



70th INTERNATIONAL ASTRONAUTICAL CONGRESS

21-25 October 2019
Washington, D.C.

PRESS KIT

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About the IAC 2019

The world's premier global space event

The International Astronautical Congress has always been the place where space issues - from scientific and technical topics to industry R&D and advancements, international cooperation, education and career development are discussed in a convivial spirit and among worldwide experts. IAC attendees come from very diversified and complimentary backgrounds and experiences and all of them greatly contribute to making the IAC the ideal platform for exchanging ideas and knowledge for:

- ❖ **scientists, engineers and technicians**
- ❖ **agency officials, including Heads of Agencies**
- ❖ **industry representatives, including CEOs of the leading space companies**
- ❖ **university and research centres' staff**
- ❖ **representatives of associations, professional societies and museums**

At the same time the Congress introduces **students and young professionals** to the field.

Last year's IAC which took place in Bremen, Germany from 1 – 5 October 2018 attracted more than 6 500 participants coming from 81 countries.

In 2019, the IAC comes for the sixth time to the United States, a country where many high-tech companies, with their diverse space industrial facilities, space technology, expertise, and know-how, have much to offer to the international space community.

With the theme "Space: The Power of The Past, The Promise of The Future", the IAC 2019 promises to be rich in networking and business opportunities, discoveries, discussions, social moments, and emotions. Indeed, this year, the capital of the United States will be the place to be to properly celebrate the 50th anniversary of the Apollo 11 mission, this extraordinary engineering, scientific, and political achievement as well as the international accomplishments and partnerships that have become the hallmarks of space exploration.



About the International Astronautical Federation (IAF)

Connecting @ll Space People

Created in 1951 to establish a dialogue between scientists around the world and to lay the foundation for international space cooperation, the IAF continues to connect space people to this day. The Federation is the **world's leading space advocacy body with almost 400 members** including all leading space agencies, industries, societies, associations, universities and R&D institutes worldwide. Over **40 experts' 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.

IAF's Mission

❖ Promoting Cooperation

The IAF's International Astronautical Congress and various IAF committees provide unique collaborative platforms for experts from space agencies, industry and research

❖ Advancing International Development

The IAF is building a future of cooperation, development and international friendship, bringing together experts from experienced and emerging space nations alike

❖ Sharing Knowledge

The Federation has many well-established channels to disseminate information within its global network and the wider space community

❖ Recognising Achievements

The Federation's prestigious awards are presented annually to individuals and groups who have distinguished themselves in the global space community

❖ Preparing the Workforce of Tomorrow

To nurture new talent, the Federation has many activities for students and young professionals to facilitate their attendance at IAF events and connect them with senior experts

❖ Raising Awareness

The global network of the IAF and its dedicated publications help to promote the public appreciation of space activities worldwide

International Astronautical Federation

100 Avenue de Suffren | 75015 Paris | France

T: +33 1 45 67 42 60 | F: +33 1 42 73 21 20 |

W: www.iafastro.org | E: media@iafastro.org

Be part of the conversation [@iafastro](https://twitter.com/iafastro)





IAC 2019 Co-organizers

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



IAC 2019 LOCAL ORGANIZING COMMITTEE (LOC)

Led by Sandra H. Magnus and Vincent C. Boles, the Local Organizing Committee (LOC) comprises representatives from government, industry, and academia from across the United States and has work hard to plan and organize this Congress attracting the global space community and highlight local space activities.

IAC 2019 INTERNATIONAL PROGRAMME COMMITTEE (IPC)

The International Programme Committee, co-chaired by Michael E. López-Alegria and Adnan Al Rais, is responsible for the technical programme of the IAC 2019. The IAC technical programme presents scientific and technological breakthroughs, providing the latest advances in space science, research, technology, exploration, regulation, and education.



IAC 2019 Partner Organizations

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 organisation established in 1960 and recognised 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 52 studies to date and is engaged in the preparation of 40 others. The Academy also publishes the journal *Acta Astronautica* containing refereed papers. The Academy now organises 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 organizes 13 Symposia. The Academy also continues to enjoy its participation in the COSPAR Assemblies by sponsoring and co-sponsoring symposia. Although the IAA has many connections to these and other similar organisations, 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 Galilee, 75016 Paris

P.O. Box 1268-16 – 75766 Paris Cedex 16 – France

T: 33 (0)1 47 23 82 15 | F: 33 (0) 1 47 23 82 16

W: <http://iaaweb.org> | E: sgeneral@iaamail.org

IAA Shop: <http://shop.iaaweb.org>





INTERNATIONAL INSTITUTE OF SPACE LAW (IISL)

Founded in 1960, the International Institute of Space Law (IISL) is an independent non-governmental organisation dedicated to fostering the development of space law. The membership of the Institute is composed of individuals and institutions from more than forty countries, elected on the basis of their contributions to the field of space law or other social sciences related to space activities. Additionally, prospective membership is open to students and young professionals with a demonstrated interest in space law. Since 1992, the IISL has organized the annual Manfred Lachs Space Law Moot Court Competition. The competition is based on a hypothetical space law case, and is written by IISL members. Approximately sixty student teams from universities in Africa, the Asia Pacific, Europe, and North America participate. The competition is an important part of the organisation's outreach programme, and is its principal mechanism for engaging future generations of space law experts. The regional champions compete in the World Finals, which take place at the IAC and are judged each year by judges of the International Court of Justice. This unique feature makes the Manfred Lachs Moot Court one of the most prestigious moot court competitions in the world. The IISL is an officially recognized observer at sessions of the United Nations Committee on the Peaceful Uses of Outer Space, and its Scientific & Technical and Legal Subcommittees. In cooperation with the European Centre for Space Law (ECSL), the IISL organizes an annual space law symposium for the delegates and staff attending the sessions of the UNCOPUOS Legal Subcommittee. In addition, the Institute organises a variety of conferences on space law throughout the year in locations all over the world. It publishes an annual volume of IISL Proceedings with papers and reports of all these activities during the year. As one of its main activities, the IISL holds an annual Colloquium at the International Astronautical Congress (IAC). During these Colloquia, the IISL strives to address topics that are of interest to all space actors and invites all IAC attendees to attend and participate in its sessions. The themes of the sessions of this year's Colloquium are:

