle School Stud
		14:45 - 17:45	Technical Sessions
Tuesday 22	October: Walter E. Washington Convention Center	19:00 - 22:00	ISEB No Host Dinner
08:30 - 09:30	Plenary 3		
09:45 - 12:45	Technical Sessions	Friday 25 C	ctober: Walter E. Washington
11:00 - 12:00	Lunchtime Sessions		PUBLIC DAY
	(JAXA/CNES/NASA) (Open to All Students)	08:30 - 09:30	Late Breaking News (LBN)
12:00 - 13:00	Young Professionals Career Panel (ISZ)	09:45 - 12:45	E1.8 Hands-On Session - ISZ
	(Open to All Students)	12:45 - 13:15	Keynote Presentation - ISZ
13:30-14:30	IAC Plenary 4	13:30 - 14:30	Special Activities - ISZ
L4:45 - 17:45	Technical Sessions	13:30 - 16:30	Technical Sessions
15:00 - 18:00	ISEB HoE Meeting – Crystal City Hilton	15:00	Tear-down of the ISZ
18:00 - 20:00	Student Networking – Crystal City Hilton	16:45 - 17:30	Closing Ceremony
		19:00 - 22:00	ISEB Social Activity
Wednesday	23 October: Walter E. Washington Convention Center		
08:30 - 09:30	Plenary 5	Saturday 2	5 October: Mount Vernon
	Technical Sessions	09:00 - 14:00	ISEB Students and Staff Cultural Ac
19:45 - 12:45			

- STEM Engagement Middle School Students (ISZ) 10:00 - 11:00
- Exhibits Tour Middle School Students 10:00 - 11:30
- 11:30 11:30 Lunch (Room 207 AB)
- Astronaut Panel 11:45 - 12:30
- STEM Engagement Middle School Students (ISZ) 12:45 - 14:45
- Exhibits Tour Middle School Students 12:45 - 14:45
- 13:30 14:30 Plenary 6
- 14:45 1:45 **Technical Sessions**
- College Live Broadcast "NASA Presents Space and STEM How Do You Fit In? (NASA HQ) 18:30 - 19:30





ter E. Washington Convention Center

ent - Middle School Students (ISZ)

E. Washington Convention Center

UDENTS & YOUNG PROFESSIONALS EVENTS



6.2 Young Professionals Events

All Young Professionals, please join us at these events included in your registration.

6.2.1 2019 IPMC Young Professional Workshop

Date:	Sunday 20 October 2019
Time:	08:45 - 18:00
Venue:	Walter E. Washington Convention Center,
	Room 150B and 207AB



The International Programme/Project Management Committee Young Professional Workshop sought to gather ideas and recommendations from early career employees in the international space community and provide the IPMC and IAF member organizations with greater knowledge, insights, and perspectives that can help better develop and empower the next generation of space program employees.

For this purpose, 5 topics have been identified to be researched for the 2019 workshop;

- Earned Value Management in Project Management of Large Space Projects.
- Fostering Project Management in the world of Diversity.
- Challenges faced by teams working on space projects between emerging and legacy space economies. -
- Knowledge Management practices.
- Project Management practices for encouraging rapid prototyping and short fused product life cycle for space projects.

The observations and recommendations from the topic working groups will be presented and discussed on Sunday October 20th, in the afternoon.

The IPMC welcomes interested to join the presentations in the afternoon starting at 13:30 in room 150B

The workshop is sponsored by:







6.2.2 2019 Young Professionals Programme

Sunday 20 O	ctober
08:00 - 13:30	Cross-Cultural Workshop - Room 149
09:00 - 18:00	IAF IPMC Workshop - Room 150B
19:00 - 21:00	YSL Panel on IAF Opportunities - Room 207 AB
	 Moderator: Kevin Stube, Vice-Chair, IAF Workforce De Committee Panelists: Minoo Rathnasabapathy, Research Engine Liz Seward, Senior Strategist, Space System
	Avid Roman-Gonzalez, Full Professor, Univ
20:00 - 21:00	YSL Reception (Restricted to Young Professiona Location: Walter E. Washington Convention Cer
Tuesday 22 C	October
09:45 – 12:45	GTS – Space Communications and Navigations
19:30 – 21:30	Networking Event: "Industry Panel: The Moon Location: Walter E. Washington Convention Cer Moderator:
	• Dan Dumbacher, Executive Director, Amer Panelists:
	Takeshi Hakamada, Founder and CEO, ispa
	 Yoav Landsman, Deputy Mission Director, Maria Antonietta Perino, Director Interna Space
	Ander Solorzano, Lead Systems Engineer,
20:30 - 21:30	Industry Day Young Professionals Reception (F
	Location: Walter E. Washington Convention Cer
Wednesday 2	23 October
09:45 – 12:45	GTS – Student team Competition - Room 147 B
11:45 – 12:30	 GNF – NASA YP Town Hall - Grand Ballroom C Speaker: Jim Bridenstine (Administrator, NASA) Moderator: Jackelynne Silva-Martinez (Mission Planni
20:00 – 22:00	Joint Networking Reception with SGAC and ISU Location: Walter E. Washington Convention Cer On the evening of Wednesday 23 October Programme (IAF WD-YPP) Committee is teami and the International Space University (ISU) for This year we celebrate the 50 th anniversary o space will we be celebrating 50 years from toda contestants will compete to pitch the next great mingle and cheer on the best pitch!





evelopment / Young Professionals Programme (IAF WD-YPP)

- eer, Space Enabled Research Group, MIT Media Lab
- ms, Airbus Defence and Space
- versidad Nacional Tecnologica de Lima Sur
- als)
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Room 147B

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ational Network Opportunities Development, Thales Alenia

Astrobotic Restricted to Young Professionals) nter, Room 207AB

ing Operations JSC, NASA)

nter, Room 207AB

the IAF Workforce Development - Young Professionals ing up with the Space Generation Advisory Council (SGAC) r a joint reception.

of the first moon landing. What next great achievement in ay? The event will feature a "Shark Tank" competition where at human achievement in space to a panel of judges. Come

IENTS & YOUNG OFESSIONALS EVENTS



Thursday 24 October 2019

08.30 - 09.30	NGP "Harnessing Citizen Science for Future of Earth Observation – Grand Ballroom B
	Panel:
	Avid Roman-Gonzalez, Caroline Juang, Fabiana Milza, Jorge Nicolas-Alvarez, Ufuoma Ovienmhada
	Moderators:
	Masami Onada (Director, Washington Office of JAXA)
	Kristin Wegner (Project manager, GLOBE Implementation Office, UCAR)
09.45 –12:45	GTS – Small Satellite Missions – Room 147B (Broadcast Live Online)

Friday 25 October 2019

- 09:45 12:45 GTS Human Spaceflight Room 147B (Broadcast Live Online)
- 13:30 16:00 GTS Entrepreneurship Around the World Room 147B (Broadcast Live Online)



6.3. IAF Grant and Recognition Programmes for Students and YPs

6.3.1 IAF Young Space Leaders (YSL) Recognition Programme

These awards are issued to students and young professionals who are in the course of their academic or professional activities, and have helped promote astronautics by enhancing outreach opportunities, expanding knowledge of space among the general public or fostering deeper engagement within the international space community. The five winners will be awarded their prizes during the Closing Ceremony of the 70th IAC on 25 October. They will also be invited to the gala dinner as guests of honor of the IAF President, Dr. Jean-Yves Le Gall.

Mia Brown



Mia Brown is a space policy and research professional with a background in international government affairs. She is currently a Research Associate at the Space & Aeronautics Boards of the U.S. National Academy of Sciences (NAS) in Washington, DC. In this role, she supports consensus-building activities, focusing her time on encouraging discourse among today's most challenging topics across different communities within the international and private space sectors. This includes expanding the conversations beyond traditional boundaries and building platforms for diverse stakeholder engagement, leading to cross-disciplinary approaches for addressing the intersections of space exploration and policy.

Matteo Emanuelli



Matteo Emanuelli works as Senior Systems Engineer at GomSpace, a leading provider of turn-key solutions using nano- and microsatellites. Matteo is the technical manager for several programs in GomSpace, spanning from advanced in-orbit demonstration spacecraft to a LEO constellation aiming to provide tracking and surveillance for aircraft and ships. Matteo has received his master degree in space engineering at Politenico di Milano, in Italy.

Avid Roman Gonzalez

Avid ROMAN-GONZALEZ is an IEEE Senior Member. He is an electronic engineer from the Universidad Nacional San Antonio Abad del Cusco, a systems engineer from the Universidad Andina del Cusco. He received his master's degree in industrial and human automatic, from the Université Paul Verlaine de Metz – France, and he received his Ph.D. degree in image and signal processing from TELECOM ParisTech. He was a postdoctoral fellow at Universidad Peruana Cayetano Heredia.

João Lousada



João Lousada graduated from Instituto Superior Técnico, in Portugal, with a Masters in Aerospace Engineering that included studies at Universitat Politecnica de Catalunya, in Spain, and University of Victoria, in Canada. He has worked in space feasibility concepts at the German Aerospace Agency (DLR) and in satellite assembly, integration and testing at OHB System, for European Space Agency (ESA) projects.

Olga Stelmakh-Drescher



Dr. Olga Stelmakh-Drescher is an international space lawyer, NewSpace advocate and space environmentalist – shaper of the Space Sustainability Goals and social responsibility for space activities concepts. She holds the position of Director of Business Development and International Affairs at the International Institute of Space Commerce and is a member of the World Economic Forum Global Future Council on Space Technologies. In addition to this, she is the Assistant Executive Secretary and Head of the Board Election Committee at the International Institute of Space Law.



WELCOME MESSAGES

ORGANIZERS & PARTNER ORGANIZATIONS

WASHINGTON D

CONGRESS PRACTICAL INFORMATIO

CONGRESS PROGRAMME

STUDENTS & YOUN PROFESSIONALS EVENTS

> ASSOCIATED EVENTS

> > SOCIAL EVENT

AWARDS

EXHIBITION



6.3.2 IAF Emerging Space Leaders (ESL) Grant Programme

Twenty-five students and young professionals were chosen by the Emerging Space Leaders Steering Committee composed of six highly experienced space stakeholders. They will attend the 70th International Astronautical Congress and have the opportunity to extend their network, gain knowledge and meet all the relevant people in space industry.



Alexander Bowen-Rotsaert

Australia

Alexander Bowen-Rotsaert is a Systems Engineer at Boeing Defence Australia where he works on Project Currawong, delivering satellite communications capabilities and equipment to the Australian Defence Force. His efforts have been recognised with the 2018 Australian Industry & Defence Network Queensland Young Achiever Award. Active within industry groups, Alexander is a member of the Institute of Engineers Australia, Royal Aeronautical Society, American Institute of Aeronautics and Astronautics, Space Generation Advisory Council, and Space Industry Association of Australia.

Alexander received his BE(Hons) in Mechanical and Aerospace Engineering from the University of Queensland in 2013. During his studies he took semester abroad at the Technische Universiteit Delft, Netherlands, as well as business school studies at the Korea Advanced Institute of Science and Technology. His honours thesis on health and usage monitoring systems was a finalist in the VSSEC-NASA Australian Space Prize and won the Data Processing/Electronics category. After graduating he completed the International Space University's Southern Hemisphere Space Studies Program in Adelaide.

Outside of work, Alexander is passionate about educating the next generation of engineers and scientists. In his capacity as Vice President of Space Design Competitions Australia (SDCA), he organises annual space settlement design competitions for primary and secondary school students nationwide. These competitions are a unique aerospace engineering industry simulation with an intense team-based learning environment. SDCA is part of an international network of competitions and Alexander has also supported the establishment of the Indian national design competition.



Alexandra Jercaianu

Romania

Alexandra Jercaianu is a Project Manager at Eurisy – a Paris based association of space agencies working to bridge space and society by raising awareness on the benefits of satellite-based services. In her position she works across the space value-added chain to exchange good practices on satellite applications and provide a bottom-up feedback on the policy barriers impeding the large-scale adoption of satellite-based services in sectors such as, emergency calling and health. As part of her role, she also coordinates Eurisy's contribution to EU Horizon2020 Earth Observation Research and Development projects.



Ana-Mia Louw

South Africa

Ana-Mia Louw obtained a bachelor's degree in Mechatronic Engineering at the University of Stellenbosch in 2014. While studying, she developed and interest optical design while doing an internship under South Africa's preeminent optical designer and thereafter took a course in advanced optical physics. After graduation she immediately joined the Simera team as optical designer. Her passion for management and optics led to her spearheading Simera Sense, Simera Group's product development company for imaging systems, focusing on earth observation payloads for small satellites with the xScape range of payloads. Since the start of 2018, Mia has been managing Simera Sense, and currently has 12 engineers working under her. Her is continually expanding her knowledge in optics and management and she recently completed a financial management course at the University of Stellenbosch Business school. She is a passionate, enthusiastic engineer with high hopes for the future of the space industry, both in South Africa, and in the world with unified space collaboration.

Before embarking the current development of nanosatellites in Simera Sense, Ana-Mia worked on three larger earth observation satellite payloads that were launched in 2018.

When not involved in the space industry and to stay fit, Ana-Mia literally climbs walls, but only when it is not feasible to scale cliff faces of the mountains around Cape Town.



Angeliki Papadimitriou Greece

Angeliki Papadimitriou is a Political Scientist, specialised in high-tech and aerospace policy and law. Since 2016, she works at the Strategy Department of the European Space Agency (ESA), where she currently holds the position of Assistant Strategy Analyst. Prior to joining ESA, she has worked in banking and telecommunications industries. Her educational background is multidisciplinary, in the fields of political science, law and public administration. She holds a degree in Political Science and Public Administration, with specialisation in Public Law and Administrative Science, from the National and Kapodistrian University of Athens, where she got a distinction for her dissertation on Space and Security Policy in Europe. She is also currently pursuing a Master's degree in Telecommunications and Space Law, with specialisation in digital communications law, at the University of Paris XI (Université Paris-Sud/Université Paris-Saclay). Her research experience has led to fourteen academic publications in peer-reviewed journals and conferences. She is member of Women in Aerospace-Europe (WIA-E) and Space Generation Advisory Council (SGAC). Her goal is to raise awareness on the opportunities arising from the active engagement in the space sector for socioeconomic growth, in the light of relevant policies and legislation.



Aqeel Shamsul Malaysia

Aqeel is a space advocate and aerospace engineer from Malaysia. He believes that interstellar space is for everyone, and one day, we will go back and live on the Moon. Currently, he is pursuing his PhD in Astronautics and Space Engineering at Cranfield University, UK. Where he is developing a bioCubeSat called BAMMsat which stands for Bioscience, Astrobiology, Medicine and Material CubeSat, a miniaturised space laboratory which could allow low-cost BAMM experiment in space with reduced development times, more frequent flight opportunities and reduce cost. If we want to go venture in to space for long term duration mission, beyond the Earth magnetosphere; the effect of high energy particles radiation on Earth biologies remains a big question. BioCubeSats could enable quick turnaround and large experiment sample size for these biological experiments in space compared to traditional spacecraft and ISS, which often requires more significant resources.

He co-founded Malaysia Space Initiative (MiSI) in 2017 with other Malaysian space advocates to help grow the local space industry. MiSI is a non-profit NGO to promote space in Malaysia in collaboration with the Malaysian government, industry and academia to advance the space industry. Since it was founded, MiSI has organised pioneering space events named Space Entrepreneurship Symposium to promote space entrepreneurship and MiSI SpaceUp, an unconference event to encourage discussion and collaboration on space agenda with the general public.

Avid Roman Gonzalez

Peru

Avid ROMAN-GONZALEZ is an IEEE Senior Member. He is an electronic engineer from the Universidad Nacional San Antonio Abad del Cusco, a systems engineer from the Universidad Andina del Cusco. He received his master's degree in industrial and human automatic, from the Université Paul Verlaine de Metz – France, and he received his Ph.D. degree in image and signal processing from TELECOM ParisTech. He was a postdoctoral fellow at Universidad Peruana Cayetano Heredia.

His work experience includes research at the French Space Agency (CNES) and German Aerospace Center (DLR); university teaching (Universidad Nacional San Antonio Abad del Cusco – UNSAAC, Universidad Andina del Cusco – UAC, Universidad Nacional de Ingenieria – UNI, Universidad Peruana Cayetano Heredia – UPCH, Universidad de Ciencias y Humanidades – UCH, and Universidad Nacional Tecnologica de Lima Sur – UNTELS); performance as consulting engineer in the Peruvian Space Agency (CONIDA), SPECTRUM, EGEMSA, etc.

Currently, he is the coordinator of the Image Processing Research Laboratory (INTI-Lab) at Universidad de Ciencias y Humanidades (UCH) and full professor at Universidad Nacional Tecnologica de Lima Sur (UNTELS).

He participates as keynote speaker and jury of projects in various academic events. He has more than 60 international published papers. He gives more than 100 lectures.

His areas of interest are signal and image processing, biometrics, artificial intelligence, human automation, bioengineering, industrial automatic, control, and aerospace technology.



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AWARDS



Charlotte Nassey

France

Charlotte is a French and British trainee at the European Space Agency. She works in the Technology Transfer and Business Incubation Office of the European Space Research and Technology Centre (ESTEC), in the Netherlands.

She first obtained a double Bachelor in Law and European Studies. She then completed a Master's degree in Public International Law before obtaining her specialized Master's degree in Space and Telecommunications law from University Paris-Saclay. This program included an internship in the legal department of French Space Agency Headquarters, CNES,

Once qualified as a space lawyer, she ambitioned to develop her technical and scientific knowledge. With the support of a joint CNES and ESA scholarship, she is currently in the process of completing her Master in Space Studies at the International Space University. During this year, she has developed strong multi-disciplinary skills ranging from engineering and medicine to management and economics. Within her team, she developed a set of Lunar Sustainability Goals aiming to guide and support the future steps of humanity on the Moon. In addition, her personal research focused on identifying the origins of the Moon Village concept in order to propose further strategies for its development. Her work on both these subjects will be presented at the next International Astronautical Congress in Washington.

As a lawyer in a technical field, having lived in France, Spain, the UAE and the Netherlands, she not only supports but lives according to the international, intercultural and interdisciplinary nature of space.

Charlotte is an alumni and former student Vice-President of the International Cité of Paris.



Di Wu China

Di Wu is a PhD student in Aerospace Engineering at the University of Arizona and has been a member of the research group SAMOS since 2018. He received a bachelor's degree in Space Engineering from Beihang University, and a master's degree in Aerospace Engineering from University of Michigan, Ann Arbor. His research focuses on using advanced astrodynamics and machine learning to gain insight into space situation awareness, space autonomy, and space sustainability. He is a member of SGPC, SSPI, and NSS.



