www.iac2016.org







Making space accessible and affordable to all countries

September **26**th - **30**th 2016 Guadalajara, Mexico





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About the IAC 2016

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.

The previous IAC in 2015, in Jerusalem, Israel, attracted close to 2100 participants, including more than 1300 delegates and press representatives and more than 700 students and young professionals.

In 2016, for the very first time, the IAC comes to Mexico, 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.

The theme of this year's congress is **"Making Space Accessible and Affordable to all Countries**". The promise: to contribute positively and give an additional boost to the efforts of involved emerging nations into a new era of international collaboration to solve common problems using space science and technology.



About International Astronautical Federation

Connecting 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 300 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

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IAC 2016 Co-organisers

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 cosponsoring 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

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INTERNATIONAL INSTITUTE OF SPACE LAW (IISL)

Founded in 1960, the International Institute of Space Law (IISL) is an independent nongovernmental 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: 8th Nandasiri Jasentuliyana Keynote Lecture on Space Law and Young Scholars Session
- E7.2: Legal Perspectives on Space Resources and Off-Earth Mining
- E7.3: Contemporary Considerations about the 1986 Principles Relating to Remote Sensing of the Earth from Space
- E7.4: Legal Challenges Represented by Large Satellite Infrastructures and Constellations
- E7.5: Current Developments in Space Law with Particular Consideration for Latin America

During the IAC, the IISL also co-organises annual Scientific-Legal Roundtables with the International Academy of Astronautics (IAA), the 31th of which will be held this year in Guadalajara (E7.6-E3.5 – The Future of Regional Cooperation). Furthermore, the IISL co-organises a session each year with the IAF (E7.7-B3.8 – Legal Framework for Collaborative Space Activities).

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LOCAL ORGANISING COMMITTEE (LOC)

The 2016 IAC Local Organising Committee is composed by the following institutional representatives:

- Francisco Javier Mendienta LOC Chair and Director General, Mexican Space Agency
- Enrique Pacheco Executive Director, Mexican Space Agency
- Sandra Ramirez IPC Co-Chair
- Alejandro Ramírez Chief Executive Officer, BTC
- Mariana Espinosa Logistics, BTC
- David Lara Website, BTC
- Valeria López Housing, BTC
- Elena Cuadra Registration, BTC
- Soledad Gutiérrez Exhibit Marketing, BTC

Local Organising Committee IAC 2016 Secretariat Tel/ Fax: + 52 (55) 5200 5100 Email: <u>contact@iac2016.org</u>



IAC 2016 at a glance





IAC 2016 at a glance





IAC 2016 Agenda

PRE CONGRESS EVENTS

Space Generation Congress (SGC)

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 gathers a select group of top university students and young professionals from various areas of the international sector – government, industry, and academia, who have a passion for space.

Thursday 22 – Friday 23 September, 9:00 – 18:15

Saturday 24 September, 9:00 – 18:00

Venue: Holiday Inn Expo Guadalajara, Avenida Lopez Mateos Sur 2500. Avenue Mariano Otero, Guadalajara 45050, Mexico

Website: www.spacegenerationcongress.org

Cross-Cultural Communications and Presentation Workshop

The Cross-Cultural Presentation Workshop is organised for Emerging and Future Space leader Grants 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.

Sunday 25 September, 8:15 – 13:30

Venue: Expo Guadalajara, Business Center 1, room Meuble 1 & 2

IPMC Young Professionals Workshop

In connection with the IAC, the IAF's International Project Management Committee (IPMC), the Young Professionals Programme organizes an annual workshop for young professionals in the international space community to discuss topics of mutual interest with a view toward nurturing and empowering the next-generation workforce.

Sunday 25 September, 9:00 – 18:00 Room Events Ballroom 7

Young Professionals Networking Events: Welcome Reception

Cocktails and light appetizers will be served. Sunday 25 September, 19:00 – 21:00 Room Guadalajara Hall 1



IAF/ISEB Educators Professional Development Workshop

Ian Christie, Outreach Co-Ordinator and Curriculum Designer, Victorian Space Science Education Centre (VSSEC), Melbourne, Australia, will introduce participants to the nine classroom techniques for which there is real evidence that student outcomes are improved by teachers who use these techniques.

Sunday 25 September, 8:00 – 16:00 Room Events Ballroom 3

IAC OPENING CEREMONY

Monday 26 September, 9:00 – 11:00, Guadalajara Hall 4,5,6,9&10

Come and enjoy the IAC Opening Ceremony at the Guadalajara Halls at the Expo Guadalajara center. The IAC Opening Ceremony will feature a good mix of artistic performances from Mexican artists and high-level speeches from top-level international representatives.

PRESS CONFERENCES

Heads of Agencies Press Conference

• Monday 26 September, 15:15 – 15:45, Guadalajara Hall 8

SpaceX, Elon Musk, Press Conference

• Tuesday 27 September, 14:30 – 15:00, Guadalajara Hall 4,5,6,9&10

ESA Director General, Jan Werner, Press Conference

• Tuesday 27 September, 15:00 – 16:00, Desfilia room

PLENARY EVENTS

Plenary panellists are carefully chosen so as to be 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/iac2016/plenary-programme/

PLENARY 1: HEADS OF AGENCIES

Monday 26 September, 13:30 - 15:00, Guadalajara Hall 4,5,6,9&10

The Heads of Agencies plenary event will bring together the leaders of major space agencies worldwide. Following the structure of previous years, this year's Heads of Agencies Plenary will



begin with an introductory presentation on latest developments, followed by a discussion on specific topics as well as an interactive Q&A session with the audience.