- E7.1. Dr. Jasentuliyana Keynote lecture by a leading space law expert and IISL Young Scholars session
- E7.2. Dispute Settlement in Space Law: Are We Ready for the Commercial Challenge?
- E7.3. National Space Legislation – Harmonisation and Enforcement
- E7.4. Space Traffic Management: From Space Situational Awareness and Space Surveillance and Tracking to developing Rules of the Road
- E7.5. Space Mining: National Authority? International Authority? Both?
- E7.6-E3.5. 34th IAA / IISL Scientific-Legal Roundtable: Mega Constellations and Microsatellites: challenges, including registration and liability
- E7.7. Remediation of Space Debris: A Fundamental Legal Challenge?
- IP. Interactive Presentations - IISL COLLOQUIUM ON THE LAW OF OUTER SPACE

International Institute of Space Law

100 Avenue de Suffren | 75015 Paris, France

W: www.iislweb.org | E: info@iislweb.org





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 organisation 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 13 000 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 (UN OOSA) 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 organisation, SGAC relies on the sponsorship and support of governmental, non-governmental, and industry partners as well as private individuals. This support is administered either 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 organisation, 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 per the below organization structure: 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
 F: @spacegeneration
 T: @SGAC



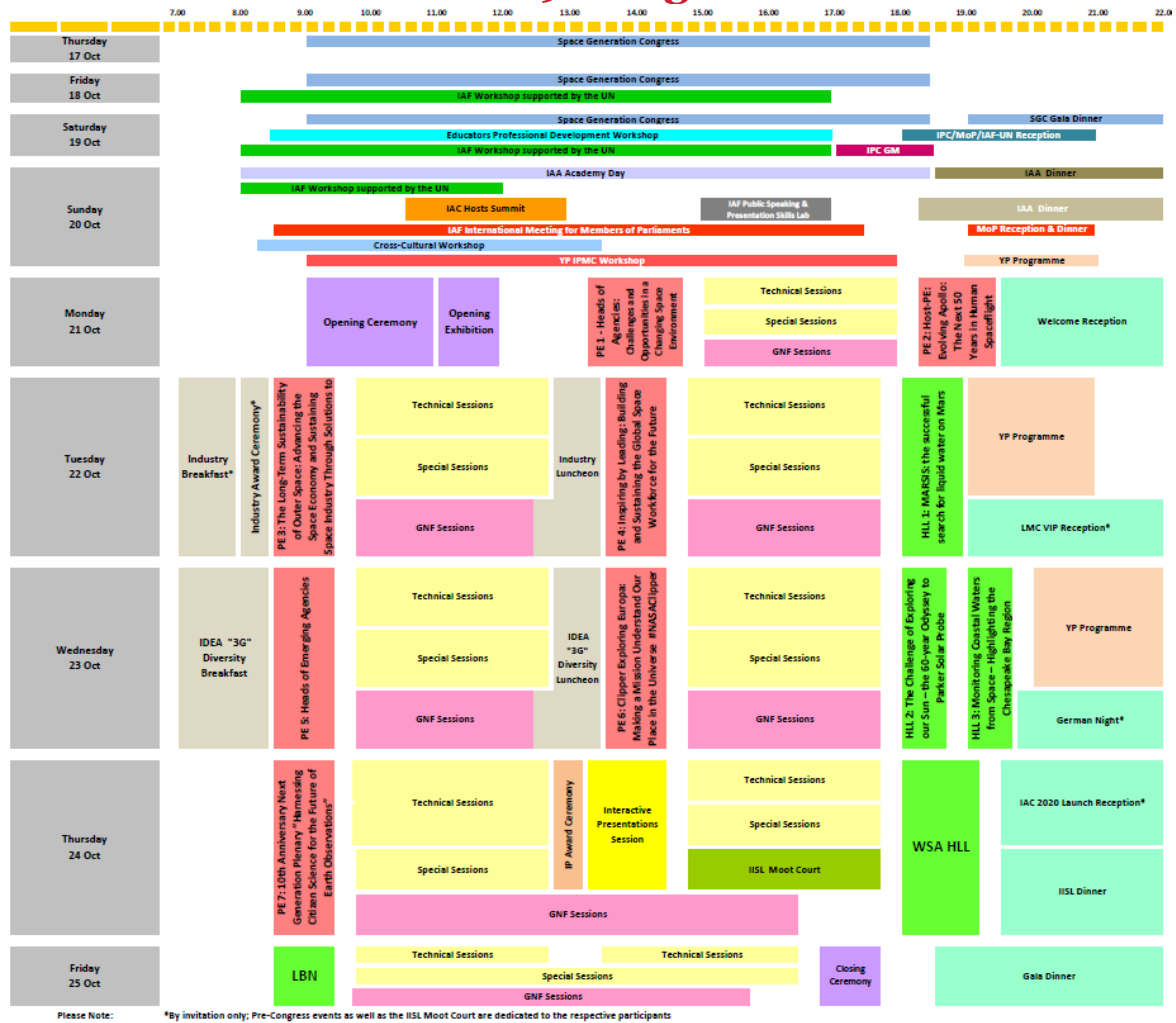
SPACE GENERATION
 ADVISORY COUNCIL



IAC 2019 at a glance

- ❖ **7 Plenary Events, 3 Highlight Lectures**
- ❖ **181 Technical Sessions (including 5 Global Technical Sessions)**
 - More than **1,900 Oral Presentations**
 - More than **230 Interactive Presentations**
 - 19 Special Sessions**
 - 33 Keynote Lectures**
- ❖ As in past years, the IAF is organizing a **Global Networking Forum (GNF)** and this year it will feature a very intense programme all along the IAC week. Some of the highlights of this year's GNF programme include:
 - ✓ **European Space Strategy: Achievements and Perspective**
 - ✓ **IAF GNF Industry Stream**
 - ✓ **Why We Suborbital Passengers Are Eager to Fly to Space**
 - ✓ **Lessons from Business Women in the Space Industry – Positive Tales from a Journey Through a Male Dominated Industry**
 - ✓ **Artemis: Enabling Lunar Exploration**
 - ✓ **IAF – ASE Astronaut Event**
- ❖ **IAC 2019 Exhibition** with over 100 exhibitors from industry, space agencies, research centres and universities, associations and space societies.