Divya Rao Ashok Kumar

India

Divya Rao Ashok Kumar is a PhD student at Simon Fraser University, Mechatronics Systems Engineering department since 2018 Fall. She started working on satellites with the year-long internship for her master's degree thesis at Indian Space Research Organisation (ISRO), India on the attitude control design using control moment gyros. She served as Assistant Professor & Principal Design Engineer, at Crucible of Research and Innovation, PES Institute of Technology, India. She has an extensive experience in the design and development of nanosatellites such as PISAT1,2,3 for about seven years. She was the head of attitude determinations and control system for PISAT which was launched in 2016. She played a major role in the selection of sensors and actuators, calibration and testing of sensors, the design of operating modes of satellite, orbit determination, onboard software development, mission analysis and development of onboard in-loop simulation system for ground testing in the PISAT development. All the designed control modes of PISAT really worked well in space and received a lot of appreciation from ISRO Scientists. The detailed work on PISAT mission provided her an opportunity to visit various ISRO centers and meet prominent scientists of ISRO during technical reviews of the satellite. In total, she experienced fundamental research, design realization, testing and validation, product development, computational modeling and simulation from this project. She also received funding and served as Principal Investigator for a funded project from Naval Research Board, DRDO, India; in the domain of low-cost MEMS-based sensors data fusion and estimation. She is also a proud recipient and co-investigator for major five projects funded by DRDO and private companies. She was also consultant for Team Indus project (Google Lunar X prize) for GNC system. Divya's work resulted in 4 Journal articles and 15 conference papers in reputed international conferences. She is also awarded "Young Engineers Award" by Institution of Engineers India chapter in the aerospace discipline for the year 2016-2017.

Elena Petrakova **Russian Federation**

Ms. Elena Petrakova, M. Sc. in Aerospace Engineering (ECTS Grading Scale: A). She is the founder and CEO of the Aerospace technological company Easar LLC which has grown from an international project launched by Elena in 2015 at the Department of Rocketry and Space Systems, Aerospace Institute of the MAI (National Research University). Patent owner for a small satellite launch system. Key professional interests: Rocketry, Space Systems Engineering, Additive Manufacturing, Space Safety, Social Implementation.

Faviola Romero Bolivia

Faviola has a degree in Electronic and Telecommunications Engineering from the Universidad Privada Boliviana. For her final degree thesis, she worked with Queen's University Canada, with spectrometry and photovoltaics. The six months spent in China Academy of Space Technology in the framework of the TK-SAT1 mission – the first Bolivian satellite- unlocked her passion towards space engineering.

She pursued her studies and obtained a Double Master Degree in Space Science and Technology, held in Germany, Sweden and France. During this time, she had the opportunity to contribute to the MAXUS 19 mission of Swedish Space Corporation, proposing a new algorithm to calculate the flight trajectory and impact point of a sounding rocket. For her Master Thesis work held at the *Centre National d'Études Spatiales*, she focused on the modelling of the radiation damage on CCD sensors from the Pleiades mission, currently on orbit.

After obtaining her degree, Faviola joined Thales Alenia Space in late 2017 to work for Earth Observation Programs based on Radar Altimetry such as Sentinel 3, SWOT and Jason CS/Sentinel 6. Since June 2019, she is working as a Test Engineer for the ExoMars2020 mission.

During her studies, Faviola was an active IEEE member, and helped to stablish the local student branch. Today, as a Young Professional, she is an active contributor to Space Generation Advisory Council, WIA-E and Thales internal organizations like EAT which addresses subjects like gender equality inside the space sector.

Femi Ishola Nigeria

Femi Ishola is a Doctoral Research Assistant at the Laboratory of Spacecraft Environment and Interaction Engineering (LaSEINE), Kyushu Institute of Technology, Kitakyushu, Japan. His PhD is focused on Deep-Space Optical Communication Technologies for Small Satellites; developing Cubesat Laser Communication Modules with associated Low Cost Telescope-Detector Ground System.

Femi is an Accredited Professional Engineer and Researcher at the National Space Research and Development Agency, Federal Ministry of Science and Technology, Nigeria. At the Space Agency's Centre for Space Transport and Propulsion, he was the Pioneer and Project Manager of the Ground Control Station with interconnected Sounding-Rocket Avionics System.

Alumni of the International Space University (ISU) Masters Programme, Strasbourg, France. Participated in the South-Australian Universities Collaboration Satellite (SUSat) QB50-Project as an International Visiting Research Student, Institute for Telecommunications Research, University of South Australia. Obtained First Degree in Electrical/Electronics Engineering from University of Lagos and Distinction Grade in Electrical/Electronics Engineering, Ondo State Polytechnic, Nigeria.

Recipient of the Kano State Government Award for the Best Millennium Development Goals (MDGs) Project, 2011. SEEES/Nigerian Society of Engineers Nationwide-Award for the Best and Most-Outstanding University Project on "Microwave Wireless Power Transmission Prototype and Demonstration", 2010. Lockheed Martin's C-130 Hercules and Alenia-Aeritalia's G-222 Aircrafts Avionics Engineering Work Experience, 401 Aircraft Maintenance Depot (ACMD), Nigerian Air Force, 2009.

Femi is the Founder-CEO, Phemotron Systems Ltd and Director of Student Affairs of the Space and Satellite Professionals International (SSPI, Nigeria). He affirms that Deep-Space Exploration, Resource Utilization and Planetary Colonies are the future of Mankind in the vast Universe.





Ivan Vasilev

Russian Federation

Exploration, Innovation and Business.

Hansley Noruthun

Mauritius

Vasilev Ivan – the doctor in the surgical department of City Clinical Hospital № 29 named after N. E. Baumana of the Moscow Department of Health and researcher of the Department of operational management of medical support of space flights at Institute of Biomedical Problems of Russian Academy of Science.

Hansley Noruthun is a bioscientist, elected associate of King's College and alumnus of London South Bank

University and International Space University. He is currently the National Point of Contact (NPoC) for the

Republic of Mauritius for the Space Generation Advisory Council in support of the United Nations Programme on

Space Applications. He was awarded the UK Space Agency and European Space Agency scholarship to complete

the Space Studies Program 2015 hosted by NASA Glenn Research Center. As a young professional, he has a proven

track record in terms of innovation, creativity and self-starter in the space field. His portfolio includes projects

such as an astronaut training, commercial airline travel study, BBC Stargazing partner, and several global outreach

and awareness programmes as the recent African Space Generation Workshop 2018 - Launching Africa: Space

In 2011 he graduated from the medical faculty of the Pirogov Russian National

Research Medical University specialty "General medicine". He was trained in residency at the Department of faculty surgery №1 medical faculty of RNRMU (specialty "Surgery"). In 2013, he continued his postgraduate studies in two specialties - "Surgery" and "Physiology". In 2017 he defended his thesis on "The results of treatment of trophic ulcers in patients with varicose veins of the lower limbs with immunocorrection." At the same time he worked in the Scientific-educational medical-technological center at Bauman Moscow State Technical University.

Now combines medical practice the surgeon with scientific work in IBMP at a position of the researcher in laboratory of development of means and methods of rendering medical care in extreme conditions and telemedicine. Takes a direct part in medical support of space flights.

He is a regular participant of Russian and international conferences and scientific schools (seminars) on surgery and aviation and space biology and medicine. Holder of a number of diplomas and certificates, has publications in both national and international scientific journals

Izrael Bautista

The Philippines

"I have been involved with the PHL-Microsat Program (now STAMINA4Space), the Philippines' first microsatellite project, since 2015. I shared my expertise in the design and layout of power systems for the amateur radio of the Diwata-2 microsatellite. The amateur radio is now being used by amateur radio operators around the world utilizing its FM voice repeater functionality. I was also involved in the establishment of the amateur radio ground station in the University of the Philippines-Diliman which is being used to track and receive data from amateur satellites.

Currently, I am taking my Doctorate degree in Kyushu Institute of Technology in Japan, under the Philippine government's scholarship through the STAMINA4SPACE program. I am also the project manager of the fourth Joint Global Multi-National Birds project or BIRDS-4 project, together with students from Japan, Paraguay, Nepal, Turkey, Egypt, Sudan and France.

Being a part of a multi-nation project such as BIRDS-4, made me realize that international cooperation is key in reaching greater heights in space science and technology. This is true especially for countries that lack the monetary resources and experience in space technology. Pooling resources from different sources, countries could build more capable satellites than what they can build using their resources alone. Working with people from different countries is really a one of a kind experience. One can learn a lot from one another's culture, country, and many other things that onea can only experience through international cooperation."



Jiten Thapa Nepal

Mr. Jiten Thapa is currently working as Research and Development Engineer at ORION Space, Nepal. He graduated in Electrical and Electronics Engineering from Kathmandu University in 2018. Currently he is working in Electrical Power Subsystem, Ground Station and Structural Subsystem in Nepal-PQ1, which is Nepal's first Picosatellite. At his company he is also helping to provide various trainings and workshops regarding Ground Station Development, CanSat and Picosat development in Nepal. He also took the course on HEPTA-Sat Training Course held on November 15-17, 2017 at Kathmandu University. He also took a short course on Small Satellite Mission organized by ISRO and CSSTEAP.

He is also the winner of oral presentation at National Young Scientists Conference 2019.

Jorge Nicolás-Álvarez Spain



Born in 1994, he is originally from Banyeres del Penedès, a small town in the northern Mediterranean coast of Spain. He obtained the Aerospace Engineering degree in 2016, joined ESA's Advanced Concepts Team as a stagiaire researcher in the mission analysis discipline during 2017 and got the Master in Aerospace Science and Technology in 2018.

Jorge is strongly committed to science and technology education: he has worked as a teacher for the past three years, currently participates in several space-related dissemination activities and recently won a scientific communication contest at country level. His hobbies include playing guitar and bass, judo and biking.

Martin Ristov

Canada



"As a student with academic research experience in aviation, aerospace and robotics, I have always been interested in developing technology solutions that advance and assist human spaceflight. These interests led me to MDA, where I support the Canadian Space Agency with robotics on-board the International Space Station. Specifically, I am implementing autonomous capability to the Mobile Servicing System (MSS). This will ultimately enable visionguided control of the MSS manipulators - a step towards the next generation, Lunar Orbital Gateway-Platform robotics, that will have to operate without human intervention, using artificial intelligence to maneuver.

Fundamentally, my love of aerospace is derived from the people who comprise the field. I have the extraordinary opportunity to interact with individuals from all over the world with unique backgrounds, who are drawn to the unifying, romantic notion of driving humanity outwards in space."

Mpho Tshisaphungo

South Africa

Ms Mpho Tshisaphungo is currently a Space Weather Practitioner at the South African National Space Agency (SANSA). She is responsible for coordinating and managing the Space Weather Centre as well as ensuring that the space weather services reach the end-users. Her role includes monitoring and analysing space weather events and preparing space weather forecasts, warnings and alerts for government and private industry users. She is also studying part -time towards obtaining her PhD. As part of her PhD project, she currently has one peer-reviewed publication which is part of her contribution to the space science community. She has presented about the space weather activities and research projects that SANSA is involved in, at different international workshops and conferences such as European Space Weather Week (ESWW), European Geophysical Union (EGU), International Reference Ionosphere (IRI) workshop, International Heliospheric Year (IHY), and the South African Institute of Physics (SAIP). She also attended the 2011 Centre for Integrated Space Weather Modelling (CISM) summer school for two weeks in Boston University, USA. At the summer school, a networking opportunity with some of the international experts in space weather was prevailed. The space sector is regarded as one of the knowledgebased sectors, which require increased research and development in areas where developing countries like South Africa has a potential advantage. International cooperation in space-related activities is an important part of what we do and to ensure future sustainability.



Jorge is currently carrying out his PhD Thesis at the CommSensLab (Unidad de Excelencia María de Maeztu) of the Universitat Politècnica de Catalunya in Barcelona, Spain. Within the Remote Sensing line, his research is focused on the GEOSAR (Geosynchronous Synthetic Aperture Radar) concept. It is taking place in the context of G-CLASS, a space mission recently selected by ESA to compete as the tenth Earth Explorer. His work involves several fields of expertise: from the design and construction of the orbit observation hardware to the precise



Nicole Villanueva

Peru

Nicole is a peruvian undergraduate student in the Management School at Pontificia Universidad Católica del Perú, with a mayor in Project Management and Operations Management. Her research fields are: Systems design and mission architecture for space operations, pre-feasibility analysis and financial risks in space operations and Space technology and innovation for Humanity. She is the founder of the Space Studies Program at Pontificia Universidad Católica del Perú, a project focused on promoting the participation of undergraduate students from multiple careers for the development and growth of the space sector in Peru. This year Nicole organized the first event related to this initiative called "Peruvian Mission to Mars". Nicole currently holds the position of financial director of the Mars Society - Peru chapter, member of the board of The Mars Society - Latin American chapter and she is a volunteer student at the Institute for Radio Astronomy of Pontificia Universidad Católica del Perú, INRAS – PUCP. She was participant of the Caltech Space Challenge 2019: Encelanders, a mission design competition to search for life in Enceladus, organized by the California Institute of Technology and NASA's Jet Propulsion Laboratory.

She is member of the Space Safety and Sustainability project group in the Space Generation Advisory Council, currently working in the socio-economic benefits of Space and has been selected to be speaker at the International Astronautical Congress 2019 where she will present her study about the pre-feasibility of a Space Studies Program for Management students in South America in addition with a collaborative study by the members of the Space Safety and Sustainability project group about the benefits and uses of space technologies in Africa aligned to the Sustainable Development Goals (SDG) of the United Nations.

Rigoberto Reyes Morales

Mexico

Rigoberto is a PhD Candidate in the Department of Mechanical and Control Engineering at the Kyushu Institute of Technology (KYUTECH) in Japan. His doctoral research is sponsored by the Mexican Council of Science and Technology. He is completing a research on attitude determination methods for free-rotating small/lean satellites. In addition, he holds a MEng in Mechanical Engineering, and a BSc. in Mechatronics Engineering from the National Autonomous University of Mexico (UNAM).

Since 2009 he has been involved in space research. In 2013, he was selected as the Mexican student representative by the University Space Engineering Consortium (UNISEC) to attend the 1st UNISEC Global Meeting. Two years later he was a short-term guest student at the Massachusetts Institute of Technology (MIT) Space Systems Laboratory, where he received basic training to operate the miniaturized satellites SPHERES. More recently, during his doctoral studies he was the responsible for the Attitude Determination Subsystem of the LEO satellite TEN-KOH (Thc5), which was successfully launched on October 29th, 2018.

"I believe that space plays a key role in addressing the myriad of challenges and needs that humankind faces, such as: global warming, inequality, and poverty. I think it is essential for developing countries to have access to and use of space-based technology and its applications. As several international initiatives have proved, I share that international cooperation is crucial for non-spacefaring countries to benefit from space technologies. Thus, helping these countries in their quest for space exploration."



Tess Morris-Paterson

United Kingdom

Prior to working in the space sector, Tess pursued a career in human performance and research. This ranged from planning and delivering clinical trials to working with extreme explorers and elite athletes. She worked closely with athletes and their medical teams in a variety of arenas (such as Formula One, the Premier League and Olympic/Paralympic sport) in order to optimise physical and cognitive performance. In 2019 she started working at NASA Ames in California, leveraging her expertise in human biology to support the objectives of NASA GeneLab; a group who are dedicated to open source data whilst exploring the genomic adaptation to spaceflight. Tess has been completing her PhD part-time, which investigates skeletal muscle adaptation to simulated microgravity. This research has included development of a new microgravity analogue (hyper-buoyancy floatation) and a novel method for remotely and accurately measuring muscle (deuterium labelled creatine). This summer Tess is attending International Space University Summer Space Program in Strasbourg before piloting a general aviation flight around the USA, as she works toward gaining her commercial pilots licence. In her spare time, Tess enjoys weight lifting and running to keep fit, as well as skiing and mountaineering with her family.



Thomas Beckingham United Kingdom

Thomas Beckingham is a first year PhD student at the University of Liverpool researching Sensors in Extreme Environments. This work, amongst other non-space related projects, has involved Tom in developing a sleep/ fatigue monitoring system intended for use in microgravity so that astronaut rest and recovery may be analysed and potentially improved. To achieve this, techniques such as sensor integration, embedded IoT, and signal/ data processing are employed; skills gained whilst an undergraduate in Electrical Engineering and Electronics also at the University of Liverpool. Tom is keen to take part in the Emerging Space Leaders grant programme to further develop his knowledge and gain experience, with hopes of benefiting the global space industry. Outside of academia, Tom enjoys the outdoors having previously been employed by the UK based charity, the RNLI; an organisation dedicated to saving lives at sea. He also enjoys playing sports such as cricket and hockey.



"I am Usman Shehryar and worked in the Space and Upper Atmospheric Research Commission of Pakistan. During my stay here, I have gained diverse experience of space technologies starting from the design and development of high speed analog and digital electronic systems for satellite payloads to the system level architecture design of satellite ground stations.

Currently, I am pursuing Master degree in the Wireless, Photonics and Space Engineering program in Chalmers University of Technology, Sweden under the Swedish Institute Scholarship for Global Professionals(SISS). This program is enabling me to learn experiences of Swedish space, microwave and photonics sectors. I am doing research for optimization of satellite communication link by digital beam forming specially in ground stations which will be an important intellectual contribution to the experimental design in the future.

Many developing nations lack in the field of space engineering. I want youth to learn these engineering fields so that they can contribute to the knowledge of these evolving technologies to harness its benefits to their societies. One vision of mine is to educate manpower in these technical arenas by involving them practically in various projects of these technologies. All this requires extensive knowledge, practical trainings and industrial exposure. I am envisaging that ESL UN-IAF workshops and IAC participation will contribute to my knowledge database regarding ongoing researches in the space technologies and provide the opportunity to network with the space leaders."

Yasir Abbas

Sudan

Yasir ABBAS is a Sudanese Space Systems Engineer pursing PhD in Kyushu Institute of Technology (Kyutech) and doing researches in the embedded system laboratory in the university. He's got an aerospace engineering MSc in Istanbul Technical University (ITU), Turkey.

National Committee for Space (SUNACS) and with Ceres Space Technology Center (CSTC).

CubeSat multinational project carried out by Kyutech university.

Yasir is keen to develop the space field and increase the technical awareness, he was selected as the representative of The Universe Awareness organization in Sudan. He is part of the Young African Leadership Initiative established by President Obama in Africa.

By the international cooperation between the developed and developing countries, Yasir thinks Sudan and other nations in Africa and the middle east can promote their space abilities and activities. International cooperation in space programs reduces cost as well as maximize knowledge and technologies transfer.

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6.3.3 Future Space Leaders (FSL) Grant Programme

The Future Space Leaders Foundation (FSLF) organizes the Future Space Leaders Grant Programme providing opportunities for U.S. graduate students and young professionals pursuing space and satellite-related careers to participate in the 70th International Astronautical Congress (IAC).