IAC 2019 at a glance





IAC 2019 Agenda

IAC OPENING CEREMONY

Monday 21 October, 9:00 – 11:00, Walter E. Washington Convention Centre, Grand Ballroom ABC

The IAC Opening Ceremony will feature a good mix of artistic performances from American artists and high-level speeches from top-level local and international representatives. The **Honorable Mike Pence**, Vice President of the United States is scheduled to deliver welcome remarks at the Opening Ceremony. The IAF President will present the **IAF World Space Award**, presented for an outstanding contribution to space science, space technology, space medicine, space law or space management. This year the award goes to the **Apollo 11 Crew** in recognition of their outstanding impact to the world's progress in astronautics.

PRESS CONFERENCES

Location: Walter E. Washington Convention Centre- Room 206

SUNDAY 20 OCTOBER

IAC 2019 Kick-off Press Conference

12:30 – 13:15

- **Vincent C. Boles**, Co-Chair, IAC 2019, Local Organizing Committee
- **Daniel L. Dumbacher**, Executive Director, American Institute of Aeronautics and Astronautics
- **Jean-Yves Le Gall**, President, International Astronautical Federation
- **Sandy Magnus**, Co-Chair, IAC 2019, Local Organizing Committee

MONDAY 21 OCTOBER

Heads of Agencies Press Conference

15:15 – 16:00

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.

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

Introducing Aurora, an innovative Cloud-Based Mission Control Software Suit

16:15 – 16:45

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.

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



Spearheading the Moon Village Development: Briefing on the MVA Activities

17:00- 17:30

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.

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

Thales Alenia Space, Pioneering the future of space exploration

17:30 – 18:30

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 in 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

TUESDAY 22 OCTOBER

The MILO Space Science Institute; affordable university led science missions

10:00 – 11:00

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.

- **Lon Levin**, President and CEO, GEOshare
- **Lisa Callahan**, Vice President and General Manager, Commercial Civil Space, Lockheed Martin
- **Jim Bell**, Professor in ASU's School of Earth & Space Exploration and the Director of ASU's Space Technology and Science (NewSpace)



- **Betsy Cantwell**, Senior Vice President of Research and Innovation at the University of Arizona

Open for Business: The Trillion Dollar Space Economy

11:15 – 12:15

Moderator:

- **Rob Meyerson**, Executive Producer, ASCEND and Former President, Blue Origin

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

Firefly Aerospace Provides Updated Information on Alpha Development and Announces New Cooperative Agreement

14:00 – 14:45

Firefly Aerospace is preparing for the maiden launch of the Firefly Alpha launch vehicle in the first quarter of 2020. CEO Dr. Tom Markusic will provide an update on Alpha development progress and announce a new partnership agreement that will enable rapid development of Firefly's larger Beta launch vehicle.

Speakers:

- **Tom Markusic**, *Co-founder and CEO*, Firefly Aerospace
- **Mark Watt**, *Co-founder and Acting CFO*, Firefly Aerospace

Airbus press briefing

16:30 – 18:00

Room 155

Updates on Airbus latest activities covering the Moon as well as of Earth observation and science topics.

Speakers:

- **Oliver Juckenhöfel**, Head of On-Orbit Services and Exploration, Airbus
- **Philippe Pham**, Head of Earth Observation, Navigation and Science, Airbus

GK Competition for a free launch of 1U CUBSAT Announcement

17:00-17:30

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 quarter 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.

Moderator:

- **Christian Feichtinger**, Executive Director, International Astronautical Federation (IAF)

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)



- **Sergey Krikalev**, Executive Director for Piloted Spaceflight, State Space Corporation ROSCOSMOS
- **Dmitry Loskutov**, CEO, Glavkosmos
- **Alexander Serkin**, CEO, GK Launch Services

WEDNESDAY 23 OCTOBER

Smithsonian's National Air and Space Museum & ispace: Preserving the History & Pioneering the Future of Private Lunar Exploration

10:00 – 11:00

Smithsonian's National Air and Space Museum & ispace: Preserving the History & Pioneering the Future of Private Lunar Exploration. 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.

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

Artemis Supplier Panel and Space Flight Awareness Award Presentation

16:00 – 17:15

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.

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

THURSDAY 24 OCTOBER

Ahead of Space19+, the Ministerial Council of the European Space Agency, ESA Director General Jan Wörner meets the Press

16:00 - 17:00

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.

- **Jan Woerner**, Director General of the European Space Agency ESA



PLENARY EVENTS

Plenary panellists are carefully chosen among the best experts within their respective fields. The events last one hour, but in the special case of the Heads of Agency Plenary and the Host Country Plenary they are extended up to a maximum of one hour and thirty minutes. Depending on the number of participants (4 to 8 panellists), they take the form of debate or round-table discussion with a moderator.

For more information on the speakers of the plenaries please visit:

<http://www.iafastro.org/events/iac/iac-2019/pleenary-programme/>

PLENARY 1: Heads of Space Agencies: Challenges and Opportunities in a Changing Space Environment

Monday 21 October, 13:15 – 14:45, Walter E. Washington Convention Center, Grand Ballroom ABC

Panellists:

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

Moderator:

- **Jean-Yves Le Gall**, President, International Astronautical Federation (IAF), France
- **Pascale Ehrenfreund**, Incoming President, International Astronautical Federation (IAF), Germany

PLENARY 2: HOST PLENARY – EVOLVING APOLLO: THE NEXT 50 YEARS IN HUMAN SPACEFLIGHT

Monday 21 October, 18:15 – 19:30, Walter E. Washington Convention Centre, Grand Ballroom AB

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.

Panellists:

- **Lisa Callahan**, Vice President and General Manager of Commercial Civil Space, Lockheed Martin, United States
- **Jeffrey Manber**, CEO, Nanoracks, United States
- **George Nield**, President, Commercial Space Technologies, LLC, United States
- **Norah Patten**, Scientific Astronaut Candidate, Iospace Limited, Ireland
- **Ellen Stofan**, John and Adrienne Mars Director, Smithsonian National Air and Space Museum, United States
- **Johann-Dietrich Woerner**, Director General, European Space Agency (ESA), France

Moderator:

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

PLENARY 3: THE LONG-TERM SUSTAINABILITY OF OUTER SPACE: ADVANCING THE SPACE ECONOMY AND SUSTAINING SPACE INDUSTRY THROUGH SOLUTIONS TO SPACE SECURITY ISSUE

Tuesday 22 October, 08:30 – 09:30, Walter E. Washington Convention Centre, Grand Ballroom ABC

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.