Tatem Burns has a Masters degree in Industrial-Organizational Psychology from DePaul University in Chicago, IL and is in the process of earning doctoral candidacy in this field of study. As a graduate student, her passion lies in conducting research on individual differences, gender differences, and team composition. She conducts research for two NASA-funded grants, the work of which brings a multifaceted approach to understanding and optimizing crew relations in simulated space mission teams by considering the person, the team, and the context. Her paper at the IAC examines how crew differences in gender and personal values predict crew relations, findings of which can help inform team composition decisions for long duration space exploration.



Liz De La Torre has a BFA in Illustration from Art Center College of Design, designing vehicles and environments for feature film. Liz uses creative methods to imagine the future of technology in space. She is a Creative Technologist, MS Candidate and Research Assistant at the MIT Media Lab, hailing from The Studio at NASA's Jet Propulsion Laboratory where for 5 years, she worked on creative projects for various space missions and pre-mission formulation for future missions. Her current research examines the intersection of creativity and aerospace, and how creative techniques are of benefit to space technology innovation. Lizbeth is also a consultant with The Science and Entertainment Exchange, a program of the National Academy of Sciences (NAS) that connects entertainment industry professionals with top scientists and engineers to create a synergy between accurate science and engaging story lines in both film and TV programming. This summer, she is a Graduate Associate Intern with Disney, learning from the Imagineering process and how it might benefit space. She plans on returning to JPL to support space technology innovation.



Conor Duggan serves as the Business Development Manager for Aerospace at the Washington State Department of Commerce, where he manages the state's aerospace business development portfolio and is working to strengthen and grow Washington's aviation, space, and drone industries. Prior to joining the state government, Conor worked for Moon Express and gained industry expertise in government affairs, business development, marketing, and communications. Combined with previous experience in international relations at NASA Headquarters and NASA Ames Research Center, he has become adept at bridging the divide between business and government in the aerospace sector. Conor also founded Project Human, a grassroots campaign to capitalize the letter H in Human in order to promote the idea that being Human is part of our individual and global identity. Conor earned a B.S. in Political Science from Santa Clara University, where he became passionate about the role of science and technology policy in fostering global peace, progress, and prosperity.



Tanya Harrison lives in Washington D.C. as the Account Manager for Scientific Users at Planet Federal. She holds a PhD in Geology with a specialization in Planetary Science and Exploration from the University of Western Ontario. Tanya is considered a passionate advocate for Mars and a social media influencer, using Twitter for public outreach about space. She spent 4 years working in mission operations as an Assistant Staff Scientist at Malin Space Science Systems on the Mars Reconnaissance Orbiter Context Camera (CTX) and Mars Color Imager (MARCI), as well as the Mast Cameras (Mastcam), Mars Hand Lens Imager (MAHLI), and Mars Descent Imager (MARDI) aboard the Curiosity rover. Later at Arizona State University she worked in mission operations for the Panchromatic Camera (Pancam) aboard the Opportunity rover and held the position of Director of Research for the Space Technology and Science Initiative for 3 years. Currently she also serves as the youngest member of the Board of Governors for the National Space Society.



Caroline Juang is an incoming Ph.D. student in Earth and Environmental Sciences at Columbia University and formerly the project coordinator for the NASA citizen science project Landslide Reporter at Science Systems and Applications, Inc./NASA Goddard Space Flight Center. At NASA, Caroline launched the project and handled all aspects from outreach to data analysis with the help of the GSFC team. Previously, she interned as a Brooke Owens Fellow at Bryce Space and Technology. On the side, she volunteers with the Brooke Owens Fellowship and the Space Generation Advisory Council, motivated by her passion to increase access to opportunities in space. Caroline graduated in May 2017 with an A.B. in Earth & Planetary Sciences and a minor in Environmental Sciences and Public Policy from Harvard University. She is the only applicant accepted for a Plenary in IAC this year.



Steven Ramm works at Lockheed Martin Space as a Systems Engineer and the Commercialization Lead in Advanced Programs. Based in Denver, Steven helps shape and execute human space exploration projects such as NASA's Lunar Gateway, Commercial Lunar Payload Services, and the Orion Commercial Payloads effort announced at IAC last year. Steven aspires to create a future where humanity has established a sustainable presence and vibrant economy on the Moon, harnessing deep space resources to improve life on Earth and propel us farther into the solar system. Prior to Advanced Programs, Steven performed Flight Test Integration on the Fleet Ballistic Missile Program in the Bay Area. He graduated from the University of Colorado at Boulder with a B.S. in Aerospace Engineering. Outside of work, Steven shares his passion for space by being very active in the local community, performing various outreach activities to encourage younger generations to pursue careers in space.



Todd F. Sheerin will be joining The Aerospace Corporation in the Vehicle Design and Innovation Department this August where he will focus on spacecraft systems engineering for civil, commercial, and defense sectors. Todd recently completed his Ph.D. in Aeronautics and Astronautics at the Massachusetts Institute of Technology and received fellowships from the Draper Fellow Program (2014-2019), the Department of Defense National Defense Science and Engineering Graduate Fellowship (2016-2019), and the Matthew Isakowitz Fellowship Program (2018). Todd's doctoral research focused on a first-of-its-kind optical atomic clock for GPS-denied positioning, navigation, and timing for which he led systems integration, thermal control design, atom-laser interactions modeling, and frequency reference instability investigations as part of a DARPA program and a Draper-NIST collaboration. Prior to his doctoral research, Todd led a variety of technology development and space systems maturation efforts at Draper, the Massachusetts Institute of Technology, and NASA directing three separate microgravity flight campaigns and working on projects ranging from astronaut mobility systems to reconfigurable spacecraft, small satellite deployables, lunar and low-gravity hoppers, high power solar electric propulsion and spacecraft guidance, navigation, and control. Todd received his Master of Science in Aeronautics and Astronautics from the Massachusetts Institute of Technology and has form Harvard University.



Caleb Williams is the Lead Economic Analyst at SpaceWorks Enterprises where he oversees delivery of business strategy and economic analysis engagements for private-sector clients. During his time at SpaceWorks, he has served as the principal analyst for more than 15 engagements, covering topics ranging from Lunar Landers to additively manufactured rocket engines. Caleb is particularly interested in enabling wide-spread commercialization of outer space and his commentary regarding the commercial space industry has been widely featured across Forbes, WIRED, SpaceNews, Aviation Week and many others. In addition to his professional work, Caleb currently serves as an Advisor to the Symposium on Space Innovations at the Georgia Institute of Technology and previously served as the Principal Investigator for the Solar Crafting project in NASA's 3D Printed Habitat Design Challenge. He received undergraduate degrees in Marketing and Economic Consulting from the Kelley School of Business at Indiana University.



Melodie Yashar is an architect, designer, and researcher. She earned a Masters in Human-Computer Interaction (MHCI) within the School of Computer Science at Carnegie Mellon University as well as a Masters In Architecture at Columbia University. Melodie is a Senior Researcher within the Human Computer Interaction lab within the Human Systems Integration Division of NASA Ames. She is also co-founder and member of SEArch+ (Space Exploration Architecture), a group which won NASA's Phase I and Phase III 3D-Printed Habitat Competition, and has since been collaborating with researchers at NASA Langley to realize a sub-scale demo for a future Martian ice habitat.





ORGANIZERS & PARTNER ORGANIZATIOI

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CONGRESS PROGRAMME

STUDENTS & YOUN PROFESSIONALS EVENTS

ASSOCIATEC

SOCIAL EVENTS

AWARDS



6.4 IAF/ISEB Educators Professional Development Workshop

Date:	Saturday 19 October 2019
Time:	08:30 - 17:00
Venue:	Walter E. Washington Convention Center, Room 202B

Saturday 19 October 2019

Time:	Programme:
08:30	Opening/Introductory Remarks/Agenda Review Carolyn Knowles, Lead, ISEB RWG
08:35	Welcome/Introduction of NASA Commercial Crew Project (CCP) Team Kris Brown, Deputy AA, OSTEM
08:40 - 09:45	CCP and NextGen STEM Pilot CCP Programme Team
09:50 – 09:55	Introduction of Facilitators Carolyn Knowles
09:55 – 12:00	i5: Teaching Thinking, Teaching Innovation Jane E. Pollock, Ph.D
12:00 - 12:50	Lunch
13:00 - 15:00	Teaching Thinking Skills Michael Pakakis/Ian Christie Victorian Space Science and Education Center
15:00 - 17:00	Atmosphere Cloud Protocols NASA Globe Team

Organized by:

International Space Education Board (ISEB) and ISEB Representatives Working Group (RWG)

6.5 Cross-Cultural Communications and Presentation Workshop

Date:	Sunday 20 October 2019
Time:	08:00 - 13:30
Venue:	Walter E. Washington Convention Center, Room

The Cross-Cultural Communications and Presentation Workshop is organized for Emerging Space Leader grant recipients and Next Generation Plenary speakers to provide them with the opportunity to improve their oral skills for their presentations and to sensitize them to the issues of speaking at large multi-cultural events.

Session presenters:



Scott Madry is a research associate professor at the University of North Carolina at Chapel Hill and a member of the faculty of the International Space University in Strasbourg, France. He has been doing international teaching and research for some 30 years and is interested in effective international communications and presentation skills.



Carol Carnett is an attorney and a teacher of English to Speakers of Other Languages. She is Director of English Programs for the International Space University Summer Space Studies Program and Southern Hemisphere Space Studies Program, where she teaches English language skills, including writing and presentation workshops focused on effective English communication in international meetings and conferences.

TUDENTS & YOUN PROFESSIONALS EVENTS



ns 149A and 149B



7 Associated Events

7.1 IAF IDEA "3G" DIVERSITY PROGRAMME



INTERNATIONAL PLATFORM FOR DIVERSITY AND EQUALITY IN ASTRONAUTICS

3G GEOGRAPHY . GENERATION . GENDER

With the aim of promoting and advancing the principles of "3-G" (Geography, Generation, and Gender) Diversity amongst a global space community the IAF has established an International Platform for Diversity and Equality in Astronautics (IDEA). The IAF welcomes delegates to participate in the IAC Diversity Activities and benefit from an intensive and open exchange on diversity and equality aspects within the IAF, amongst IAF member organizations as well as other organizations promoting diversity.

Wednesday, 23 October 2019, will again be declared as IAF IDEA "3G" Diversity Day with 2 main key events focusing on different diversity aspects and using valuable networking opportunities to bring together a global IAF community, including IPC members, IAF committee members and IAF Member representatives.

On Thursday, 24 October 2019, the IAF invites all delegates to hear the story of Rhoda Shaller Hornstein, retired from the National Aeronautics and Space Administration (NASA), who will talk about "A Girl in the Man-on-the-Moon Program: Camaraderie and Discrimination in the Apollo Era".

In addition, the IAC will host on Friday, 25 October 2019, a further "3G" Diversity event featuring a Panel and Roundtable with the Women of Aeronautics and Astronautics (WoAA) on the topic of "The First Woman on the Moon: The Women Who Are Working to Get Us There".

on behalf of JPL and share an exciting video with the audience. Furthermore, the event will feature a 3-person panel with Rukmini Roy, Rosemary Davidson and Rachael McKee – 3 female engineers currently in their degree program or very recently graduated. During the panel discussion the three women will address the important question of "What would you do to improve

7.1.1 IAF IDEA "3G" Diversity Breakfast

Date: Wednesday, 23 October 2019		Company, United States	
Time:	07:00 – 08:30		
Venue:	The Walter E. Washington Convention Center – South Prefunction	07:40 - 07:50	Concluding Remarks
As an imposponder	ortant element of the IAF "3G" Diversity Day the IAF welcomes all delegates to the IAF IDEA "3G" Diversity Breakfast by Jet Propulsion Laboratory (JPL).		Mary Snitch, Special Advisor to the IAF Presic Astronautical Federation (IAF), United States
The event Mary Snite	will be opened with a welcome by the IAF President, Jean-Yves Le Gall followed by an introduction from Moderator th, the Special Advisor to the IAF President (Diversity Initiatives). Larry D. James, Deputy Director of JPL, will speak	07:50 - 08:30	Networking

118



the diversity of the Engineering Workforce?"

Sponsored by:

Jet Propulsion Laboratory





Jean-Yves Le Gall, President, International Astronautical Federation (IAF), France

Programme:

Welcome

Astronautical Federation (IAF), United States

Presentation by Sponsor

Panel discussion

United States

United States

07:00 - 07:05

07:05 - 07:10

07:10-07:20

07:20 - 07:40

Moderation and Introduction to IAF "3G" Diversity Breakfast Mary Snitch, Special Advisor to the IAF President (Diversity Initiatives), International

Larry D. James, Deputy Director, Jet Propulsion Laboratory (JPL), United States

"What would you do to improve the diversity of the Engineering Workforce?"

• Rukmini Roy, Aerospace Engineering Student, Georgia Institute of Technology,

• Rosemary Davidson, Graduate Student, Massachusetts Institute of Technology,

• Rachael McKee, Business Development Analyst, Lockheed Martin Space Systems

President (Diversity Initiatives), International















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7.1.2 IAF IDEA Excellence in "3G" Diversity Award Luncheon

Date:	Wednesday 23 October 2019
Time:	12:30 – 13:30
Venue:	The Walter E. Washington Convention Center – South Prefunction

The IAF Excellence in "3G" Diversity Award recognizes IAF member organizations (industry, government, academia) worldwide for outstanding contributions to the fostering of "3G" (Geography, Generation, Gender) Diversity within the space sector.

This Luncheon is dedicated to the award ceremony for the IAF Excellence in "3G" Diversity Award. At the IAC 2019 this award will be given to the UAE Space Agency.

وكالة الإمارات للفضاء UAE SPACE AGENCY



The United Arab Emirates Space Agency, the first national space agency in the region, was established in 2014, and is responsible for organizing, regulating, and supporting the national space sector under federal law. This includes the oversight and funding of space missions such as the UAE's Emirates Mars Mission's Hope Probe, the region's first Arab and Islamic interplanetary mission. The primary goals of the UAE Space Agency are to contribute significantly to the diversification of the national economy, enhancing the UAE's international standing in space-related fields, and issuing policy and laws for the space sector. Space sector capacity building programmes and raising awareness of space sciences and STEM fields develop the next generation of Emiratis for leadership in the space sector.

Programme: 12:30 - 12:35 Welcome

Jean-Yves Le Gall, President, International Astronautical Federation (IAF), France



12:35 - 12:40 Introduction of the IAF Excellence in "3G" Diversity Award Mary Snitch, Special Advisor to the IAF President (Diversity Initiatives), International Astronautical Federation (IAF), United States

12:40 – 12:45	Award Ceremony and Photo

12:45 – 13:05	Presentation by the Award winner
	UAE Space Agency represented by:
	His Excellency Dr. Ahmad Belhoul Al Falasi,
	Minister of State for Higher Education and Advanced Skills
	Chairman, UAE Space Agency
	United Arab Emirates

13:05 - 13:30 Networking



7.1.3 IAF IDEA "3G" Diversity Keynote

Date:	Thursday 24 October 2019
Time:	14:45 – 15:05
Venue:	The Walter E. Washington Convention Center –

As a valuable addition to the IDEA programme, the IAC 2019 will feature on Thursday 24 October a Keynote by Rhoda Shaller Hornstein on "A Girl in the Man-on-the-Moon Program: Camaraderie and Discrimination in the Apollo Era". Mary Snitch, Special Advisor to the IAF President (Diversity Initiatives), will welcome and introduce this special Keynote Session with Rhoda Shaller Hornstein, the recipient of the IAF Distinguished Award in 2016.

Rhoda Shaller Hornstein reported for duty 51 years ago to the NASA Goddard Space Flight Center. As an entry level Aerospace Technologist, her role in Apollo 11 was to operate the Goddard Real Time System to record radar data from the tracking sites and use this data to update the orbit and send out acquisition messages. Rhoda Shaller Hornstein's fondest memory of the Apollo program, especially Apollo 11, was that, with less than one year of Government service, she had the opportunity to work among the "giants" of NASA and experience firsthand the "Apollo Mentality" that guided her through 46 years at NASA. She also experienced the highs of camaraderie and the lows of discrimination. The camaraderie lasted one year until a manager asked why she was not pregnant. Thus, began the discrimination, more specifically gender harassment. This Keynote addresses how the "girl" accommodated both behaviors through the lens of the "Apollo Mentality" during her NASA career.

Programme:

14:45 - 14:50	Welcome and Introduction	
	Mary Snitch, Special Advisor to the IAF Presid Astronautical Federation (IAF), United States	
14:50 - 15:10	Symposium Keynote "A Girl in the Man-on-the-Moon Program: Co Era"	
	Rhoda Shaller Hornstein, Retired, National Ae United States	







Room 147B

lent (Diversity Initiatives), International



amaraderie and Discrimination in the Apollo

eronautics and Space Administration (NASA)



SSOCIATED EVENTS



7.1.4 IAF IDEA "3G" Diversity Public Day Women of Aeronautics and Astronautics (WoAA) Panel

Date:	Friday 25 October 2019
Time:	10:20 – 12:00
Venue:	The Walter E. Washington Convention Center – The Launch Site is located in the IAC Exhibition Hall, Booth 3008

On Friday 25 October the IAC will feature a Panel and Roundtable with the Women of Aeronautics and Astronautics (WoAA) on the topic of: "The First Woman on the Moon: The Women Who Are Working to Get Us There". The Women of Aeronautics and Astronautics (WoAA) is a new committee within the American Institute of Aeronautics and Astronautics (AIAA), with a mission to provide support, empowerment, and networking opportunities for women and other minorities in the aerospace field, primarily focusing on university students. WoAA aims to provide outreach to primary and secondary school students, provide technical development opportunities for university students and working professionals, and support members throughout their careers.

Elena Feichtinger, IAF Manager for the Diversity Programme, will welcome the female space role models who are breaking barriers in the aerospace industry around the world. They will introduce themselves and tell their stories. The second half of the session will feature interactive roundtables, allowing for attendees to dialogue with speakers and brainstorm in small groups about how we can build a diverse aerospace workforce.



Programme:

10:20 - 10:25	Welcome and Introduction
	Elena Feichtinger, Manager for the Diversity Programme, International Astronautical
	Federation (IAF), France

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10:25 - 10:50Keynote Presentation10:50 - 11:25Women of Aeronautics and Astronautics (WoAA) Panel

- 10:50 11:25 Presentation about Women of Aeronautics and Astronautics (WoAA)
- 11:30 12:00 Breakout Sessions

7.2 10th IAF International Meeting for Members of Parliaments (Closed Meeting)

Date:	Sunday 20 October 2019
Venue:	Walter E. Washington Convention Center

Opportunities and Challenges for Legislators in Space Exploration and Space Traffic Management

Saturday 19 O	ctober 2019
	All day: Arrival of Participants
18:00	Joint MoP/IAF-UN/IPC Welcome Reception South Prefunction (Walter E. Washington Conv
Sunday 20 Oct	ober 2019
	The Meeting will take place in Room 201 of the
08:30	Welcome Coffee
09:00	Welcome Remarks
	• <i>Kendra Horn,</i> Chairperson, US House Scie the 10 th IAF MOP Event
	• Jean-Yves Le Gall, President, International
	• Jan Woerner, Vice President for Agency, Pa
	• <i>Klaus-Peter Willsch,</i> Member of German B 2018 Host Country
	John S. Langford, President, American Inst Country
	• Mohammed Al Ahbabi, Director General, I
10:00	Keynote 1:
	Sandra Magnus, IAC2019 Local Organizing
10:15	Keynote 2: • YAMAKAWA Hiroshi, President, Japan Aero
10:30	Keynote 3:Jim Bridenstine, Administrator, National Administra
10:45	Coffee Break
11:15	Interventions by Members of Parliaments and





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e Walter E. Washington Convention Center

ence Subcommittee on Space and Aeronautics and Chair of

- Astronautical Federation (IAF)
- arliamentarians and Ministerial Relations, IAF

Bundestag and Chairman of Aviation and Space Group, IAC

titute of Aeronautics and Astronautics (AIAA), IAC 2019 Host

UAE Space Agency, IAC 2020 Host Country

g Committee Co-Chair

ospace Exploration Agency (JAXA)

eronautics and Space Administration (NASA)

d Discussion

SSOCIATED EVENTS



12:00 Session 1: Space Exploration

Space exploration has evolved from a domain of competition to a realm of international cooperation. With an increasing number of space actors and the rise of new technologies that allow us to acquire new knowledge in ways only imaginable 50 years ago, new challenges and opportunities are also emerging for legislators.

Moderation by Jan Woerner, Vice President for Agency, Parliamentarians, and Ministerial Relations, International Astronautical Federation (IAF)

Presentations (10 min) and Roundtable discussion

- Mohammed Al Ahbabi, Director General, UAE Space Agency
- Pascale Ehrenfreund, Chair of the Excutive Board, German Aerospace Centre (DLR)
- Sergey Krikalev, Executive Director for Human Spaceflight, State Space Corporation ROSCOSMOS
- Clay Mowry, Vice President, Sales, Marketing and Customer Experience, Blue Origin
- Masami Onoda, Director of Washington Office, JAXA
- Christian Sallaberger, Chairman of the International Space Exploration Committee, International Astronautical Federation (IAF)

	• Group photo
	Dominique Tilmans, Honorary Senator and President of Eurisy
14:45	Keynote 4:
	• Kevin O'Connell, Director, Office of Space Commerce, US Department of Commerce

Lunch Break

Keynote 5:

13:30

15:00

15:15

15:30

• Simonetta Di Pippo, Director, United Nations Office for Outer Space Affairs (UNOOSA)

Keynote 6:

• Carine Claeys, Head of Space Task Force, European External Action Service (EEAS)

Keynote 7:

• Sarah Anyang Agbor, Commisioner in charge of Human Resources, Science, Technology, African Union Commission (AU)

15:45 Session 2: Space Traffic Management

Space activities are regulated by the five space treaties and agreed principles. Nevertheless, they do not provide a legal framework for space traffic management. With more actors in space, and an increasing reliance on space services, the issue requires the attention of legislators.

Presentations (10 min) and Roundtable discussion

- Christophe Bonnal, IAF Co-Chair of the Joint IAF/IAA/IISL Space Traffic Management Working Group
- Peter Martinez, President, Secure World Foundation
- Wayne R. Monteith, Administrator of the Commercial Space Office, Federal Aviation Administration (FAA)
- Elina Morozova, Intersputnik International Organization of Space Communications

Moderation by Kai-Uwe Schrogl, President, International Institute of Space Law

• Paulo Eduardo Vasconcellos, Director of Space Transportation and Licensing, Brazilian Space Agency (AEB)

17:15 **Closing Remarks**

• Kendra Horn, Chairperson, US House Science Subcommittee on Space and Aeronautics and Chair of the 10th IAF MOP Event

	Moderation of the event by Kendra Horn , Chai Aeronautics and Isabelle Duvaux Bechon, Head European Space Agency
17:45	Adjourn
19:00	IAF International Meeting for Members of Par Shaw Ballroom - Residence Inn by Marriott 901 L Street NW, Washington, D.C.
Monday 21 O	ctober 2019
08:00 - 09:00	VIP Gathering – South Prefunction (Walter E. V
09:00 - 11:00	IAC 2019 Opening Ceremony Grand Ballroom ABC, Third Floor (Walter E. W MoPs
11:00 - 12:00	Opening of the IAC 2019 Exhibition and VIP To
	Gathering at the entrance of the ExhibitionOpening and VIP Tour of the Exhibition
12:00 - 13:00	VIP Luncheon sponsored by L3Harris - South P
13:15 – 14:45	Plenary Event 1: Heads of Space Agencies "Sp Space Environment" – Grand Ballroom ABC
15:00 - 18:00	Free time to visit the Exhibition and attending
18:15 - 19:30	Plenary Event 2: Host Plenary "Evolving Ap Ballroom ABC
19:30 - 22:30	IAC 2019 Welcome Reception – Exhibition Hall
Tuesday 22 Oc	ctober 2019
07:00 - 08:00	Dynetics Industry Breakfast
08:00 - 08:30	IAF Excellence in Industry Award to Blue Origi
08:30 - 09:30	Plenary Event 3 "The Long-Term Sustainability
12:00 - 15:30	MoP Visit to Capitol Hill
12:00	MoPs Gathering at L Street Entrance (Walter E.

Shuttle bus departure

Members of Parliaments tour U.S. Capitol

Shuttle bus departure from Capitol Hill

- RHOB)

12:15

12:35

12:50

13:00

14:30 15:00

15:20

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SSOCIATE EVENTS





irperson, US House Science Subcommittee on Space and d of Member States Relations and Partnership s Office,

rliaments Cocktail and Dinner

Washington Convention Center)

/ashington Convention Center) – Reserved VIP Seats for the

our Hall (Hall D and E)

Prefunction

pace Agencies: Challenges and Opportunities in a changing

the GNF Programme

ollo: The Next 50 Years in Human Spaceflight" - Grand

(Hall D and E)

in - Fireside Chat with Jeff Bezos – Grand Ballroom AB y of Outer Space" – Grand Ballroom AB

Washington Convention Center)

Security Screening and entrance at Rayburn House Office Building, arrival at Rep. Bill Posey's office (2150

Members of Parliaments meet with Congressman Posey (tentative)

Members of Parliaments meet with Congressman Posey (tentative)

Shuttle bus arrival at Walter E. Washington Convention Center

SSOCIATED EVENTS



7.3 IAC Hosts Summit – Sixth Session (Closed Meeting)

Date:	Sunday 20 October 2019		An in-depth analysis of how the IAC Corpore theme of the Congress. How does the IAC vision
Time: Venue:	10:30-13:00 Walter E. Washington Convention Center, Room 202B	Moderator:	Philippe Willekens CSAC Chair, International Astronautical Fed
Time:	Programme	Panellists:	Sandy Magnus IAC 2019 LOC Co-Chair
Opening 09:00	Welcome Address and Opening Remarks by Master of Ceremony & Moderator		Saud Karmustaji Director, Corporate Communication, Mohai IAC 2020 Team
	Vice President – Global Sales, Marketing & Customer Experience, Blue Origin, United States Vice President for Financial Matters and IAC Evolution, International Astronautical Federation (IAF)		Lionel Suchet Chief Operating Officer, Centre National d'É IAC 2021 LOC Chair
Keynote	IAC 2018: the IAC of All Records The IAC 2018 holds the newest record of attendance with more than 6.500 delegates from the record number of 83 countries (with 40% of delegates being below the age of 35) and more than 10.000 participants attending Public Day. The Congress Programme was a record itself, with recording-breaking numbers of Global Networking Forum Sessions (GNF), Technical Sessions, Special Sessions, and by being the most loved and tweeted IAC theme ever #InvolvingEveryone. The IAF General Assembly also elected the first ever woman to represent the Federation as President, Prof. Pascale Ehrenfreund.		Rashad Nabiyev CEO, Azercosmos IAC 2022 Bidder Jonathan Hung President, Singapore Space and Technology IAC 2022 Bidder
	Heiner Heseler Chairman of the IAC 2018 Steering Committee		Director, Vikram Sarabhai Space Centre, In IAC 2022 Bidder
Panel Disc	ussion The IAF, the IAC Host and the PCO: a Commitment to Trust, Communication and Transparency		Paulo Eduardo Vasconcellos Director, Space Transportation and Licensin IAC 2022 Bidder
	Trust, communication and transparency are fundamental to ensure the success of an IAC. This panel of IAC experts will discuss what is the best approach to develop a longstanding and trustworthy relationship between the IAF, the IAC Host and the PCO?	Keynote	A New Era of IAC New initiatives, new tools, new technologies of evolution of the IAC. How is the IAF respond
Moderator	: Christian Feichtinger Executive Director, International Astronautical Federation (IAF)		improved IAC experience for its participants?
Panellists:	Salem Humaid Almarri Assistant Director General for Science & Technology Centre, Mohammed Bin Rashid Space Centre		Christian Feichtinger Executive Director, International Astronauti
	(MBRSC) IAC 2020 LOC Chair	Closing	Closing Remarks
	<i>Merlene De Cunha Gomes</i> Sales Manager – Production Services, DXB Live IAC 2020 PCO		Christian Feichtinger Executive Director, International Astronauti
	Lionel Baize Innovation & Foresight Team, Centre National d'Études Spatiales (CNES) IAC Paris 2021 Project Manager	13:00 - 14:00	Hosts Summit Lunch
	Delphine Baudouin IAC 2021 PCO Representative Director of K.I.T Group France		
	Jan Kolar CSAC Member, International Astronautical Federation (IAF) IAC 2010 LOC Chair and Past IAF Vice President		

Coffee break





Panel Discussion The Impact of IAC Corporate Branding

h analysis of how the IAC Corporate Branding is important in representing the message and he Congress. How does the IAC visual identity contribute to the success of the event itself?

nair, International Astronautical Federation (IAF)

Corporate Communication, Mohammed Bin Rashid Space Centre (MBRSC)

perating Officer, Centre National d'Études Spatiales (CNES)

nt, Singapore Space and Technology Association (SSTA)

Vikram Sarabhai Space Centre, Indian Space Research Organisation (ISRO)

Space Transportation and Licensing Department, Brazilian Space Agency (AEB)

tives, new tools, new technologies and environmental challenges are contributing to the natural of the IAC. How is the IAF responding to the current trends and how is it creating a new and

ve Director, International Astronautical Federation (IAF)

ve Director, International Astronautical Federation (IAF)

AWARDS SOCIAL EVENTS STUDENTS & YOUNG CONGRESS CONGRESS CONGRESS WASHINGTON D.C. ORGANIZERS WESCOME PROCFICAL WASHINGTON D.C. ORGANIZERS MESSAGES EVENTS EVENTS		
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	SOCIAL EVENTS	

International Astronautical Congress 21-25 October 2019 | Washington, D.C

7.4 IAF Public Speaking & Presentation Skills Lab

Date: Sunday 20 October 2019 Time: 15:00 - 17:00

Walter E. Washington Convention Center, Room 151B Venue:





Whether you are pitching your project or a business idea, presenting as an author, speaking as a moderator or a panellist in a plenary or a GNF session, or simply delivering meeting talking points to peers, the IAF Public Speaking & Presentation Skills Lab (IAF PS Lab) will give you the tools to connect with your audience.

The IAF PS Lab is a two-hour coaching session to help you make your presentations more interesting while teaching you the confidence skills you need to get up and give a public talk, whether it be to an audience of three or three hundred. The event will be led by the International Public Speaking Coach, TEDx Speaker and Best-Selling author Jason Teteak who has taught more than one million people how to flawlessly command attention and connect with audiences in their unique style.

During the session, Jason will share his secrets on how to improve your public speaking and presentation skills. Here is what you can learn from the IAF PS Lab:

- Master proper stance, body language, and vocal techniques;
- Boost confidence and charisma;
- Understand presentation "pitfalls" and how to avoid them;
- Think outside the box to make presentations more exciting, engaging, and memorable.

Join us at the first IAF PS Lab session on Sunday 20 October from 15:00 to 17:00.

7.5 27th Workshop on Space Technology for Socio-Economic Benefits: "Ensuring Inclusiveness through Space-based Applications and Space Exploration"

Date:	Friday 18 - Sunday 20 October 2019
Time:	08:00 - 17:30
Venue:	Walter E. Washington Convention Center, Roo
	152A, 152B

INTRODUCTION AND BACKGROUND

The International Astronautical Federation (IAF) with the support of The United Nations, through its Programme on Space Applications implemented by the United Nations Office for Outer Space Affairs (UNOOSA), is organizing the Workshop on Space Technology for Socio-Economic Benefits on the theme "Ensuring Inclusiveness Through Space-Based Applications And Space Exploration" to provide space emerging countries with capacity building opportunities in using space science, technologies, applications and exploration in support of sustainable economic, social and environmental development and on the role of industry.

WORKSHOP OBJECTIVES

The Workshop will facilitate exchanges on space science, technologies, applications and exploration in support of economic, social and environmental development with a focus on inclusiveness as an underlying factor in sustainable development. It will provide opportunities for space emerging countries to perceive space as contributor to inclusive growth of countries, especially as a catalyst in empowering people and ensuring inclusiveness and equality. Considering the direct and/or indirect relevance of space to all 17 Sustainable Development Goals (SDGs), the workshop will address the specific elements of SDG 4 (quality education), SDG 8 (decent work and economic growth), SDG 10 (reduced inequalities), SDG 13 (climate action) and SDG 16 (peace, justice and strong institutions), in addition to SDG 17 (partnerships for the Goals). The Workshop will serve as a platform to ensure inclusive development in the areas of space technologies taking people, students, private sectors, researchers, academia, innovators and other actors on board in bringing benefits of space to the end users.

The main objectives of the Workshop are to:

- 2. Demonstrate success stories of space applications for SDGs with focus on inclusiveness and equality;
- 3. Promote and discuss inclusiveness on space exploration;
- trigger inclusiveness through new partnerships involving space emerging nations and industries; and
- 5. Bring together policy- and decision-makers, and the research and academic communities to help integrate space into policy and the decision-making process.

Presentations made during the Workshop will be published on the website of the Office for Outer Space Affairs to increase awareness about the capabilities and benefits of space technology applications. The report of the Workshop and its recommendations will be distributed to the participants and the space technology user community.

EXPECTED OUTPUTS

The role of space applications and exploration is increasing and strengthening cooperation across all sectors related to sustainable development, particularly in the context of developing countries. This workshop shall complement the High-Level Political Forum on Sustainable Development to take place in 2019 and, considering the needs of space emerging countries and commitments of space faring nations, the workshop will focus on the following set of Sustainable Development Goals:

- Goal 4: Quality Education. How space exploration contributes to inclusive and equitable guality education and promote lifelong learning opportunities for all
- and productive employment and decent work for all through space technologies
- · Goal 10: Reduced Inequalities. Space exploration and its contribution to the reduction of inequality within and among countries





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1. Provide insight on how space applications contribute to empowering people and ensuring inclusiveness and equality;

4. Raise awareness on the efforts of the international space community on how space exploration and innovations can

Goal 8: Decent Work and Economic Growth. How to promote sustained, inclusive and sustainable economic growth, full

- Goal 13: Climate Action. Utilising space technologies to combat climate change and its impacts
- Goal 16: Peace, Justice and Strong Institutions. Space technologies promoting peaceful and inclusive societies for sustainable development, providing access to justice for all and building effective, accountable and inclusive institutions at all levels
- Goal 17: Partnerships for the Goals. Strengthening the means of implementation and revitalize the global partnership for sustainable development within the space community and offering space technology-based tools to promote partnerships for development

The workshop will demonstrate the relevance of space applications and exploration in promoting inclusiveness and the linkages between space and the 2030 Agenda; it will provide global solutions to our common challenges, promote prosperity for all and endeavour to leave no one behind.

HIGH LEVEL PANEL: Efforts of The Space Community to Ensure No One Is Left Behind

Leaders of international organisations, space agencies, and the industry will speak about their vision of and plans regarding the role of space-related industries in ensuring inclusiveness.

THEMATIC SESSIONS

Session 1: Space for Inclusiveness: Leaving no oneBehind

The session will focus on initiatives that aim at leaving no one behind, utilizing space as the subject matter. The link between the projects presented and their impact on national planning or strategies shall be presented. This session is most relevant to space-related projects that target specific communities.

Session 2: Mobilizing everyone: Innovative Space Applications for Socio-Economic Development

The session will present innovative space applications and programmes in support of socio-economic development at the national and regional level. It will demonstrate progress in space applications, tools, models, and solutions integrating space data with in-situ data. The session will provide comprehensive discussion on the use of data received from advanced space-based sensors, satellite navigation, and satellite communication. Experts will present operational programmes launched by their organisations in support of mobilizing everyone through socio-economic development.

Session 3: Space Exploration for Everyone

Space exploration activities have peaked in recent years. Space is becoming more and more accessible to everyone. The development of CubeSats has opened the door to new players in low earth orbit; they have now been launched even towards Mars. Radio hobbyists have had the opportunity to listen to the Longjiang-2 satellite, of only 47 Kg, orbiting the moon. This session will focus on initiatives aiming at lowering the entry barriers of space exploration, such as standardization of space exploration systems or international cooperation. This session is open to research institutions and universities.

Session 4: Opportunities for Space Emerging Countries and Industries to Join Efforts On Space Exploration

The session will present opportunities and collaboration offered by UNOOSA, space agencies and international organisations towards access to space education, access to space data, access to space technology and research facilities and direct access to space. The session aims to reinforce the vision of the UNISPACE+50 thematic priority on "Global partnerships in space exploration and innovation". For more information on UNISPACE+50, please see:

http://www.unoosa.org/oosa/en/ourwork/unispaceplus50/index.html

Breakout sessions

Breakout interactive sessions will be organised on specific topics to get contributions from participants on the objectives of the workshop. The topics for the breakout sessions are:

- I. Opportunities for space education and capacity building;
- II. UNOOSA's Access to Space for All initiative; and
- III. Space for youth innovative ideas on space exploration.

Poster session

Participants may indicate their interest in exhibiting posters. Note that there will be no provision for a screen presence for virtual posters.