Panellists:

- **Jean-Loïc Galle**, CEO, Thales Alenia Space, France



- **Daniel S. Goldberg**, President & CEO, Telesat Canada, Canada
- **Etienne Schneider**, Minister of Economy and Space, Luxembourg, Luxembourg
- **Kay Sears**, Vice President and General Manager, Lockheed Martin Corporation, United States
- **Scott Pace**, Executive Director, National Space Council, United States

Moderator:

- **Fatih Ozmen**, Owner and CEO, Sierra Nevada Corporation, United States

PLENARY 4: INSPIRING BY LEADING: BUILDING AND SUSTAINING THE GLOBAL SPACE WORKFORCE FOR THE FUTURE

Tuesday 22 October, 13:30 – 14:30, Walter E. Washington Convention Centre, 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.

Panellists:

- **Karen Andrews**, Ministry for Industry, Science and Technology, Australian Government, Australia
- **Juan De Dalmau**, President, International Space University, France
- **Pamela J. Lincoln**, Mobilization Assistant to the Chief of Staff, U.S. Air Force, United States
- **Bob Smith**, CEO, Blue Origin, United States

Moderator:

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



PLENARY 5: HEADS OF EMERGING AGENCIES

Wednesday 23 October, 08:30 – 09:30, Walter E. Washington Convention Centre, Grand Ballroom B

Emerging countries have awakened to the realization 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.

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.

Panellists:

- **Mohammed Nasser El Ahbabi**, Director General, United Arab Emirates Space Agency, United Arab Emirates
- **Jonathan Angulu**, Acting Director General and CEO, National Space Research and Development Agency (NASRDA), Nigeria
- **Valanathan Munsami**, CEO, South African National Space Agency (SANSA), South Africa
- **Anond Snidvongs**, Executive Director, Geo-Informatics and Space Technology Development Agency (GISTDA), Thailand
- **Carlos Augusto Teixeira de Moura**, President, Brazilian Space Agency (AED), Brazil

Moderator:

- **Pontsho Maruping**, Chair of the Scientific and Technical Committee, United Nations Office for Outer Space Affairs (UNOOSA), South Africa

PLENARY 6: EUROPA CLIPPER: MAKING A MISSION TO UNDERSTAND OUR PLACE IN THE UNIVERSE

Wednesday 23 October, 13:30 – 14:30, Walter E. Washington Convention Centre, 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 harbours 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!

Panellists:

- **Jennifer Dooley**, Europa Clipper Project Systems Engineer, NASA Jet Propulsion Laboratory, United States
- **Karen Kirby**, Europa Clipper Deputy Project System Engineer, Johns Hopkins University Applied Physics Laboratory, United States
- **Thomas J. Wagner**, Manager, Johns Hopkins University Applied Physics Laboratory, United States
- **Bill Nye**, CEO, The Planetary Society, United States
- **Robert Pappalardo**, Europa Clipper Project Scientist, NASA Jet Propulsion Laboratory, United States

Moderator:

- **Dipak Srinivasan**, Europa Clipper Telecommunications Manager, Johns Hopkins University Applied Physics Laboratory, Advisory Board, The Planetary Society, United States

PLENARY 7: 10TH ANNIVERSARY NEXT GENERATION PLENARY

“HARNESSING CITIZEN SCIENCE FOR THE FUTURE OF EARTH OBSERVATION”

Thursday 24 October, 08:30 – 09:30, Walter E. Washington Convention Centre, 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 continue 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 panellists will share their ideas and work in innovatively incorporating crowdsourcing and citizen science into traditional workflows for the future of Earth Observation. The panellists 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.

Panellists:

- **Kristin Wegner**, Project Manager, GLOBE Implementation Office, UCAR, Japan
- **Avid Roman Gonzalez**, Senior Member, Institute of Electrical and Electronics Engineers, Peru
- **Caroline Juang**, Ph.D. Student, Columbia University, United States
- **Fabiana Milza**, COO and Co-Founder, IceKing GmbH, Austria



- **Jorge Nicolás-Alvarez**, PhD Student, CommSensLab, Universitat Politècnica de Catalunya, Spain
- **Ufuoma Ovienmhada**, Graduate Student, Space Enabled research group, MIT Media Lab, United States

Moderator:

- **Masami Onoda**, Director, Washington D.C. Office, Japan Aerospace Exploration Agency (JAXA), United States

HIGHLIGHT LECTURES

The Highlight Lectures (HLL) are devoted to topics of broad interest to all congress participants as well as external audience. An invited speaker introduced by a moderator gives a 40-minute presentation, generally adapted to a non-specialist audience. The event ends with a 15 – 20 question/answer session.

HIGHLIGHT LECTURE 1: MARSIS: THE SUCCESSFUL SEARCH FOR LIQUID WATER ON MARS

Tuesday 22 October, 18:00 – 19:00, The Walter E. Washington Convention Centre – Grand Ballroom B

The recent finding of evidence 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, Italy

HIGHLIGHT LECTURE 2: THE CHALLENGE OF EXPLORING OUR SUN – THE 60-YEAR ODYSSEY TO PARKER SOLAR PROBE

Wednesday 23 October, 18:00 – 18:45, The Walter E. Washington Convention Centre – 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 kilometres) 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:

- **Nicola J. Fox**, Division Director, Heliophysics Division, Science Mission Directorate, National Aeronautics and Space Administration (NASA), United States

Introduction:

- **Thomas Zurbuchen**, Associate Administrator, NASA Science Mission Directorate, United States

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

Wednesday 23 October, 19:00 – 19:45, The Walter E. Washington Convention Centre – 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.

Welcome remarks:

- **Jean-Yves Le Gall**, President, Centre National d'Études Spatiales (CNES), France

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:

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

TECHNICAL PROGRAMME

The IAC technical programme is structured in more than thirty symposia, themselves broken down into different technical sessions. Technical Sessions are devoted to scientific and technical presentations, done either orally or during an interactive presentation.