PROGRAMME AT A GLANCE

	18 October 2019	19 October 2019	20 October 2019
Morning	08:00-09:00 Registration	09:00-10:35 Session 3:	09:00-09:20 Keynote speech
	09:00-10:15 Opening ceremony 10:15-10:30 Coffee break 10:30-10:50 Keynote speech 10:50-12:30 Session 1: Space for Inclusiveness: Leaving no one behind	Opportunities for space emerging countries and industries to join efforts on space science and technology <i>10:35-11:00 Coffee break</i> 11:00-11:30 High Level Keynote speech 11:30-13:00 Session 4: Space exploration for everyone	09:20-10:30 High Level Panel: Efforts of the space community to ensure no one is left behind <i>10:30-11:00 Coffee break</i> 11:00-11:20 Keynote speech 11:20-11:45 Closing ceremony
Lunch	12:30-13:30 Lunch break	13:00-14:00 Lunch break	
Afternoon	13:30-15:00 Session 1 (continued): Space for Inclusiveness: Leaving no one behind 15:00-15:30 Coffee break and poster session 15:30-15:50 Keynote speech 15:50-17:30 Session 2: Mobilizing everyone: Innovative space applications for socio-economic development	14:00-15:30 Interactive session 15:30-16:00 Coffee break and poster session 16:00-17:30 Session 5: Developing collaborations for space applications 18:00-21:00 Recention*	
		18:00-21:00 Reception*	

*The reception will be held in the South Prefunction area of the Walter E. Convention Center (3rd floor)

EVENTS









AGENDA OF THE WORKSHOP

Friday, 18 October 2019, Morning session

Time	Activity		
08:00	Registration		
00.00 10.05	Opening ceremony		
09.00-10.05	Chair: Shirish Ravan		
09:00-09:10	Opening remarks	Jon Harrison	US Department of State
00.10 00.20	Opening remarks (video message)	Simonetta Di Pippo	UN Office for Outer Space Affairs (UNOOSA)
09.10-09.20	Opening remarks (video message)	Jean-Yves Le Gall	International Astronautical Federation (IAF)
09:20-09:30	Opening remarks	Pascale Ehrenfreund	International Astronautical Federation (IAF)
09:30-09:40	Opening remarks	Vincent Boles	American Institute of Aeronautics and Astronautics (AIAA) (USA)
09:40-09:50	Opening remarks	Christina Giannopapa	Committee for Liaison with International Organisations and Developing Nations (CLIODN)
09:50-10:00	Opening remarks	Pamela Melroy	National Aeronautics and Space Administration (NASA)
10:00-10:15	Setting the scene	Shirish Ravan	UN Office for Outer Space Affairs (UNOOSA)
10:15-10:30	Coffee break		

Friday, 18 October 2019, Morning session (continued)

Time	Activity		
10:30-10:50	Keynote speech	Kai-Uwe Schrogl	International Institute of Space Law (IISL)
10.50 12.20	Session 1: Space for inclusiveness: Leaving no one b	ehind	
10:50-12:50	Chair: Kai-Uwe Schrogl	Rapporteur: Milica Mi	ilosev
10:50-10:55	Setting the scene (session 1)	Kai-Uwe Schrogl	International Institute of Space Law (IISL)
10:55-11:05	Inspiring Stars and a sonification tool for teaching astronomy and observing solar eclipses	Allyson Bieryla	International Astronomical Union
11:05-11:15	Lowering the barriers to STEAM engagement through space-themed, hands-on technical learning and teamwork: A case study of "Mars Week" at Oxford area schools, South Island, New Zealand	Jennifer Glee Blank	Blue Marble Space (USA)
11:15-11:25	The Travelling Telescope: A social enterprise dedicated to promoting science and technology using astronomy tools	Susan Murabana Owen	The Travelling Telescope (Kenya)
11:25-11:30	Q&A		
11:30-11:40	Putting the stars within reach: NASA 3D data- based models in 3D print and Virtual Reality applications, and their potential effects on improving spatial reasoning skills and STEM interest in underrepresented groups of young female learners	Kimberly Arcand	Center for Astrophysics, Harvard & Smithsonian (USA)
11:40-11:50	Space for international cooperation for sustainable development	Christina Giannopapa	Committee for Liaison with International Organisations and Developing Nations (CLIODN)
11:50-12:00	Girls InSpace project: Looking up, going higher	Alessandra Abe Pacini	InSpace LLC (USA)
12:00-12:10	Natural Physics global outreach: A global outreach template for our global community	LeRoy Larry	Natural Physics Global Outreach (Costa Rica)
12:10-12:30	Q&A and discussion with the audience		
12:30-13:30	Lunch break		







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Friday, 18 October 2019, Afternoon session

Time	Activity		
12:20 15:00	Session 1 (continued): Space for inclusiveness: Leaving no one behind		
15.50-15.00	Chair: Danielle Wood	Rapporteur: Georgios	s Profitiliotis
13:30-13:35	Setting the scene (session 1)	Danielle Wood	Massachusetts Institute of Technology (USA)
13:35-13:45	She-Space International: Societal change through space science and technology education	Shimrit Maman	Ben-Gurion University of the Negev (Israel)
13:45-13:55	Space diplomacy: Gender equality and sustainable development	Witchayanee Ocha	Rangsit University (Thailand)
13:55-14:05	Extending human presence into the solar system for the benefit of all	Lara Keaney	National Aeronautics and Space Administration (NASA) (USA)
14:05-14:10	Q&A		
14:10-14:20	UNOOSA Space for Women	Irianna Vlachopoulou	UN Office for Outer Space Affairs (UNOOSA)
14:20-14:40	From local to global: A framework for a new space paradigm	John Paul Donehoo	The Space Team (USA)
14:40-14:50	The importance of cross-culture communication in the NEO community	Nancy C. Wolfson	IAF Technical Committee on NEOs
14:50-15:00	Q&A and discussion with the audience		
15:00-15:30	Coffee break and poster session 1		
	Keynote speech		
15:30-15:50	The new paradigm for cooperation in the UN system to promote commercial space for sustainable development	Kenneth Hodgkins	US Department of State
15.50 17.15	Session 2: Mobilizing everyone: Innovative space ap	plications for socio-eco	onomic development
12:20-17:12	Chair: Kenneth Hodgkins	Rapporteur: Arthur N	lielsen Demain
15:50-15:55	Setting the scene (session 2)	Kenneth Hodgkins	US Department of State
15:55-16:05	How Earth observation SAR data as the InSAR landslide models have been allowed to support disaster emergencies in emerging countries	Norma Angelica Davila Hernandez	Autonomous University of Mexico State (Mexico)
16:05-16:15	High resolution earth observation radar data for disaster management: Presentation of use-cases applied in real scenarios in Ghana, Guatemala, Brazil and other countries	Ciro Farinelli	Airbus Defence and Space (Germany)
16:15-16:25	World Space Week Association: Strengthening the link between space and society	Maruska Strah	World Space Week Association
16:25-16:30	Q&A		
16:30-16:40	Space and astronomy for achieving socioeconomic development	Ramasamy Venugopal	International Astronomical Union
16:40-16:50	Smile Donation	Hayaki Tsuji	Tsuji Music Office (Japan)
16:50-17:00	Capacity-building for emerging space states: ISU's ARESS and Space Ready reports	Andrew Butler	University of Melbourne (Australia)
17:00-17:10	Space technology and application: Sustainable tools for monitoring and management of global natural resources	Basuti Bolo	Botswana International University of Science and Technology (Botswana)
17:10-17:30	Q&A and discussion with the audience		
17:30	Closure		

Saturday, 19 October 2019, Morning session

Time	Activity			
	Session 3: Opportunities for space emerging countries and industries to join efforts on space science and			
09:00-10:45	technology			
	Chair: Valanathan Munsami	Rapporteur: Claire Nel	son	
09:00-09:05	Setting the scene (session 3)	Valanathan Musami	South African National Space Agency (South Africa)	
09:05-09:15	Practical strategies in using space to support the realization of the UN Sustainable Development Goals in the developing countries	Ganiyu Ishola Agbaje	African Regional Centre for Space Science and Technology Education (Nigeria)	
09:15-09:25	How Alcantara's launch center can be used to promote regional development in Brazil	Michele Cristina Silva Melo	Brazilian Space Agency (Brazil)	
09:25-09:35	Space-based projects to improve STEM/STEAM education from an emerging economy perspective: The case of Paraguay	Alejandro Jose Roman Molinas	Paraguayan Space Agency (Paraguay)	
09:35-09:40	Q&A			
09:40-09:50	Space programmes supporting socio-economic development: How to help all to benefit	Isabelle Duvaux- Bechon	European Space Agency (ESA)	
09:50-10:00	The space applications needed by Sri Lanka	Dulani Chamika Withanage	Arthur C. Clarke Institute of Technology for Modern Technologies (Sri Lanka)	
10:00-10:10	Value creation from space technology through data, industry and people: The Philippines' Space Technology & Applications Mastery, Innovation and Advancement (STAMINA4Space) programme	Joel Joseph Marciano	Advanced Science and Technology Institute (Philippines)	
10:10-10:20	Economic, social and environmental development through new space industry emergence	Kenneth John Davidian	SpaceBase (New Zealand)	
10:20-10:35	Q&A and discussion with the audience			
10:35-11:00	Coffee break			
11:00-11:30	High level keynote speech	Pascale Ehrenfreund	German Aerospace Centre (DLR) (Germany)	
	Session 4: Space exploration for everyone			
11:30-13:00	Chair: Isabelle Duvaux-Bechon	Rapporteur: Ayami Ko	jima	
11:30-11:35	Setting the scene (session 4)	Isabelle Duvaux- Bechon	European Space Agency (ESA)	
11:35-11:45	Lessons learned from 20 space capacity building programmes	Roman Alexander da Silva Curiel	Surrey Satellite Technology Ltd (United Kingdom)	
11:45-11:55	Space science and technology: The future of girls and women in Africa	Chidinma Joy Iroka	National Space Research and Development Agency (Nigeria)	
11:55-12:05	Effective space taxation policy today can increase investment in space settlements	Robert Aillon	Leviathan Space Industries LLC (Ecuador)	
12:05-12:10	Q&A			
12:10-12:20	Collaborative educational life sciences experimentations in space	Pascale Lefebure	Kayser Italia (Italy)	
12:20-12:30	DropTES Programme: International collaboration towards educational microgravity research - The StELIUM case	Alvaro Romero Calvo	Politecnico di Milano (Italy)	
12:30-12:40	The International Space Station: A dynamic platform advancing the Sustainable Development Goals through collaboration	Adrienne Joy Provenzano	Butler University (USA)	
12:40-12:50	Understanding gamification to design human Mars missions	Ozan Kara	DeltaV Space Technologies Inc (Turkey)	
12:50-13:00	Q&A and discussion with the audience			
13:00-14:00	Lunch break			






Saturday, 19 October 2019, Afternoon session

Time	Activity		
14:00-15:30	Interactive session		
15:30-16:00	Coffee break and poster session 2		
16.00 17.20	Session 5: Developing collaborations for space appl	ications and education	
16:00-17:30	Chair: Soyoung Chung Rapporteur: Dulani Chamika Withanage		hamika Withanage
16:00-16:05	Setting the scene	Soyoung Chung	Korea Aerospace Research Institute (KARI) (South Korea)
16:05-16:10	The Integral Regional System of Satellite Information (SIRIS) to foster the use of space applications for the climate change: An example of regional cooperation in Latin America towards the achievements of the SDGs	Jesus Roberto Romero Ruiz	Mexican Space Agency (Mexico)
16:10-16:20	Encouraging the take up of satellite applications through joined up government: The cases of the adoption of telemedicine and AML in Europe	Alessandra Vernile	Eurisy (France)
16:20-16:30	Opportunities for space education at graduate level in INPE-Brazil for international students	Antonio Fernando Bertachini de Almeida Prado	National Institute for Space Research (Brazil)
16:30-16:35	Q&A		
16:35-16:45	SEEDS: An intercultural and interdisciplinary joint initiative by European Universities to promote space education internationally	Shrrirup Nambiar	Politecnico di Torino (Italy)
16:45-16:55	Space4Youth	Ayami Kojima	UN Office for Outer Space Affairs (UNOOSA)
16:55-17:05	Raising Awareness and Inspiring Action: Bringing the SDGs to the SpaceGen	Matteo Cappella	Space Generation Advisory Council
17:05-17:15	Leveraging Earth observation for monitoring and evaluation of environmental interventions	Anupam Anand	The Global Environment Facility
17:15-17:30	Q&A and discussion with the audience		
17:30	Closure		
18:00-21:00	Reception		

Sunday, 20 October 2019, Morning session

Keynote speech 09:00-09:20 Space for sustainable development: A practitioner's perspective Chris Lee UK Space Agency (United Kingdom) High level panel: Efforts of the space community to ensure no one is left behind Chair: Jean-Francois Clervoy Rapporteur: Irianna Vlachopoulou High level panel discussion Simonetta Di Pippo UN Office for Outer Space Affairs (UNOOSA) High level panel discussion Jon Harrison US Department of State			
09:00-09:20 Space for sustainable development: A practitioner's perspective Chris Lee UK Space Agency (United Kingdom) High level panel: Efforts of the space community to ensure no one is left behind Chair: Jean-Francois Clervoy Rapporteur: Irianna Vlachopoulou High level panel discussion Simonetta Di Pippo UN Office for Outer Space Affairs (UNOOSA) High level panel discussion Jon Harrison US Department of State			
High level panel: Efforts of the space community to ensure no one is left behindChair: Jean-Francois ClervoyRapporteur: Irianna VlachopoulouHigh level panel discussionSimonetta Di PippoUN Office for Outer Space Affairs (UNOOSA)High level panel discussionJon HarrisonUS Department of State			
Chair: Jean-Francois ClervoyRapporteur: Irianna VlachopoulouHigh level panel discussionSimonetta Di PippoUN Office for Outer Space Affairs (UNOOSA)High level panel discussionJon HarrisonUS Department of State			
High level panel discussionSimonetta Di PippoUN Office for Outer Space Affairs (UNOOSA)High level panel discussionJon HarrisonUS Department of State			
High level panel discussionJon HarrisonUS Department of State			
09:20-10:30 High level panel discussion Marius-Ioan Piso Romanian Space Agency (ROSA) (Romania)			
High level panel discussion Pascale Ehrenfreund German Aerospace Centre (DLR) (Germany)			
High level panel discussion Yoshikazu Shoji Japan Aerospace Exploration Agency (JAXA) (Japan)	วท		
High level panel discussion High scussion High level panel discussion High scussion High scussion Hi)		
10:30-11:00 Coffee break			
Keynote speech	Keynote speech		
11:00-11:20 Collaborative research of JAXA and TUS on space colony Tai Nakamura Japan Aerospace Exploration Agency (JAXA) (Japan)	วท		
Closing ceremony	Closing ceremony		
Chair: Irianna Vlachopoulou	Chair: Irianna Vlachopoulou		
11:20-11:25Closing remarksSimonetta Di PippoUN Office for Outer Space Affairs (UNOOSA)			
11:25-11:30 Closing remarks Jean-Yves Le Gall IAF			
11:30-11:45 Closure and photo opportunity			

ASSOCIATED EVENTS









POSTER SESSIONS

Poster session 1

Title	Author	Organisation
Aerospace business opportunities in Central America: Research and Development activities	Russell Torres Castro	FUNDECISE Fundación para el Desarrollo de las Ciencias la Sociedad y el Estado (Costa Rica)
Socio-economic impact assessment of watercourse rehabilitation programs in Sindh, Pakistan	Arjumand Zehra Zaidi; Sumaira Zafar; Muhammad Arslan	Mehran University of Engineering and Technology (Pakistan)
Rainwater harvesting to achieve environment, equity, and economy goals in the rainfed area of Punjab, Pakistan, using geospatial techniques	Vengus Panhwar; Arjumand Zehra Zaidi; Asmat Ullah	Mehran University of Engineering and Technology (Pakistan)
Crop water stress detection by remote sensing: A case study of the Lower Arkansas River Valley, Colorado	Nabeel Alikhan; Arjuman Zehra Zaidi; Asmat Ullah	Mehran University of Engineering and Technology (Pakistan)
Launching the satellites within: Accelerating space and peace affairs through design thinking	Arthur Nielsen Demain	Madaris Volunteer Program (Philippines)
SpaceClime: The innovative concept	Milica Milosev	Team 54 Project International
Potential synergies between space exploration and sustainable development on Earth, in light of SDG 15 - Life on Land	Georgios Profitiliotis	National Technical University of Athens (Greece)
The way forward: An implementation agreement for the Moon Treaty	Dennis Charles O'Brien	The Space Treaty Project (USA)
Global solutions for a global problem: How any country can contribute towards addressing the threat of asteroid impacts	Alexander Karl	IAF Technical Committee on NEOs
Building resilience using open source technology	Abheejit Khandagale	Vruksh Ecosystem Foundation (India)
Exploratory study for sustainability of space science education: A case study in Australia	Andoh Michael Afful	RMIT University (Australia)
The role of space technology in addressing the climate crisis: Using SpaceClime to build climate resilience	Daniel Chidubem Gbujie	Team 54 Project International
Use of Earth observation in crop insurance and yield estimation	Benard Sabwa Akenga	Davacc Tech (Kenya)
The role of developing countries in development of International law on space arms control	Syed Muhammad Miqdad Mehdi	Xian Jiaotong University (China)
Developing a space research center in Guatemala	Victor Hugo Ayerdi Bardales	Universidad del Valle de Guatemala (Guatemala)
A proposal to make an emerging space country 'space attractive' for its own citizens	Rigoberto Reyes Morales	Kyushu Institute of Technology (Japan)

Poster session 2

Title	Author	Organisation
Democratizing access to space: Lessons from New Zealand	Richard Sandor Bodo	SpaceBase (New Zealand)
Space 5.0: Building a collective intelligence machine to empower the general public and create new jobs in 4IR	Mina Takla	CosmoX (Russia)
Remote Sensing assessment of agriculture and associated factors in South Asian countries: Climate change monitoring for food security	Imran Ahmed Khan	University of Karachi (Pakistan)
Use of remote sensing in agriculture	Marie Brigitte Makuate	African Regional Institute for Geospatial Information Science and Technology (Nigeria)
Provision of access to space environment testing facilities for capacity-building and socio-economic development in emerging space economies: An African case study	Benjamin Bonsu	Kyushu Institute of Technology (Japan)
Project Praheya: The use of virtual ground station to support middle and high science education in India	Anirudh N Sharma	Digantara Research and Technologies Private Limited (India)
Inclusive development of rural India through space technology applications	Madhava Rao Vasala	Giet University (India)
Space technology in developing countries for agriculture	Poornima Peiris	Harvard University (USA)
Loss, acceleration and transport of relativistic electrons during geomagnetic disturbances	Binod Adhikari	St. Xavier's College (Nepal)
Role of insurance in tackling changes in NewSpace	Helen Tung	Elseco (UAE)
Development and applications of remote sensors in Low Earth Orbit (LEO) to improve the decision making about climate and environmental resiliency in the Caribbean and the Hispaniola island – phase 1	Edwin Antonio Sanchez Camilo	Instituto Tecnologico de Santo Domingo (Dominican Republic)
Integrating satellite Remote Sensing with water storage balance for water management	Ramsha Muzaffer	US Pakistan Center of Advance Studies in Water- Mehran University of Engineering and Technology (Pakistan)
Peaceable futures in lunar ville 2036: Reflections on the establishment of the space heritage site on the Moon and the first space goodwill games	Claire Alicia Nelson	The Futures Forum; Institute of Caribbean Studies (USA/Jamaica)
A plastic scintillator system coupled to a silicon photomultiplier read-out for cosmic ray charge measurement in space environment	Francesco Giordano	University of Bari (Italy)
Implementing inclusiveness through enhancing of participation of youth in space activities	Gulnara Omarova	Astrophysical Institute (Kazakhstan)
Habitat Marte research station as a tool to promote space education based on sustainability	Davi Alves Feitosa de Souza	Federal University of Rio Grande do Norte (Brazil)