IAC 2019 has 181 Sessions, each composed of up to twenty presentations. A list of the symposia includes:

- ❖ A1. IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM
- ❖ A2. IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM
- ❖ A3. IAF SPACE EXPLORATION SYMPOSIUM
- ❖ A4. 48th IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – The Next Steps
- ❖ A5. 22nd IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM
- ❖ A6. 17th IAA SYMPOSIUM ON SPACE DEBRIS
- ❖ A7. IAF SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS
- ❖ B1. IAF EARTH OBSERVATION SYMPOSIUM
- ❖ B2. IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM
- ❖ B3. IAF HUMAN SPACEFLIGHT SYMPOSIUM
- ❖ B4. 26th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS
- ❖ B5. IAF SYMPOSIUM ON INTEGRATED APPLICATIONS
- ❖ B6. IAF SPACE OPERATIONS SYMPOSIUM
- ❖ C1. IAF ASTRODYNAMICS SYMPOSIUM
- ❖ C2. IAF MATERIALS AND STRUCTURES SYMPOSIUM
- ❖ C3. IAF SPACE POWER SYMPOSIUM
- ❖ C4. IAF SPACE PROPULSION SYMPOSIUM
- ❖ D1. IAF SPACE SYSTEMS SYMPOSIUM
- ❖ D2. IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM
- ❖ D3. 17th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT
- ❖ D4. 17th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE
- ❖ D5. 52nd IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES
- ❖ D6. IAF SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES
- ❖ E1. IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM
- ❖ E2. 47th STUDENT CONFERENCE
- ❖ E3. 32nd IAA SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS
- ❖ E4. 53rd IAA HISTORY OF ASTRONAUTICS SYMPOSIUM
- ❖ E5. 30th IAA SYMPOSIUM ON SPACE AND SOCIETY
- ❖ E6. IAF BUSINESS INNOVATION SYMPOSIUM
- ❖ E7. IISL COLLOQUIUM ON THE LAW OF OUTER SPACE
- ❖ E8. IAA MULTILINGUAL ASTRONAUTICAL TERMINOLOGY SYMPOSIUM
- ❖ GTS. GLOBAL TECHNICAL SYMPOSIUM

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	A6.8	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								

Category A: Science & Exploration	A1--> A7	Category C: Technology	C1--> C4	Category E: Space & Society	E1--> E8
Category B: Applications & Operations	B1--> B6	Category D: Infrastructure	D1--> D6		

Special Sessions

IAC 2019 SPECIAL SESSIONS (SpS)									
10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00									
MONDAY 21 OCTOBER							Get ready to protect Earth from asteroids - Planetary Defense in your hands	ISS-Moon-Mars: Using spaceflight platforms to study and simulate future missions	146A
TUESDAY 22 OCTOBER	Home Planet 2030 – The Role of Earth Observations in Studying Our Planet	Global Launch SpaceBuzz: Launching Millions of Children into Space	Life's Journey Through the Universe			EO+AI - The Game Changer in the Way We See the World	Artificial Intelligent in Space: Are Intelligent Space Objects the Promise of the Future?	146A	
WEDNESDAY 23 OCTOBER	Space Traffic Management: Working Together to Enhance Safety and Sustainability	Futures Past and Present: Space Architecture in Imagination and Reality				Young minds meet space leaders: words into action	The future of space operations across industries	146A	
THURSDAY 24 OCTOBER	The Immortal Spaceship: A discussion on the use cases and value of persistent platforms	Planetary Protection for the Future: Science, Exploration, and Commerce				Using Open Space Data in Developing Countries	Space Applications of Machine Learning and Artificial Intelligence	146A	
FRIDAY 25 OCTOBER	Atomic Test Masses and Atom Interferometry for Inertial Sensing and Gravity Measurements in Space	Launch Tower Not Necessary: Could Responsive Launch Revolutionize Spaceport Infrastructure Needs?	Transforming Future Mission Design Through In-Space Manufacturing	Interstellar Probe: Humanity's First Deliberate Step into the Galaxy by 2030				146A	

Keynotes

MONDAY 21 OCTOBER

NASA Science under the National Space Exploration Campaign

Time: 15:00 Room: 146B

Committee on Earth Observation Satellites (CEOS): 2019 Report of Activities to the International Astronautical Congress

Time: 15:00 Room: 147A

NASA's Moon to Mars Exploration Plans

Time: 15:00 Room: 151A

Prometheus: Precursor of Low-cost Rocket Engine

Time: 15:00 Room: 143A

Falcon Launch Vehicle Lessons Learned and Reusability

Time: 15:00 Room: 146C

STEM Education: Lessons learned from the Challenger Center

Time: 15:00 Room: 144C

TUESDAY 22 OCTOBER

An Overview of NASA's Lunar Science Exploration Plans for Artemis

Time: 09:45 Room: 146B

Propulsion Technology Development Activities at NASA

Time: 09:45 Room: 143A

Mission and Spacecraft Design Challenges of the Sun-Earth L5 Point Lagrange Space Weather Monitoring Mission



Time: 09:45 Room: 145B

International Cooperation Mechanisms in Outer Space Activities for the Next Decade

Time: 09:45 Room: 152A

BepiColombo – The State of Art for the Exploration of Mercury

Time: 14:45 Room: 145B

The ASU Interplanetary Initiative: Advancing Society Through Exploration

Time: 14:45 Room: 144B

WEDNESDAY 23 OCTOBER

Mars Sample Return Mission Concept Status

Time: 09:45 Room: 146B

Astrodynamics of Lunar and Cis-Lunar Missions

Time: 09:45 Room: 150A

Paolo Santini's Memorial Lecture: Ablators from Apollo to Future Missions to Moon, Mars, and Beyond

Time: 09:45 Room: 152B

OmegA Launch Vehicle

Time: 09:45 Room: 143A

Lab to Launch

Time: 09:45 Room: 143B

Experience and Findings by Kyushu Institute of Technology to Have a Successful Space Capacity Building Program

Time: 09:45 Room: 144C

2019 Update on the Impending Small Launch Vehicle Boom

Time: 14:45 Room: 151B

The Overview Effect and the Arts

Time: 14:45 Room: 145A

THURSDAY 24 OCTOBER

Fluid Physics from International Space Station

Time: 09:45 Room: 143C

DISCOVERER – Making Commercial Satellite Operations in Very Low Earth Orbits a Reality

Time: 09:45 Room: 152B

Execution of Parker Solar Probe's Unprecedented Flight to the Sun and Early Results

Time: 14:45 Room: 146B

From LEO to the Moon, Mars, and Beyond: Shaping Capability Development Strategies for NASA's Human Exploration Campaign

Time: 14:45 Room: 151A

A Girl in the Man-on-the-Moon Program: Camaraderie and Discrimination in the Apollo Era Time: 14:45 Room: 147B

FRIDAY 25 OCTOBER

50 Years of Earth Observations: The contribution to sustainable development goals and plans for the future

Time: 09:45 Room: 144C

MarCO: Flight Results from the First Interplanetary CubeSat Mission Time: 09:45 Room: 151B

Test Complex M11: Research on Future Orbital Propulsion Systems and Scramjet Engines

Time: 09:45 Room: 143A

Managing Risk in the Effort to Maintain Orbital Sustainability Time: 09:45 Room: 144A

NASA Science Activation



Time: 12:45 Room: ISZ

ThermCERT – A Signature Commercial Space Application to Tackle Fuel-Poverty in the United Kingdom

Time: 13:30 Room: 140B

Lasting Developments from Apollo and Saturn V

Time: 13:30 Room: 146C

The Economics of Procurement in Space & Defense Contracting

Time: 13:30 Room: 144A



EVENTS AT THE IAF GLOBAL NETWORKING FORUM

MONDAY 21 OCTOBER

IAF GNF Opening Day

Room: Grand Ballroom ABC

- 15:00 – 15:10 GNF Opening
- 15:10 – 16:10 EO as a Pillar of the Space Economy and Perspectives of Industrial Policy
- 16:15 – 16:45 European Space Strategy: Achievements and Perspective
- 16:50 – 17:35 Boeing and Energia: Search for New Forms of Sustainable Cooperation in Space
- 17:40 – 18:10 OG Summit: Mankind's Return to the Moon in the NewSpace Age

TUESDAY 22 OCTOBER

IAF GNF Industry Stream

Room: Grand Ballroom AB

- 09:40 – 09:50 GNF Story Telling Session: Virgin Galactic
- 09:50 – 10:00 GNF Story Telling Session: Thales Alenia Space
- 10:00 – 10:10 GNF Story Telling Session: Made In Space
- 10:10 – 10:20 GNF Story Telling Session: Arianespace
- 10:20 – 10:30 GNF Story Telling Session: SpaceX
- 10:30 – 10:40 GNF Story Telling Session: Blue Origin
- 10:50 – 11:35 Communications Satellites – Then, Now, and Where Next?
- 11:45 – 12:30 A Grand Tour of Global Space Policy Issues
- 14:45 – 15:45 Commercial Crew Starliner
- 15:45 – 15:55 Industry Deep Dives: Small Satellites, Big Future: Frequent and Reliable Launch on Electron
- 15:55 – 16:05 Industry Deep Dives: Incorporating the Moon into Earth's Economy
- 16:05 – 16:15 Industry Deep Dives: Making Space Sustainable for Future Space Utilization and Exploration
- 16:15 – 16:25 Industry Deep Dives: Space Technology to the Power of Hundreds
- 16:30 – 17:45 The IAF Startup Pitch Session

IAF GNF Culture & Socio-Economic Stream

Room: Grand Ballroom C

- 14:45 – 15:45 Alive in Space
- 15:50 – 16:35 Outcomes of the Global Conference on Space for Emerging Countries – GLEC 2019
- 16:40 – 17:10 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
- 17:15 – 17:45 Singapore – Regional Vision to Co-Create, Build Capacity, and Expand Space Applications for New Uses

WEDNESDAY 23 OCTOBER

IAF GNF Space Exploration Stream

Room: Grand Ballroom A

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



- 10:50 – 11:50 Forming, Storming, and Norming the Future Lunar Exploration Enterprise
- 12:00 – 12:30 To the ISS, the Moon, Mars – and Then Some: A 360° Discussion on Humanity's Exploration of Our Solar System and Beyond
- 14:45 – 15:45 Why We Suborbital Passengers Are Eager to Fly to Space
- 15:55 – 16:55 ECOSYSTEM for Sustainable Space Exploration – Involving New Space, Non-Space Players
- 17:05 – 17:45 OOS and Related Technologies Enabling Next-Gen Space Missions and Ultimate Exploration

IAF GNF Diversity Stream

Room: Grand Ballroom C

- 09:40 – 10:40 SGAC – LSA SpaceGen Entrepreneurs
- 10:45 – 11:35 Lessons From Business Women in the Space Industry – Positive Tales from a Journey Through a Male Dominated Industry
- 11:45 – 12:30 NASA YP Town Hall
- 14:45 – 15:45 Industrializing the Solar System – Launching the OffWorld Industrial Robotics Workforce Program
- 15:55 – 16:55 Space Supporting the UN Sustainable Development Goals 2030 Agenda
- 17:05 – 17:50 We Are Going, and The Technologies to Get Us There

THURSDAY 24 OCTOBER

IAF GNF Legal and Policy Stream

Room: Grand Ballroom A

- 09:40 – 10:40 The Future Lunar Ecosystem and its Business Potential for Non-Space Industries
- 10:45 – 11:35 Space Traffic Management is Needed Now! IAA, IISL, and IAF Join Their Forces to Propose Long Term Sustainability of Space Operations
- 11:45 – 12:35 The Mars/Moon Generation Lawyers: A Discussion of the Legal Framework Taking NASA Back to the Future
- 12:40 – 13:30 Spaceports: Gateway to a Global Space Economy
- 13:40 – 14:10 This Time to Stay: How Markets Will Ensure Sustained Interest in the Lunar Region
- 14:20 – 15:20 Governance for Space Activities – Comparative Studies on National Space Policy and Law
- 15:30 – 16:30 Artemis: Enabling Lunar Exploration

IAF GNF Development Stream

Room: Grand Ballroom C

- 09:40 – 10:40 Space Museums and Science Centres: Heritage and Education in a Fast Changing World
- 10:45 – 11:25 Towards a Formal African Space Programme
- 11:30 – 12:15 Martian and Lunar Analogs
- 12:20 – 12:50 4th International Space Forum at Ministerial Level – The Mediterranean Chapter
- 12:55 – 13:20 Global Navigation Satellite System (GNSS) Market: What's Next for Industries, Applications and the User Community
- 13:25 – 14:25 Space Sustainability Rating: Addressing the Orbital Challenge



- 14:35 – 15:05 Making Lunar Missions Accessible, a New Approach to Planetary Exploration
- 15:45 – 16:30 EU Space: Trends for the Future

FRIDAY 25 OCTOBER

IAF GNF Public Day

Room: Grand Ballroom ABC

- 09:40 – 10:40 From the Moon to Mars NASA's Artemis Program
- 10:50 – 12:20 IAF – ASE Astronaut Event
- 13:30 – 14:30 The Science-Fiction Continuum

IAF Excellence in Industry Award

The IAF Excellence in Industry Award, presented for an industry organization worldwide for outstanding contributions to the space industry and introducing innovative space technologies to the global marketplace, this year goes to **Blue Origin**.