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SOCIAL EVEN

AWARDS

7.6 IAA Academy Day

Date:	Sunday 20 October 2019
Time:	09:00 - 20:00
Venue:	Room 146 B

THE INTERNATIONAL ACADEMY OF ASTRONAUTICS (IAA) - ACADEMY DAY - PROGRAMME

	IAA Plenary Session - Open Meeting
09:00	Opening of the Academy Day, Peter Jankowitsch , IAA President John Schumacher, M2, introduce Jim Bridenstine, M4, NASA Administrator
09:10	Thomas Stafford (M3) video exchange with Alexei Leonov (Honorary member) in Star City, Moscow, Russia
09:30	Introduction to the Laurels by Francisco Mendieta-Jimenez, Vice-President
09:35	The 2019 IAA Laurels for Team Achievement: China-Brazil CBERS Earth Resource Satellite Program. <i>Wu Meirong</i> , <i>M4</i> , <i>China</i> , <i>Jose Braga-Coelho</i> , <i>M4</i> , <i>Brazil</i>
10:15	Space exploration plans in India, Kailasavadivoo Sivan, M4, Chaiman ISRO
10:45	Interplanetary missions. Modern achievements and problems of gravitational physiology. <i>Elena Fomina, Russia</i>
11:15	Space exploration plans in USA, <i>Scott Pace, M4, USA</i>
11:45	Space exploration plans in Europe, David Parker, ESA
12:15	IAA Luncheon (in advance Registration)
13:30	30 th IAA Regular Meeting (restricted access) Induction of the 2019-2021 Board of Trustees
14:30	End of Restricted Meeting
	IAA Plenary Session - Open Meeting
14:35	Apollo Anniversary, Chair: Otfrid Liepack , M4 Introduction, Anatoly Perminov , M4, Russia, Vice-President Scientific Programs
14:40	Past, Present and Future, Buzz Aldrin, Honorary Member, Apollo 11
15:00	 Pascale Ehrenfreund, M3 Chair of the Executive Board DLR, Moderator, Bill Barry, NASA Chief Historian: Apollo: A 50th Anniversary Perspective Jim Green, NASA Chief Scientist: Apollo's science results John Logsdon, M4, George Washington University: "Once we went to the Moon" McCurdy, American University: "When the moon is in the seventh house" Muir-Harmony, Smithsonian: "Around the World with the Apollo 11 Crew" Roger Launius, M4, Smithsonian: "Apollo's Legacy: A meaning for the Moon Landing"
17:30	End of Session
19:00	Induction Ceremonies for Newly Elected Academicians (in advance registration)
20:00	Awards Gala Dinner (in advance Registration)

7.7 IISL Manfred Lachs Space Law Moot Court Competition

Date:	24 October 2019
Time:	15:00 - 18:30
Venue:	NASA HQ Auditorium

28th MANFRED LACHS SPACE LAW MOOT COURT COMPETITION ORGANIZED BY THE INTERNATIONAL INSTITUTE OF SPACE LAW (IISL)



The Manfred Lachs Space Law Moot Court Competition is organised annually by the International Institute of Space Law (IISL). The first competition was organised for law students from North America by the Association of US Members of the IISL (AUSMIISL) during the first World Space Congress held in Washington, D.C., USA in 1992. One year later, the Competition was extended to include European students. In 2000, the Asia Pacific Round was added, and the African Region was inaugurated in 2011.

Preliminary competitions are held between April and June in each region. The winning teams of the regional rounds meet in the World Finals, which are held in conjunction with the annual IISL Colloquium on the Law of Outer Space. The Final Round is traditionally judged by three 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 competition is based on a hypothetical space law dispute before the International Court of Justice. The Problem is written by a Member of the IISL upon invitation by the Organizing Committee of the Competition, alternating between the different regions. The 2019 hypothetical case is entitled Suniza v Azasi and concerns the use of space resources for military purposes. Additional issues are presented regarding the use of abandoned lunar facilities, and liability for damages resulting from an explosion on the Moon.

Regional Rounds must comply with the Official Rules for the Competition adopted by the IISL Board of Directors. Participating teams are required to submit a 'Memorial' as formal written arguments for both the Applicant State and the Respondent State on the legal issues of the hypothetical case.

In the regional Preliminary Rounds each team with two speakers presents Oral Arguments before panels of three judges. Memorials and Oral Arguments each carry a weight of 50% of the total score of a team. The four winning teams of the regional Preliminary Rounds move on to the Final Rounds.

The expenses of the teams taking part in the Final Rounds are borne by the Japan Aerospace Exploration Agency (JAXA), the European Centre for Space Law (ECSL), NASA, the Secure World Foundation, Obafemi Awolowo University and the South African Department of Trade and Industry. Teams are allowed to revise their Memorials before they resubmit them for the Final Rounds. A panel of judges review and grade the Memorials, and the scores are used to determine the team pairings for the semi-finals oral arguments. These oral arguments are conducted in closed sessions before three judge panels, and the two winning teams qualify for the Final.

The 28th Manfred Lachs Space Law Moot Court Competition will be held in Washington D.C., USA. The Semi-finals will be conducted in closed sessions on Tuesday, 22 October 2019. The Final is a public event and will take place on Thursday 24 October, at the NASA HQ Auditorium in Washington D.C. before a panel of Judges of the International Court of Justice, located in The Hague. Exact timings and transportation arrangements will be announced at the start of the IAC.

Contact details of the Manfred Lachs Moot Court Committee:

Chair Milton "Skip" Smith, lachsmootchair2@iislweb.org Co-Chair Les Tennen, Esq. lachsmootchair1@iislweb.org Co-Chair Melissa K. Force, Esq. melissa.force@spaceportamerica.com

Websites:

Lachs Space Law Moot Court: http://www.iislweb.org/lachsmoot/ Facebook: Lachs Moot Court: <u>http://www.facebook.com/spacemoot</u> Twitter: Lachs Moot Court: http://twitter.com/SpaceLawMoot





IISL: www.iislweb.org

SOCIATED EVENTS



7.8 18th Space Generation Congress (SGC)

17 - 19 October 2019 Date:

Venue: Lockheed Martin, 2121 Crystal Dr, Arlington, VA 22202, USA Website: https://spacegeneration.org/sgc2019

THE GLOBAL SPACE CONGRESS FOR UNIVERSITY STUDENTS AND YOUNG **PROFESSIONALS INTERESTED IN TODAY'S KEY SPACE ISSUES**



The Space Generation Congress (SGC) is the annual meeting of the Space Generation Advisory Council (SGAC) held in conjunction with the International Astronautical Congress. SGC brings together 150 of top university students and young professionals from various areas of the international sector - government, industry, and academia, who have a passion for space.

With SGC, SGAC aims to hone and promote the perspectives of tomorrow's space leaders on today's key space issues. SGC delegates also have the opportunity to meet many high-level international space leaders through networking events. SGC is proudly endorsed by the United Nations Office of Outer Space Affairs.

Aims

The aim of the SGC is threefold:

- First, to strengthen the international network of the Space Generation Advisory Council. From the perspective of the individual delegates, many of whom come from developing countries, it is a chance to interact and engage with the incoming generation of space policy professionals from all over the world. From the perspective of the Space Generation Advisory Council, it allows us to consolidate our international links in order to best represent and facilitate the voice of the next space generation.
- Second, to examine and consider key questions that are facing the space and international community at large and to provide input to international thinking from the next generation of space professionals.
- Third, to allow tomorrow's space sector leaders to grow their network within their generation and to also have the opportunity to interact with today's space leaders by way of our high-level speakers



Space Generation Congress 2018 Delegates in Bremen, Germany

SGC 2019 Programme **

Thursday 17 October

08:00 - 18:00	SGC Sessions
19:00 - 22:00	Space Night

Friday 18 October

08:00 - 17:00	SGC Sessions
19:00 - 22:00	SGC International Cultural Night

Saturday 19 October

08:30 - 15:00	SGC Sessions
15:00 - 17:30	SGC Working Groups Final Presentations
19:00 - 23:00	SGC 2019 Closing Dinner

** Note:

All sessions require attendees to register in advance unless otherwise specified. "SGC Sessions" include featured speakers, Working Group time, networking opportunities

** More information at: <u>https://spacegeneration.org/sgc2019</u>

SGC GALA DINNER – Saturday 19 October

L8:30 - 23:00	SGC 2019 Closing Dinner (Invitation only)
	Address: National Air and Space Museum, 60
	Website: https://spacegeneration.org/sgc20
	For more information about the CCC 2010 C

Clementine Decoopman

SGAC Executive Director clementine.decoopman@spacegeneration.org

Christopher Nie SGC 2019 Manager

christopher.nie@spacegeneration.org

Wrapping up three days of SGAC's 18th Space Generation Congress, the annual SGC Closing Dinner honours the extraordinary work of SGAC's volunteer members, and appreciation of the continuous support of our partners to inspire the next generation of space leaders.

SGAC would like to thank all the Sponsors and Supporters of the Space Generation Congress 2019.



EVENTS





00 Independence Ave SW, Washington, D.C. 20560, USA)1<u>9</u>

For more information about the SGC 2019 Closing Dinner, please email:

	EVENTS
ASSOCIATED EVENTS	
SOCIAL EVENTS	



For more information, please contact:

around the world.

Clémentine Decoopman SGAC Executive Director clementine.decoopman@spacegeneration.org

Christopher Nie SGC 2019 Manager christopher.nie@spacegeneration.org

The Space Generation Advisory Council in support of the United Nations Programme on Space Applications (SGAC) is a non-

governmental, non-profit organization, which aims to represent students and young space professionals to the United Nations,

industry, agencies and academia. SGAC has permanent observer status in the UN Committee on the Peaceful Uses of Outer Space

(COPUOS). SGAC has a long history, and was conceived at the Third United Nations Conference on the Exploration and Peaceful

Uses of Space (UNISPACE-III) in Vienna in 1999. The SGAC Executive Council is made up of representatives from each of the six

UN regions, and has a larger body of representatives from nation states. Our focus is on pragmatic space policy advice to policy

makers based on the interests of students and young professionals, broadly in the age range 18-35, interested in space from

SGAC at the 70th IAC

Sunday, 20 October 2019, 09:00 – 17:00: Hackathon (advanced registration required), Walter E. Washington Convention Center, 143 A, 143 B and 143 C, Washington, D.C.

In the 20 years since the founding of SGAC, we have become established in the space sector as a voice of university students and young professionals to the United Nations, space agencies, industry, and academia. This is through various international SGAC events and project group activities sponsored and mentored by leaders of the space sector. As a part of those efforts, two of our new project groups – Space Technologies for Earth Applications (STEA) and Space Medicine and Life Sciences (SMLS) have come together to host one of SGAC's unique wokshops, the "Space for Earth Hackathon", which provides a platform for SGAC members to innovate and solve UN-SDGs based challenges in interprofessional and multidisciplinary groups. This is to create a realised and measurable impact by students and YPs in the space sector and on the SDGs which can be presented to the UN and other entities where required. These challenges will be proposed by selective industry, academia and government partners whose subject matter experts will provide guidance throughout the day and judge your pitch at the end of it.

For more information, please contact:

Clementine Decoopman SGAC Executive Director clementine.decoopman@spacegeneration.org

Swetha Kotichintala Hackathon Manager swetha.kotichintala@spacegeneration.org

Anthony Yuen Hackathon Manager anthony.yuen@spacegeneration.org

Sunday, 20 October 2019, 09:00 - 17:00: Space Exploration Workshop (advanced registration required), Udvar-Hazy Centre of the National Air and Space Museum, Washington, D.C

The 2019 Space Exploration Workshop, sponsored by NASA SCaN, is aimed at students and young space professionals with little to no prior experience in the areas of space communications and navigation. A morning of talks by subject matter experts will be followed by a practical group exercise in the afternoon. Delegates will be presented with scenarios related to the challenges of deep space communications and navigation, and tasked to solve them using the information and tools taught during the earlier sessions. Lunch and a guided tour of Udvar-Hazy is included.

For more information, please contact:

Clementine Decoopman SGAC Executive Director clementine.decoopman@spacegeneration.org

Ani Vermeulen Sunday Workshop Manager ani.vermeulen@spacegeneration.org

Christopher Nie SGC 2019 Manager christopher.nie@spacegeneration.org

Monday 21 October 2019, 16:00 - SGAC Booth Reception, Exhibition Hall Booth 200

Join SGAC and Space Foundation for refreshments at our Booth (Exhibition Hall Booth 200) and get acquainted with fellow SGAC members, IAC delegates, speakers and panellists.

For more information, please contact:

Clementine Decoopman SGAC Executive Director clementine.decoopman@spacegeneration.org

Christopher Nie SGC 2019 Manager

christopher.nie@spacegeneration.org

SpaceGen Entrepreneurs

Location: Grand Ballroom C, Walter E. Convention Center

Supported by:

Luxembourg Space Agency (LSA)

The SpaceGen Entrepreneurs held for the first time during IAC 2017 in Adelaide, Australia, is an event organised by the Space Generation Advisory Council designed to connect entrepreneurs and potential entrepreneurs with startup veterans and venture capitalists, investors, business angels and business incubators. This year, SGAC proposes a joint GNF with Luxembourg Space Agency focused on the concept of space commercialization. Luxembourg has a dynamic and growing space sector, with more than 50 private, public and academic players. In the context of its unique framework for the exploration and commercial utilization of resources in space and the SpaceResources.lu initiative, about 20 space companies have established a presence in Luxembourg in the last 3 years. Technological progress, cheaper access to space and interest from investors is expected to fuel the growth of the industry in the near future. The SpaceGen Entrepreneurs will feature high-calibre entrepreneurs, business investors and startup experts that will analyse how to capitalize new commercial opportunities in the space industry, discuss the most effective ways to succeed in startup ventures and share the human story behind space entrepreneurs.

The SpaceGen Entrepreneurs format is the following:

- 1. Keynote speech (10 min)
- space startup world sharing their experiences and tips for success
- 3. Entrepreneur's TED-style talk (25 min): Three inspiring entrepreneurs from all over the globe will share their personal how they found their path to success.





Wednesday 23 October 2019, GNF: 9:40 - 10:40 - SGAC Global Networking Forum: SGAC - LSA

2. Startup ecosystem panel (25 min): The panel will feature several prominent space entrepreneurs and CEOs from the

stories behind their ventures. Learn about the challenges they overcame, their experiences in the start-up world, and

Wednesday 23 October 2019, GNF: 15:55 - 16:55 – SGAC Global Networking Forum: Space Supporting the UN Sustainable Development Goals 2030 Agenda

Location: Grand Ballroom C, Walter E. Convention Center

Supported by:

European Space Agency (ESA)



Since the adoption in September 2015 of the 17 United Nations Sustainable Development Goals, there has been an increased understanding that space programmes, projects, applications or technologies are and can be great contributors to the measurement and the achievement of the Goals. Initiatives have been developed at local, regional or global level. Still much has to be done in order to take full benefit of "space" and make sure those tasked to implement the Goals are aware of what exist, or find the right ways to pass the message on what they would need. The Goals have to be reached by 2030, that gives little time to act. The GNF will give the opportunity to some of the actors to exchange on what they propose and what they need.

Speakers and moderators:

Round Table Discussion:

- 1. Jan Woerner, Director General, European Space Agency
- 2. Chris Lee, Chief Scientist/Head of Science Programmes, United Kingdom Space Agency
- 3. Davide Petrillo, Deputy Manager Space Generation Congress 2019, Space Generation Advisory Council
- 4. Simonetta di Pippo, Director, United Nations Office for Outer Space Affairs (UNOOSA)

Moderator:

Isabelle Duvaux-Bechon, Head Member States Relations & Partnerships Office, European Space Agency

On-site contact:

Clementine Decoopman SGAC Executive Director

clementine.decoopman@spacegeneration.org

Christopher Nie SGC 2019 Manager

christopher.nie@spacegeneration.org

Website: www.spacegeneration.org

The Space Generation Advisory Council in support of the United Nations Programme on Space Applications (SGAC) is a nongovernmental, non-profit organization, which aims to represent students and young space professionals to the United Nations, industry, agencies and academia. SGAC hosts conferences around the world to mobilize today's young minds on key space issues.

7.9 Startup and Entrepreneur Programme at IAC 2019

21 – 25 October 2019 Date: Venue: Walter E. Washington Convention Center, Washington, D.C.

IAC TECHNICAL PROGRAM: E.6 BUSINESS INNOVATION SYMPOSIUM

Tuesday, 22 October – Friday, 25 October

The symposium will address creative business approaches to serving government and private sector customers, as well as government options for encouraging this activity. It will also address the general role of government in encouraging space industry applications, new business models in traditional space industry applications (e.g., satellite-based services involving Earth observation, navigation and communications), and new space industry applications (e.g., space tourism, space industrialization, space resource utilization).

- E6.1. Entrepreneurship and Innovation: The Practitioners' Perspectives
- E6.2. Finance and Investment: The Practitioners' Perspectives
- E6.3. Innovation: The Academics' Perspectives
- E6.IP. Interactive Presentations IAF Business Innovation Symposium
- E6.4. Strategic Risk Management for Successful Space

IAF STARTUP PITCH SESSION

Tuesday, 22 October | 16:30–17:45 | Grand Ballroom A

Watch these preselected participants-early- to mid-stage startups-pitch their ideas, solutions, and plans to a jury of international space experts and investors. The eight startups that have been selected to participate in the session are:

- Morpheus Space
- HIVE
- HOSTmi GmbH
- Klepsydra Technologies
- Space Zab Company
- Dipteron
- Intergalactic Education LLC
- Digantara Research and Technologies

@THE LAUNCH SITE

Monday, 21 October – Friday, 25 October | Exhibit Hall, Booth 3008

The Launch Site will:

- Connect the IAC community with startups and entrepreneurs
- Connect startups and entrepreneurs with industry experts and fi nancial resources
- Showcase unique, new products

SSOCIATED EVENTS







SCHEDULE OF LAUNCH SITE

Tuesday 22 October 2019

09:00 – 11:00	Techstars Startup Weekend D.C., Space Kickoff
	(closed session/separate registration required)
	Learn more and register at
	http://communities.techstars.com/usa/washington-dc/startup-weekend/15230

11:00 - 13:00 Starburst Accelerator Company Pitches

Starburst is an innovation catalyst in the aerospace industry. It is the first and only global aerospace accelerator, connecting startups with corporates, investors and government, providing growth and investment opportunities for all.