The award will be accepted by:

- **Jeff Bezos**, CEO and President of Amazon, United States

Date: Tuesday, 22 October 2019

Time: 8:00 – 8:30

Venue: The Walter E. Washington Convention Centre- Grand Ballroom AB

IAF IDEA “3G” Diversity Breakfast



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?”.



Date: Wednesday, 23 October 2019

Time: 7:00 – 8:30

Venue: The Walter E. Washington Convention Centre- South Prefunction



Programme

Welcome (07:00 – 07:05)

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

Moderation and Introduction to IAF IDEA “3G” Diversity Breakfast (07:05 – 07:10)

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

Presentation by Sponsor (07:10 – 07:20)

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

Panel discussion (7:20 - 7:40):

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

Rukmini Roy, *Aerospace Engineering Student*, Georgia Institute of Technology, United States

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

Rachael McKee, *Business Development Analyst*, Lockheed Martin Space Systems Company, United States

Concluding Remarks (07:40 – 07:50)

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

Networking (07:50 – 08:30)

IAC EXHIBITION

Location: The Walter E. Washington Convention Centre- Hall D&E

The IAC 2019 Exhibition will feature over 100 exhibitors from industry, space agencies, research centres and universities, associations and space societies.

Opening - Monday 21 October, 11:00 – 18:00

Kick-off with a cutting of the ribbon to open the Exhibition Hall, followed by the **IAF customary Exhibition VIP tour**, including the presence of Head of Agencies.

Tuesday 22 October - Thursday 24 October, 09:00-18:00

Friday 25 October 09:00 – 17:00



IAC CLOSING CEREMONY

Friday 25 October, 16:45 – 17:45, The Walter E. Washington Convention Centre- 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 and the IAF President will present the **IAF's annual awards**, given to individuals and groups that have distinguished themselves in space cooperation and space activities at the global level.

- ❖ **Allan D. Emil Memorial Award**, presented for an outstanding contribution to space science, space technology, space medicine or space law, this year goes to **Dr. Joan Vernikos** in recognition to her outstanding long-term contributions to space technology and international cooperation in astronautics.
- ❖ **Frank J. Malina Astronautics Medal**, awarded to an educator who has demonstrated excellence in taking fullest advantage of the resources available to promote the study of astronautics and related space science, this year goes to **Prof. Mengü Cho**, who has presented an outstanding contribution to space education and promotion to the study of astronautics and space science.
- ❖ **IAF Hall of Fame** is this year awarded to **Roberto Battiston** and **Faren Qi** in recognition to contribution during the course of their careers to the progress of astronautics within the framework of the IAF activities.
- ❖ **Luigi G. Napolitano Award** is presented by the Space Education and Outreach Committee of the IAF to a young scientist under the age of 30 years, who has contributed significantly to the advancement of aerospace science and has given a paper at the IAC on the contribution.
- ❖ **The Young Space Leaders Recognition Programme** is awarded to **Joao Lousada, Mia Brown, Olga Stelmakh, Matteo Emanuelli and Avid Roman- Gonzalez** for demonstrating leadership in their academic or early careers.
- ❖ **IAF Student Awards** recognise the best papers presented by students at the IAC in the undergraduate and graduate categories

At the end of the ceremony, the **Congress flag** will be handed over to the next host country – United Arab Emirates, Dubai.

Practical information

You will receive daily agenda emails every morning.

CONGRESS VENUE



A world gathering deserves a world-class space. Its downtown location on Mt. Vernon Place puts it right in the middle of an array of hotels and dining options. Served by the Mt. Vernon Square Metro station, the convention centre is a short distance away from Washington, D.C.'s major attractions and world-renowned



restaurants. In short, it's the perfect location for IAC 2019.

The building offers 65,310 square meters (703,000 square feet) of convention space, designed with the environment in mind. From the hall's low-emission glass that moderates temperatures while providing abundant natural light to its state-of-the-art HVAC systems coupled with its recycling programs, IAC 2019 will be a green event. In addition, special roofing technology and a sound dampening design keeps noise in the hall to a minimum, assuring few interruptions to ongoing meetings or consultations on the exhibit floor.

Of course, the building is handicapped accessible and provides several service facilities on site.

A floorplan is available on the next page.

For more information on the venue, visit:

<http://eventsdc.com/Venues/ConventionCenter.aspx>

INTERNATIONAL PRESS CENTRE

Location: Room 103A

Opening hours: Sunday, 20 October– Thursday, 24 October: 08:00 – 18:00

Friday, 25 October: 08:00 – 18:00



70th INTERNATIONAL ASTRONAUTICAL CONGRESS

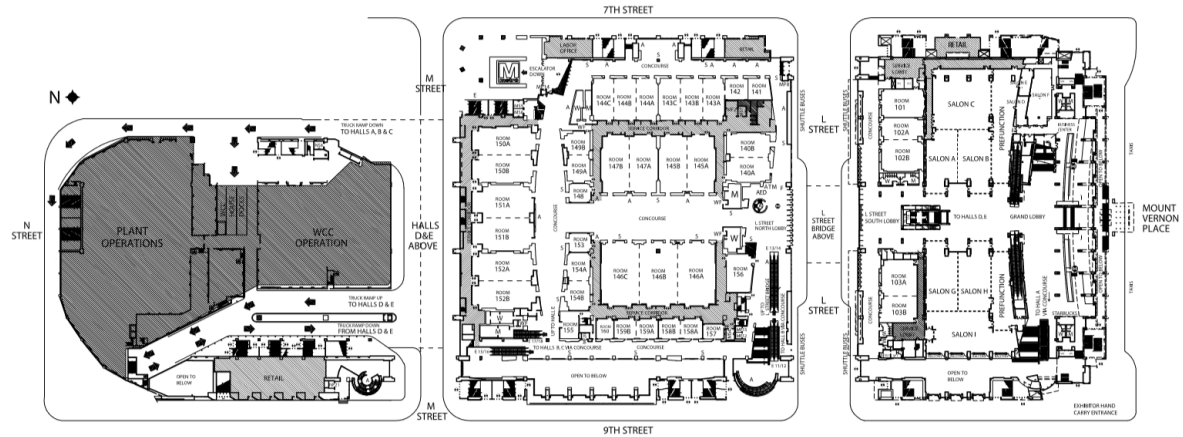
21-25 October 2019 | Washington, D.C.