14:30 - 16:00 **ASCEND Programming: Founders Panel**

In this panel organized by ASCEND Executive Producer Rob Meyerson, hear from the founders on key takeaways from space startup successes and failures. Dialogue with the experts and get your questions answered by space industry pioneers.

Wednesday 23 October 2019

Techstars Starburst Space Accelerator Company Pitches 10:00 - 12:00

The Techstars Starburst Space Accelerator, a Los Angeles-based program, focuses on the next generation of space technology companies and related frontier technologies. Startup companies in commercial space or that are developing related technologies are encouraged to apply. The program consortium includes: NASA's Jet Propulsion Laboratory, U.S. Air Force, Lockheed Martin, Maxar Technologies, SAIC, and Israel Aerospace Industries North America.

To the Moon! Orion's Next Giant Leap into Deep Space 12:30 - 13:30

NASA's Artemis program has a bold charter to land astronauts, including the first woman and the next man, on the Moon by 2024. To achieve this feat, the Orion spacecraft has been designed, developed and tested to gear up for humanity's next giant leap into deep space. Come meet the Orion Program Managers to learn about this bold new endeavor for the future of human space exploration. Panelists include: Mark Kirasich, NASA Orion Program Manager; Dr. Mike Hawes, Lockheed Martin Vice President for Human Space Exploration and Orion Program Manager; Nico Dettmann, ESA Development Projects Group Leader for the Directorate of Human and Robotic Exploration; and Dr. Mark Kinnersley, Airbus, Director of Business Development Human Spaceflight Programs. Moderated by Linda Singleton, Lockheed Martin Orion Program.

Thursday 24 October 2019

13:30 - 14:30 Meet the Techstars Starburst Space Accelerator partners

15:00 - 17:30 Dcode Launch: Space 2019 - Connecting Commercial Space Tech with Government; company pitches

Dcode connects the tech industry and government to solve critical challenges through commercial innovation. With deep understanding of both technology and the government and our invaluable community of tech companies and government leaders, Dcode breaks down barriers to improve government. Participants include: Aventior, Isotropic Systems Ltd., Loft Orbital, Swarm Technologies, and URSA Inc.

15:00 - 18:00 Techstars Startup Weekend, D.C., Space – Final Presentations

Techstars Startup Weekend is a 54-hour high-energy, intense experiential education for technical and nontechnical entrepreneurs. Beginning with pitches and continuing through brainstorming, business plan development, and basic prototype creation, this event will culminate in demos and presentations. Come meet the participants and hear their pitches.

Friday 25 October 2019

10:00 - 12:00 Moon: Stories of the Women Who Are Getting Us There"

anything!

12:30 - 14:00 **Explore Moon to Mars**

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It has been forty years since humans traveled to deep space. Did you know right now NASA is building the rocket and spacecraft that will return humans to the Moon and eventually onto Mars? If you want to learn more about America's new Space Launch System and Orion spacecraft-which will take us farther into space than we have ever been—don't miss this forum with NASA & industry leaders sharing insights into the Artemis program.

 Moderator: Marcia Lindstrom, Strategic Communications Manager, NASA Marshall Space Flight Center

Panelists:

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- Joe Cassady, Executive Director of Space, Aerojet Rocketdyne
- 0
- 0 Astronaut Don Thomas (retired)

Project Mars Mini-Film Festival 14:00 - 17:00

Filmmakers bring to life their interpretation of NASA's work to send humans to the vicinity of the Moon and onward to Mars through breathtaking cinematography, amazing animations and state-of-the-art special effects. Come see the winning and finalist films and prepare to be inspired!





Women of Aeronautics and Astronautics (WoAA) Panel and Roundtable: "The First Woman on the

Female space industry trailblazers will introduce themselves and tell their stories. The second half of the session will feature interactive roundtables, allowing a endees to dialogue with speakers and ask them

- Tony Castilleja Jr., Human Spaceflight Systems Engineer, Boeing
- Kathleen Coderre, Advanced Programs Engineer, Lockheed Martin



7.10 Space Climate Observatory (SCO International) First Steering Committee

Date: 22 – 23 October 2019

Venue: Walter E. Washington Convention Center, Washington, D.C., Room 156

The Space Climate Observatory (SCO International) is a multi-lateral initiative dedicated to provide information, methodologies and showcases of climate change impacts at local scales. The SCO is based on Space observation data complemented by in situ and socioeconomic data. It has been officially launched by the French President Emmanuel Macron on June 17th, 2019 in Le Bourget. Today, 22 national space agencies have joint the initiative as well as ESA, UNPD and UNOOSA.

The SCO International members is holding its first steering committee on October 22nd-23rd, 2019, in Washington, aside from the IAC forum. This meeting aims to

- Decide a simple governance structure
- Define the mandate of the steering committee
- Define an international agenda and the first deliverables by 2 years.
- Share ideas

A summary of the discussions with recommendations will be forwarded to all members short after the meeting for approval.

Tuesday 22 October 2019

Time:	Programme:
	Room: 156
09:00	Welcoming Coffee
09:30	Opening session 5mn - Speaker 1 (Christian Feichtinger, Executive Director, IAF) 5mn - Speaker 2 (Jean-Yves Le Gall, President, CNES)
09:45	Remarks – Focus - Outputs 15mn – CNES
10:00	Session 1: Defining a governance for the SCO International
	This session aims at discussing and agreeing on a simple governance structure of the SCO International. The mandate of the steering committee will be sketched. Members are invited to participate and share proposals. Session open to teleconference.
	Introductive Speech
12:30	Lunch
	Room : 149 A
14:00	Session 2: Funding opportunities
	This session aims at clarifying funding mechanisms, and share visions.
	Introductive Speech
15:00	Coffee break
15:45	Session 3: Wrap-up Session

Wednesday 23 October 2019

Time:	Programme:
09:30	Welcoming Coffee
10:00	Session 3: What should the SCO Portal look like
	This session aims at brain storming about final o
	Introductive Speech
12:00	Lunch
	Room : 149 A
14:00	Session 4: Some SCO InitiativesPlan for SCO FranceOther ?
15:00	Coffee break
15:30	Session 5: Global Wrap-up and next steps
	The session is opened to associated members w
16:30	Closing remarks





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who have not formally signed the joint declaration

ASSOCIATED EVENTS

70 th International Astronautical Congress 21–25 October 2019 | Washington, D.C

8 Social Events and Technical Visits

Social Events

Welcome Reception

Date: 21 October 2019 Time: 19:30-21:30 Location: Exhibition Hall D & E

Please join us for a Welcome Reception celebrating the 50th Anniversary of the Lunar Landing on Monday, October 21 19:30-21:30. Celebrate this historic achievement by taking a tour around the United States through our NASA Centers all the way to the Moon. We will feature food and beverage from the areas of the United States such as Texas, Alabama, Florida, and California. Please be aware that the drinking age in the United States is 21 or older. Bartenders will check for I.D.

Yuri's Night @ IAC 2019, a space dance party!

The National Union Building in downtown DC (just a few blocks from the Convention Center!)

Date: 24 October 2019 Time: VIP doors open at 6:30pm General Admission starts at 8pm Tickets and info at <u>dc.yurisnight.net</u>



Gala Dinner

Date: 25 October 2019 Time: 19:00-23:00 Location: Stephen F. Udvar-Hazy Center, National Air and Space Museum Cost: 150 Euro

The IAC Gala Dinner will be held on Friday, October 25 at the Stephen F. Udvar-Hazy Center, National Air and Space Museum. Shuttle transportation will be available from the Washington Convention Center (L Street Entrance). Shuttles will leave starting from 18:00 and start returning to the Washington Convention Center starting at 22:30.

A Gala Ticket Booth is located in the Registration Area. Advance purchase is recommended as seats are limited. Dress is cocktail attire.

Please note that you purchased a gala dinner ticket when registering, you should see the registration desk to receive your ticket.



Technical Visits

NASA Goddard Spaceflight Center Tour

Date: 24 October Time: 11:30 -17:00 Location: Greenbelt, Maryland Fees \$25

NASA's Goddard Space Flight Center in Greenbelt, Maryland, opened its gates in 1959 as the agency's first spaceflight center. Throughout the decades, the center has addressed some of humanity's greatest questions, from the changing environmental systems on Earth to the fundamental nature of the entire universe. Its missions span the disciplines of astrophysics, Earth science, heliophysics, planetary science, and engineering and technology. Now at 60 years in operation, Goddard has evolved into a definitive resource for the global scientific community.

Tour participants will be welcomed by a senior Goddard official and, during the tour receive an overview of the center's exhaustive scientific portfolio in the Dr. Piers J Sellers data visualization studio, or hyperwall. They will then be guided through the following stops: Satellite Servicing Projects Division, Integration and Testing Complex, Wide Field Infrared Survey Telescope Briefing, Sample Analysis at Mars Test Bed Lab. Participants will also have the opportunity to explore Goddard's gift shop and visitor center, depending on time.

Registration closed on: 13/9/2019

NOAA Satellite Operations Center Tour

Date: 24 October Time: 08:30-12:30 Location: Suitland, Maryland Fees \$25

Description: The National Oceanic and Atmospheric Administration's Office of Satellite and Product Services (OSPO) will provide a tour of one of its facilities, the NOAA Satellite Operations Facility (NSOF). During the tour, visitors will have an opportunity to learn about NOAA's requirements for controlling and commanding satellites. In addition, the visitors will have a chance to view the NOAA Satellite Operations Control Center (SOCC), which provides communication for both Geostationary and Polar-orbiting satellites. The visitors will also have a tour of the U.S. National Ice Center (USNIC). The NIC will discuss ice and snow products, ice forecasting and other environmental intelligence services. Attendees will have the ability to meet with NOAA scientists and engineers, enjoy a tour of the satellites on the roof, and more. A government issued photo I.D. is required. All bags are subject to security screening upon entry.

REQUIREMENTS: A government issued photo I.D. is required. All bags are subject to security screening upon entry.

RESTRICTIONS: Foreign Nationals' sponsor needs to submit the "OSY Foreign National Request" form to NOAA Security.

WEBSITE: http://commerce.maryland.gov/Documents/BusinessResource/NSOF-NOAA-Satellite-Operations-Facility.pdf

Registration closed on: 13/9/2019





SOCIAL EVENTS



NOAA National Center for Weather & Climate Prediction

Date: 22 October Time: 09:00-13:00 Location: College Park, MD Fees \$25

Description: Visitors will have the opportunity to learn how meteorologists use environmental satellite data to forecast storms, learn how the U.S. National Oceanic and Atmospheric Administration (NOAA) uses satellites to support responses to oil spill, wildfire and volcanic ash, meet NOAA's satellite application and research scientists, and more. The NOAA Center for Weather and Climate Prediction houses dedicated scientists who provide the United States with expert weather, water, and climate forecasts that touch everyone's lives. The center provides a seamless suite of environmental analysis, diagnostics and forecasts from the surface of the sun to the depths of the ocean floor. This integrated facility advances NOAA's effort to build a Weather-Ready Nation through improved precision forecasts, effective communications, and strong partnerships.

REQUIREMENTS: A government issued photo I.D. is required. All bags are subject to security screening upon entry.

RESTRICTIONS: No pictures allowed on the forecasting floor.

WEBSITE: https://www.ncep.noaa.gov/openhouse/pdf/NCWCP_One_Pager.pdf

Registration closed on: 13/9/2019

IAF Awards 2019 9

9.1 IAF World Space Award

The IAF World Space Award is presented for an outstanding contribution or contributions in space science, space technology, space medicine, space law or space management of exceptional impact to the world's progress in astronautics.

The recipient of this year's award is the Apollo 11 Crew:



Commander Neil A. Armstrong, Command Module Pilot Michael Collins and Lunar Module Pilot Edwin E. (Buzz) Aldrin, Jr

"For Making an Unparalleled Impact on Space Exploration and on Human Civilization and for Earning their Place in the Pantheon of Human Achievement through their Heroic Feats during the Apollo 11 Mission in 1969 and their Subsequent Careers."

Allan D. Emil Memorial Award 9.2

The Allan D. Emil Memorial Award is one of the most prestigious IAF awards. Since 1977, the Allan D. Emil Memorial Award is presented annually for an outstanding contribution to space science, space technology, space medicine or space law. This contribution either involved the participation of more than one nation or furthered the possibility of greater international cooperation in astronautics.

The recipient of this year's award is Joan Vernikos.



Joan Vernikos Former Director of Life Sciences, National Aeronautics and Space Administration (NASA), United States

Dr. Joan Vernikos, Ph.D. was Director of Life Sciences at NASA Headquarters from 1993 until September, 2000, She is well known throughout the scientific community, coming to Washington, D.C. from NASA's Ames Research Center (ARC) in California. She joined ARC in 1964 after four years at Ohio State University Medical School where she was Assistant Professor of Pharmacology. Trained in London, Dr. Vernikos held honorary academic appointments at Stanford University, Wright State University School of Medicine, and was Visiting Professor at the University of London. She is now President of Thirdage LLC. She has published over 200 scientific papers and reviews, has served on editorial boards of scientific journals, and was Associate Editor of Pharmacological Reviews. She holds 3 patents, including one for the Human Powered Centrifuge (US patent #5616104).





Allan D. Emil (1898 – 1976)

AWARDS



9.3 IAF Excellence in "3G" Diversity Award

The IAF Excellence in "3G" Diversity Award is intended to recognize IAF member organizations (industry, government, academia) worldwide for outstanding contributions to the fostering of "3G" (Geography, Generation, Gender) Diversity within the space sector.

The recipient of this year's award is UAE Space Agency



The United Arab Emirates Space Agency, the first national space agency in the region, was established in 2014, and is responsible for organizing, regulating, and supporting the national space sector under federal law. This includes the oversight and funding of space missions such as the UAE's Emirates Mars Mission's Hope Probe, the region's first Arab and Islamic interplanetary mission. The primary goals of the UAE Space Agency are to contribute significantly to the diversification of the national economy, enhancing the UAE's international standing in space-related fields, and issuing policy and laws for the space sector. Space sector capacity building programmes and raising awareness of space sciences and STEM fields develop the next generation of Emiratis for leadership in the space sector.

9.4 IAF Excellence in Industry Award

The IAF Excellence in Industry Award is intended to distinguish an industry organization, member or non-member of the IAF, worldwide for introducing innovative space technologies to the global marketplace and is recognized throughout space industry for successfully executing a landmark space mission.

The recipient of this year's award is Blue Origin:



Blue Origin's vision is a future where millions of people are living and working in space. To achieve our vision we need to lower the cost of access to space with reusable launch vehicles. Our step-by-step approach begins with New Shepard, a fully reusable suborbital booster and crew capsule targeting first human flight later this year. Learnings from New Shepard are being applied to New Glenn, which will take people and payloads to Earth orbit and beyond starting in 2021. Our roadmap also includes Blue Moon, a lander capable of delivering cargo and humans to lunar surface by 2024. These vehicles are powered by a family of powerful liquid hydrogen and liquefied natural gas-fueled engines with deep throttling capability for smooth landings. Together, we are building a road to space.

9.5 IAF Hall of Fame

The IAF Hall of Fame is intended to create a standing forum of personalities that have contributed substantially to the progress of space science, technology, and space benefits to mankind. It will consist of a permanent gallery of these personalities, including a citation, biographical information, and a picture, in a special part of the IAF web presence.

The recipients of this year's award are Roberto Battiston and Faren Qi.



Roberto Battiston Former President, Italian Space Agency (ASI),

Roberto Battiston was born in Trento, Italy, in 1956. He received his Laurea degree at Scuola Normale Superiore di Pisa in 1979 and his Ph.D. degree at the University of Paris IX (1982). He has been nominated full Professor of Physics at the University of Perugia, Italy, in 1992. He received a Doctor honoris causa from the University of Bucharest (2000). He received the French Legion d' Honneur (2017). His research has focused on experimental high energy and astroparticle physics:

- experiment at the SPS-ppbar Collider;
- Measurement of the number of neutrino families- with the SLD experiment at SLAC
- Search for the Higgs bosons and study of the quark b and tau lepton physics with the L3 experiment at LEP;
- Space Station
- Study of the ionospheric, magnetospheric, lithospheric coupling associated to seismic events.



Chief Scientist, China Academy of Space Technology (CAST),

Professor QI Faren is the first Chief designer of Shenzhou Manned Spaceship Program and the technical director of China's first satellite "DFH-1". He is also the full member of IAA and academician of China Academy of Engineering. As a famous space scientist, he has made great contribution to China's space technology and laid good foundation for international exchanges.





• Strong interactions, electroweak interaction physics including the discovery of the W and Z bosons - with the UA2

Search for antimatter and dark matter in Cosmic Rays – with the AMS experiment on the Shuttle and on the International





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Frank J. Malina Astronautics Medal 9.6

Since 1986, the Frank J. Malina Astronautics Medal is presented annually to an educator who has demonstrated excellence in taking the fullest advantage of the resources available to them to promote the study of astronautics and related space sciences.

The recipient of this year's award is Mengu Cho.



Mengu Cho Head of Department of Space Systems Engineering Kyushu Institute of Technology,

Prof. Mengu Cho received the B.S. and M.S. degrees from the University of Tokyo, in 1985 and 1987, respectively, and the Ph.D. degree from the Department of Aeronautics/Astronautics, Massachusetts Institute of Technology, in 1992. After working at Kobe University from 1992 to 1995 and at International Space University from 1995 to 1996, he joined Kyushu Institute of Technology (Kyutech), Kitakyushu, Japan in 1996. Since 2004, He has been a Professor and the Director of the Laboratory of Spacecraft Environment Interaction Engineering (LaSEINE) of Kyutech. Currently, he is the head of Department of Space Systems Engineering. His research interests include spacecraft environmental interaction, particularly spacecraft charging and nanosatellite reliability. He is the author or co-author of more than 160 papers in peer reviewed journals. He served as the project lead of three ISO standard, including the nanosatellite testing standard ISO-19683. He supervised 10 university satellite projects, among which 8 projects, 16 satellites, were already in orbit as of June I 2019. He received Space Development and Utilization Award from Japanese government twice. The satellite project, BIRDS-I, he supervised received 2017 GEDC Airbus Diversity Award in recognition of demonstrating a fine example of bringing diversity to engineering education.

IAF Interactive Presentations Competition Award 9.7

To be announced on Thursday 24 October during the IP Award Ceremony at 12:45 in the IP Area. The five best Interactive Presentations of the IAC2019 will be awarded during a dedicated ceremony to be held just before the Interactive Presentation Session. A dedicated jury has chosen one winner for each of the five categories: A. Science and Exploration; B. Applications and Operations; C. Technology; D. Infrastructure; E. Space and Society. This event will kick-off the IP Session and the IP cocktail reception, so do not miss your chance to mingle with the presenters and make sure to join us in the IP Hall!



Frank J. Malina

(1912 - 1981)

Luigi G. Napolitano Award 9.8

The Luigi G. Napolitano Award is presented annually by the Space Education and Outreach Committee (SEOC) of the International Astronautical Federation to a young scientist, below 30 years of age, who has contributed significantly to the advancement of the aerospace science and has given a paper at the International Astronautical Congress on the contribution.



The Luigi G. Napolitano Award will be given during the closing ceremony on Friday 25 Ooctober 2019 of the 70th IAC and the recipient will be invited to participate in the gala dinner of the IAC. The award was donated by the Napolitano family and consists of the Napolitano commemorative medal and a certificate of citation. The Luigi Gerardo Napolitano Society sponsors this annual award.

Exhibition 10

10.1 Exhibition Floorplan



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capabilities and much more.

Booth: 680	3D PLUS				
<u>plus</u>	Contact: Marilou Dela Cruz 3D PLUS is a world leading supplier of advanced h meeting the demand for high reliability, high p required for embedded snace electronic system	Email: Web: igh density 3D m erformance and	<u>mdelacruz@3d-plususa.com</u> <u>http://www.3d-plus.com</u> nicroelectronic products and die level stacking technology d very small size of today's and tomorrow's electronic: s with their small dimensions, adjustable reliability and		
	radiation performance, fit to perfection the chall	lenging requiren	nents associated with any types of satellites designs.		
Booth: 470	a.i. solutions, Inc.				
(i) a.i. solutions	Contact: Shannon Terry	Email: Web:	shannon.terry@ai-solutions.com https://ai-solutions.com		
	At a.i. solutions, we are passionate about taking 1996, a.i. solutions' superior engineering capat programs. With core competencies that span sp engineering, flight dynamics ground systems, spa emergency management a.i. solutions has a "big and defense agencies today. We have a strong r complex mission challenges. Whether the missi staff to offer end-to-end mission support. As a results - SPOT ON.	g smarter appro- pilities have bee bace mission de ace software app -picture" perspe reputation amor on is civil, com trusted space i	baches to reach better results for our customers. Since en proven on a variety of NASA and DOD missions and sign and operations, launch vehicle and missile systems plication including FreeFlyer Software, cybersecurity, and ective on the unique challenges facing the nation's space and our customers for providing best-in-class solutions to mercial or defense, we have the experience and expert industry partner, we deliver what we promise: superior		
Booth: 5029	AAC Clyde Space				
AAC CLYDE SPACE	Contact: LibbyHoban Operating internationally within the Small Sate	Email: Web: Ilite market, A	libby.hoban@aac-clyde.space https://www.aac-clyde.space/ AC Clyde Space specialise in the provision of advanced		
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Booth: 591	ABB Measurement & Analytics				
Booth: 591	ADGA GROUP INC				
Booth: 283	AENCOM CLUSTER				
	Contact: AENCOM is a cluster of Italian companies workir	Web:	http://www.aencom.it/		
	for aero-engine components, sub-assemblies ar fastest solution to satisfy your requests. The bas	id equipments. is of the work is	Thanks to our skilled chain, we can find the easiest and s a turn-key approach with a clear governance: a Cluster		

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Booth: 2023 Air Liquide Image: Contact: Agnes Renard Mathematic Contact: Agnes Renard As a world leader in gases, Technologies and Services for Industry and Health, Air Liquide is a historic partner in space industry for more than 50 years. Ariane launchers] from Ariane 10 to the future Ariane 6, in the design of cryogenic equipment for satellites and also in space exploration (MIG, Hersche), Planck, Melf, Curtosity, ExoMars, etc.). The Group continues to innovate and push back the frontiers by developing new technologies to address two major challenges: help overcome major international challenges related to space and take part in observing Earth to understand, anticipate, and act on climate impacts. Booth: 634 Airbus Contact: Email: daniele. briere@airbus.com With cutting-edge capabilities and decades of experience, Airbus Space Systems has the expertise to design, develop and operate major space systems. Commercial and institutional customers rely on Airbus' leading space technology and solutions. Airbu's portfolia covers the full range of space products and services. In Dility, environment, communication, security. space exploration, and access to space. From thy electronics to full in-orbit satellite delivery. from very-high-resolution EO instruments to deep space science missions and the most reliable telecoms satellites to SS operation - reaching for the stars is our busines. Booth: 197 Alex Space Booth: 283 ALFA MECCANICA Contact: Web:		reputation as the preeminent public technical papers published by AIA archive, current content comprises book series, national and internati products. For the best original rese	isher of state-of-the-art aeros A and its predecessor organi cutting-edge research presen ional standards documents, a arch and historic content, lool	pace research, and over 300 books and all zations are available in ARC. Along with ted at AIAA forums, eight peer-reviewed jo nd a growing number of e-books and oth k to ARC.	nost 200,000 an expansive urnals, three er electronic
 Contact: Agres Renard Web: <a 50="" a="" air="" and="" for="" gases,="" health,="" historic="" in="" industry="" is="" leader="" li="" liquide="" more="" partner="" services="" space="" technologies="" than="" word="" yeas.<=""> Air Liquide has built a solid reputation in the space field thanks to its expertise in rocket launchers (ground resources and Ariane launchers) from Ariane 1 to the future Ariane 6, in the design of cryogenic equipment for satellites and also in chaines launchers (MC, Herschel, Planck, Meff, Curiosty, EoMaws, etc.). Air Liquide has built a solid reputation in the space field thanks to its expertise in rocket launchers (ground resources and Ariane launchers) from Ariane 1 to the future Ariane 6, in the design of cryogenic equipment for satellites and also in chaines lenges: help overcome major international challenges: related to space and take part in observing Earth to understand, anticipate, and act on climate impacts. Contact person: Daniele Briere Web: https://www.airbus.com/space.html With cutting-edge capabilities and decades of experience, Airbus Space Systems has the expertise to design, develop and solutions. Airbus' portfolic covers the full range of space products and services: mobility, environment, communication, security, space exploration, and access to space. Contact person: Space products and services: no bility environment, communication, security, space exploration (and access to space. From tiny elec	Booth: 2023	Air Liquide			
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Air Liquide has built a solid reputation in the space field thanks to its sepretise in rocket launchers (ground resources and Ariane launchers) from Ariane 1 to the future Ariane 6, in the design of crogenic equipment for satellites and also in space exploration (MTG, Hersche), Planck, Melfi, Curiosity, ExoMars, etc.). The Group continues to innovate and push back the frontiers by developing new technologies to address two major challenges: help overcome major international challenges related to space and take part in observing Earth to understand, anticipate, and act on climate impacts. Booth: 634 Airbus Contract person: Email: daniele.briere@airbus.com Daniele Briere Web: https://www.airbus.com/space.html With cutting-edge capabilities and decades of experience, Airbus Space Systems has the expertise to design, develop and operate major space systems. Commercial and institutional customers rely on Airbus' leading space technology and solutions. Airbus' portfolio covers the full range of space products and services: mobility, environment, communication, security, space exploration, and access to space. Booth: 487 Airbus Is a global leader in aeronautics, space and related services: In 2018 it generated revenues of €64 billion and employed a workforce of around 134,000. Booth: 197 Alen Space Booth: 283 ALFA MECCANICA Web: www.alfameccanicasrI.it Contract: Web: www.alfameccanicasrI.it Contract: Web: wwww.alfameccanicasrI.it		As a world leader in gases, Techno industry for more than 50 years.	logies and Services for Indust	ry and Health, Air Liquide is a historic par	tner in space
Booth: 634 Airbus Contact person Email: delates in a det on climate impacts. Booth: 634 Airbus Contact person: Email: delates in the delates of experience, Airbus Space Systems has the expertise to design, develop and operate major space systems. Commercial and institutional customers rely on Airbus' leading space technology and solutions. Airbus' portfolio covers the full range of space products and services: mobility, environment, communication, security, space exploration, and access to space. From they electronics to full in-orbit satellite delivery, from very-high-resolution EO instruments to deep space science missions and the most reliable telecoms satellites to ISS operations - reaching for the stars is our business. Booth: 197 Airbus Defence and Space the Netherlands Booth: 283 ALFA MECCANICA Mice Space Yeb: Mice Space Yeb: Multing and Turning, EDM, FPI (Nadcap Accredited), contents: Multing and Turning), EDM, FPI (Nadcap Accredited), contents:		Air Liquide has built a solid reputati Ariane launchers) from Ariane 1 to space exploration (MTG, Herschel,	on in the space field thanks to the future Ariane 6, in the o Planck, Melfi, Curiosity, ExoM	 its expertise in rocket launchers (ground r lesign of cryogenic equipment for satellite ars. etc.). 	esources and s and also in
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Japan International Aerospace Exhibition 2021 (JA2021) / The Society of Japanese Aerospace Companies (SJAC)

Contact:

Toshiyuki Nagai

The Society of Japanese Aerospace Companies (SJAC) holds an international exhibition with the participation of the world's major aerospace companies and authorities. Japan. The next exhibition, "Japan International Aerospace Exhibition 2021 (JA2021)" will be held in Sep.29 to Oct. 2, 2021 as the 16th exhibition at Tokyo Japan.

JA2021 is focusing on business and provides a cross-industry, global business meeting place for decision makers of companies, government policy makers and participants include defense community. Many diverse aerospace seminars and symposiums are planned in this exhibition. And, this exhibition also brings together many Japanese SMEs with their specific high-technologies.

Contacts:

Margaret Simon

JHU Applied Physics Lab

The Johns Hopkins Applied Physics Laboratory (APL) manages, builds and operates missions and conducts research on planetary, space physics, and Earth science for NASA and other government sponsors. APL has built 70 spacecraft and over 300 instruments, including New Horizons, MESSENGER, Van Allen Probes, and Parker Solar Probe, and is currently building DART and Europa Clipper (in partnership with JPL).

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The Japan Aerospace Exploration Agency (JAXA) is a National Research and Development Agency in Japan that aims to This year, the core theme of JAXA's exhibition is future space exploration. At the booth, we will also have several talk

> Email: toshiyuki.nagai@sjac.or.jp Web: http://www.sjac.or.jp/en_index.html

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Booth: 122	Skolkovo Institute of Science	e and Technology		
Skoltech	Contact: Antonina Gromyko	Email: Web:	a.gromyko@skoltech. https://www.skoltech	<u>ru</u> .ru/en/
involo institute of science and technology	The Skolkovo Institute of Science Established in 2011 in collaborati promotes advanced scientific know world. Skoltech applies the best R on entrepreneurship and innovat education. The Institute's close lin flow of innovative solutions for th	and Technology (Skoltech) is a ion with MIT, Skoltech cultivate wledge and fosters innovative te Russian and international resear tion. Skoltech's model leverages is with the industrial and busine	private graduate research in s a new generation of research echnology to address critical rch and educational practice s on the integration of basic ess ecosystem fosters frontie	nstitute in Moscow, Russia. archers and entrepreneurs, issues facing Russia and the s, with particular emphasis and applied research and er research and generates a

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o/Thales Alenia Space

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partnership between Leonardo and Thales, creating two joint ventures: Telespazio and

les 67/33 joint venture, is one of the world's leading operators in satellite services and

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bigger return at low cost. Small satellites built by SFL consistently push the performance tional cost paradigm. Satellites are built with advanced power systems, stringent attitude that are striking relative to the budget. SFL arranges launches globally and maintains a ng ground stations worldwide. The pioneering and barrier breaking work of SFL is a key pressive satellite constellations.

y Council (SGAC)

Email:	christopher.nie@spacegeneration.org
Web:	www.spacegeneration.org

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	Space Pioneers				
SPACE MONCERS	Contact: <i>Kim Peart</i> Space Pioneers are based in Ross, Tast Second Life, as a way to connect globally the test with avatars. We would like to s presence beyond Earth. We promote re at the moment Neil Armstrong stepped the planet, the 21 st , depending on the St work can be shown in a gallery in the St	Email: Web: mania, the island state o y with space exploration a see an orbital city in space emembering the Moon la d onto the Moon in July 12 time zone. We are worki econd Life virtual worki	spacepioneers@iinet.net.au http://spacepioneers.com.au f Australia. We work with the virtual worlds, ir and development, and to build models that can b e being built by 2029, along with a sustainable in nding each year, globally, with an event called Fi 969, which for some was the 20 th , and for others ng on gathering interest in a space art show, wh for anyone in the World to see via an avatar. We	icluding e put to dustrial rstStep, around uere the are also	
	seeking interest in supporting and crea	iting a YouTube series, where the series is been a series with series and the series of the series o	here a team of space pioneers pursue the space	dream.	E
	way. We look to ways to build a peaceful creativity among the stars. Space Pione Space Pioneers Foundation. Space Pion virtual worlds, including Second Life, as models that can be put to the test with with a sustainable industrial presence with an event called FirstStep, at the m the 20 th , and for others around the plan a space art show, where the work can be via an avatar. We are also seeking inter	at is happening with space ul future in space, where eers is a business name r eers are based in Ross, T a way to connect globall n avatars. We would like t beyond Earth. We promo ioment Neil Armstrong st net, the 21 st , depending on e shown in a gallery in the est in supporting and cre	the old week, beneficie in a rever-changing and the old ways of war will be displaced with a new egistered in Australia, which we are establishin asmania, the island state of Australia. We work v y with space exploration and development, and to see an orbital city in space being built by 202: pte remembering the Moon landing each year, g epped onto the Moon in July 1969, which for so in the time zone. We are working on gathering in Second Life virtual world, for anyone in the Worl ating a YouTube series, where a team of space p	v age of g as the vith the to build 9, along globally, me was verest in d to see ioneers	
	pursue the space dream. This can inclu	ide a news segment of w	hat is happening with space each week, deliver	ed in an	Booth: 1
Booth: 591 Booth: 591	displaced with a new age of creativity a we are establishing as the Space Pionee Space Security Index Space Simulation Services of Ott	among the stars. Space Pi ers Foundation. tawa Corporation	oneers is a business name registered in Australia	a, which	SPACE
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ooth: 745	Space Tango				Booth: 591
ooth: 745	Space Tango Contact: Danielle Rosales	Email: Web:	info@spacetango.com http://www.spacetango.com		Booth: 591
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300th: 745	Space Tango Contact: Danielle Rosales Space Tango provides improved acce bioengineering and manufacturing app ISS by late 2017, Space Tango has des technology and scientific consulting fo market segments in space with the a scalable manufacturing in microgravity. technology and healthcare will occur of	Email: Web: ess to microgravity thro blications that benefit life signed and flown nearly is or industry and academic announcement of ST-42 . Space Tango envisions a ff the planet creating a ne	info@spacetango.com http://www.spacetango.com on Earth. With two TangoLab facilities installed 80 diverse payloads. While providing their exp c partners, Space Tango is developing new com — a fully autonomous orbital platform desig future where the next important breakthroughs we global market 250 miles up in low Earth orbit.	omated I on the ertise in imercial ned for in both	Booth: 591 Booth: 6019
Booth: 745 SPACE TANGO	Space Tango Contact: Danielle Rosales Space Tango provides improved acce bioengineering and manufacturing app ISS by late 2017, Space Tango has des technology and scientific consulting fo market segments in space with the a scalable manufacturing in microgravity. technology and healthcare will occur of Spacebit	Email: Web: ess to microgravity thro blications that benefit life igned and flown nearly is or industry and academic announcement of ST-42 . Space Tango envisions a ff the planet creating a ne	info@spacetango.com http://www.spacetango.com ough their Open Orbit platform for fully aut on Earth. With two TangoLab facilities installed 80 diverse payloads. While providing their expe c partners, Space Tango is developing new com — a fully autonomous orbital platform desig future where the next important breakthroughs we global market 250 miles up in low Earth orbit.	omated on the ertise in mercial ned for in both	Booth: 591 Booth: 6019 SPACE Booth: 197
Booth: 745 SPACE TANGO Sooth: 5011	Space Tango Contact: Danielle Rosales Space Tango provides improved acce bioengineering and manufacturing app ISS by late 2017, Space Tango has des technology and scientific consulting fo market segments in space with the a scalable manufacturing in microgravity, technology and healthcare will occur of Spacebit Contact: Pavlo Tanasyuk	Email: Web: ess to microgravity thro blications that benefit life igned and flown nearly is or industry and academic announcement of ST-42 . Space Tango envisions a ff the planet creating a near Email: Web:	info@spacetango.com http://www.spacetango.com ough their Open Orbit platform for fully aut on Earth. With two TangoLab facilities installed 80 diverse payloads. While providing their expet : partners, Space Tango is developing new com - a fully autonomous orbital platform desig future where the next important breakthroughs we global market 250 miles up in low Earth orbit. pavlo@spacebit.com https://spacebit.com	omated on the ertise in mercial ned for in both	Booth: 591 Booth: 6019 SPACE Booth: 197
Booth: 745 SPACE TANGO Booth: 5011	Space Tango Contact: Danielle Rosales Space Tango provides improved accession bioengineering and manufacturing applies by late 2017, Space Tango has destechnology and scientific consulting for market segments in space with the associable manufacturing in microgravity. technology and healthcare will occur of spacebit Contact: Pavlo Tanasyuk Spacebit is the New Space UK private decrease the price of exploration and uffure of space exmodels around space communication, a future of humanity. It was founded by Paul Tanasyuk with the species.	Email: Web: ess to microgravity thro blications that benefit life signed and flown nearly is or industry and academic announcement of ST-42 . Space Tango envisions a ff the planet creating a near Email: Web: ely held company that is titlization resources on ce oploration by driving forw allowing private and public the goal to democratize a	info@spacetango.com http://www.spacetango.com on Earth. With two TangoLab facilities installed 80 diverse payloads. While providing their expe c partners, Space Tango is developing new com — a fully autonomous orbital platform desig future where the next important breakthroughs we global market 250 miles up in low Earth orbit. pavlo@spacebit.com https://spacebit.com a developing space robotics technologies to dr lestial bodies like Moon, Mars, and beyond. ard publicly directed space missions and new ed ic enterprises to shape the new space economy access to space and make humankind a multi-pl	omated I on the errise in mercial ned for in both astically onomic and the anetary	Booth: 591 Booth: 6019 SPACE Booth: 197

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