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

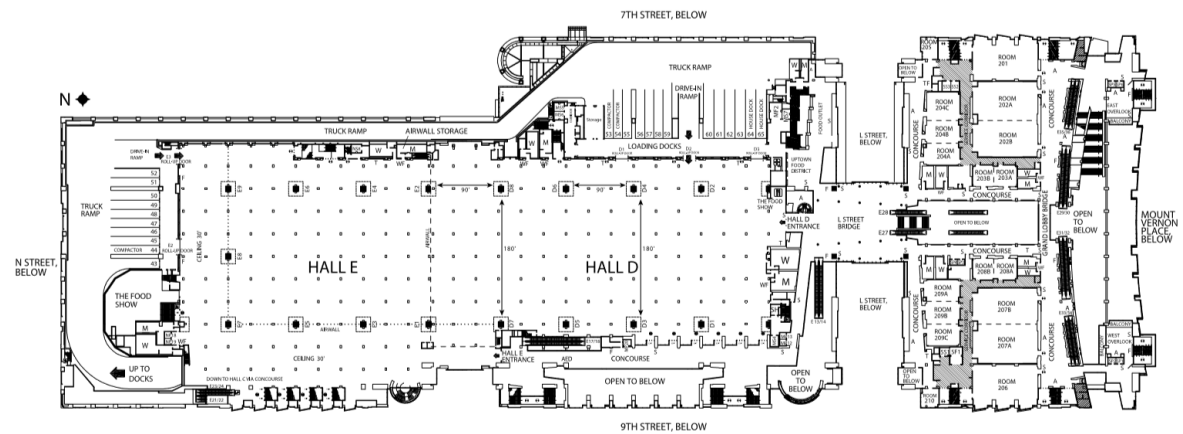


Walter E. Washington Convention Centre

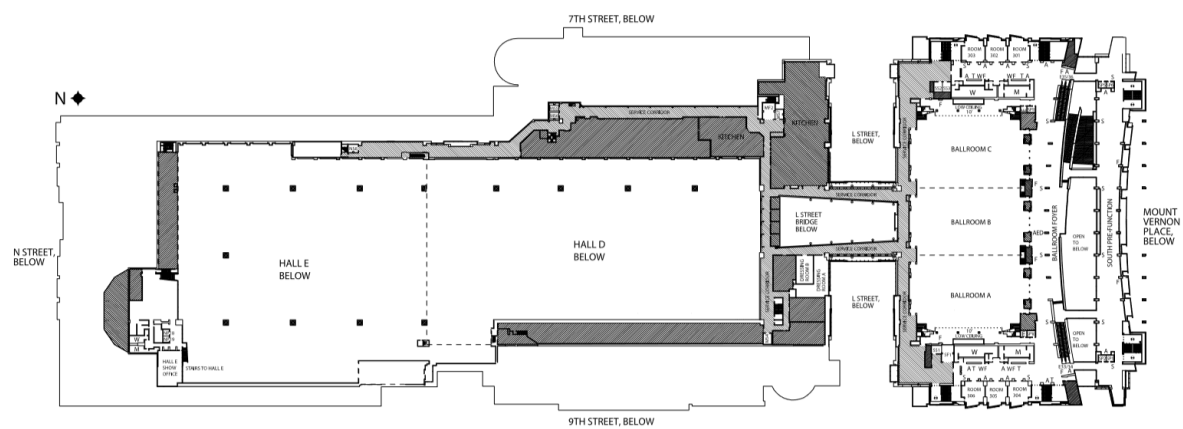
Level 1



Level 2



Level 3



CONTACTS

Silvia Antolino

Senior Communications Manager

IAF Secretariat

silvia.antolino [at] iafastro.org

Tel: +33 (0) 6 95 57 68 54

Carina Viehboeck

Communications Assistant

IAF Secretariat

carina.viehboeck [at] iafastro.org

Tel: +43 650 778 6580

IAC 2019 Local Organising Committee (LOC)

Michele McDonald

Communications Manager

MicheleM [at] aiaa.org

Tel: +1 703.201.3454

NASA

Matt Rydin

Press Secretary and Communications Advisor to the Administrator

matthew.m.rydin [at] nasa.gov

Katy Summerlin

Deputy Press Secretary and Communications Advisor to the Deputy Administrator

katy.j.summerlin [at] nasa.gov

Tel: (202) 494 – 6075

SOCIAL MEDIA

The IAC 2019 will be online on Facebook, Twitter, and Instagram through the **@iafastro** account and on Twitter also on the **@IAC2019DC** account. The official hashtag to be part of the online conversation is **#IAC2019**

APP

To be updated on the latest information regarding the IAC, please download the IAF App

The App name on the “App Store” and on the “Google Play Store” is IAFASTRO

You can download the App on:

- Google Play store: <https://play.google.com/store/apps/details?id=com.attendify.confbofn3r>
- Apple Store: <https://play.google.com/store/apps/details?id=com.attendify.confbofn3r>
- IAF Web App: <http://bofn3r.m.attendify.com/app/events>

Or directly with this QR code:



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**Note: The IAC2019 Press kit is published one week prior the IAC 2019 and doesn't take into account any subsequent changes in the IAC programme or participants – please check regularly the programme on <http://bofn3r.m.attendify.com/app/events> and on <http://www.iafastro.org/events/iac/iac-2019/>*

IAC 2020
Dubai, United Arab Emirates, 12 – 16 October 2020
IAC 2020 - INSPIRE, INNOVATE & DISCOVER
FOR THE BENEFIT OF MANKIND

The IAC 2020 will take place in Dubai, United Arab Emirates. More information will soon be available on the IAF website: <http://www.iafastro.org/events/iac/> and on the IAC 2020 website: www.iac2020.org.