Panellists:

- Charles Bolden, Administrator, National Aeronautics and Space Administration (NASA), United States
- Wu Yanhua, Vice Administrator, China National Space Administration (CNSA), China
- Igor Komarov, Head, Federal Space Agency (ROSOSMOS), Russia
- A.S. Kiran Kumar (invited), Chairman, Indian Space Research Organisation (ISRO), India
- Naoki Okumura, President, Japan Aerospace Exploration Agency (JAXA), Japan
- Jan Woerner, Director General, European Space Agency (ESA)
- Sylvain Laporte, President, Canadian Space Agency

Moderator:

• John Horack, Professor and Neil Armstrong Chair, The Ohio State University College of Engineering

Co-moderator:

• Minoo Rathnasabapathy, Executive Director, Space Generation Advisory Council (SGAC)

PLENARY 2: SATELLITE COMMUNICATIONS MAKING CONNECTIVITY ACCESSIBLE AND AFFORDABLE TO LATIN-AMERICAN COUNTRIES TO REDUCE THE DIGITAL DIVIDE – HOST PLENARY

Monday 26 September, 18:15 - 19:30, Guadalajara Hall 4,5,6,9&10

Connectivity and Internet access has been always a limitation to allow the inclusion and access to the information society for several millions of inhabitants in this world. This has produced the so-called digital divide that not only produces an impact in the access to basic services but also is an important limitation to their economic growth.

In Latin America, this factor is particularly bigger due the added challenge of geographical disperser communities that also are normally with a very difficult access and with many disadvantages. Just as a reference, in Mexico we have more than 100,000 small communities under this description, they account for around less than 10% of the total population adding restrictions to make feasible to find a suitable business model to provided services.

Panellists:

- Gerardo Ruiz Esparza, Minister of Communications and Transports of Mexico
- Greg Wyler, CEO, OneWeb
- **Rick Ambrose**, Executive Vice President, Lockheed Martin's Space Systems business area, Officer of Lockheed Martin Corporation
- Ruy Pinto, Chief Digital Transformation Officer, INMARSAT
- Steve Collar (invited), CEO, O3B
- Matthew J. Desch (Invited), CEO, Iridium Satellite LLC
- Carlos Slim Helú (Invited), Chairman of the CARSO Group

Moderator:

• Francisco Javier Mendieta Jimenez, General Director, Mexican Space Agency



PLENARY 3: SPACE AND CLIMATE: HOW SPACE AGENCIES WILL CONTRIBUTE TO THE IMPLEMENTATION AND FOLLOW-UP OF THE PARIS AGREEMENT DURING COP 21 Tuesday 27 September 2016, 08:30 – 09:30, Guadalajara Hall 4,5,6,9&10

Climate change is one of the most important challenges humankind is facing. Due to their global coverage at different scales (spatial and temporal), space missions have an important role to play in the fight against climate change since the phenomenon is global with local impacts. This has been highlighted in particular through the Mexico Summit Declaration made under the umbrella of International Academy of Astronautics in September 2015. About one year after the great success of the United Nation Framework Convention on Climate Change Conference of the Parties number 21, the so called COP 21, held in France, Space Agencies will present concrete actions in support to the agreement of Paris concerning observation, mitigation and adaptation strategies.

Panellists:

- Wu Yanhua (invited), Vice Administrator, China National Space Administration (CNSA)
- Sylvain Laporte, President, Canadian Space Agency (CSA)
- Jan Woerner, Director General, European Space Agency (ESA)
- Naoki Okumura, President, Japan Aerospace Exploration Agency (JAXA), Japan
- Ellen Stofan, Chief Scientist, National Aeronautics and Space Administration (NASA)
- Francisco Javier Mendieta Jimenez, General Director, Mexican Space Agency
- Roberto Battiston, President, Italian Space Agency

Moderator:

• Jean-Yves Le Gall, CNES President

PLENARY 4: INNOVATIVE SOLUTIONS FOR MAKING SPACE ACCESSIBLE AND AFFORDABLE – NEXT GENERATION PE

Tuesday 27 September 2016, 17:45 – 18:45, Guadalajara Hall 4,5,6,9&10

The participants will take centre-stage during the Next Generation Plenary and discuss innovative solutions for making space accessible and affordable to all countries – presenting their own research and suggesting bigger ideas for the space industry and space agencies. The panellists were selected through a global competitive process to identify the best worldwide candidates and showcase the diversity of successful efforts in towards space accessibility and affordability through solutions with a new perspective. A team of IAF experts evaluated their proposals to score and select participants for the Plenary Event. The plenary will open with remarks by the moderator followed by presentations by the panellists covering their motivations for performing research in space vs. on Earth and discuss results and benefits of their research – not only for deep-space exploration but also for improving life on Earth. This plenary looks forward to a future when the panellists will be in the prime of their careers, executing the decisions of the day and ultimately driving the space community.



Panellists:

- Marek Novak, Student Researcher, Czech Technical University in Prague
- Sinead O'Sullivan, Sainsbury Management Fellow, Harvard Business School
- Elyka Abello, Electrical Power Supply Design Engineer, Bolivarian Agency for Space Activities
- Kyle Acierno, Global Business Development Manager, ispace technologies Inc
- Yusuke Muraki, Engineer, Japan Aerospace Exploration Agency (JAXA)

Moderator:

• **David Parker**, former Chief Executive of the UK Space Agency and now ESA's Director of Human Spaceflight and Robotic Exploration (D/HRE)

PLENARY 5: LIVING FOR A WHOLE YEAR ON ISS: EARLY RESULTS AND LESSONS LEARNED. #YEARINSPACE

Wednesday 28 September 2016, 08:30 – 09:30, Guadalajara Hall 9&10

Two ISS crewmembers just completed a successful, continuous one-year stay in orbit. It has been nearly two decades since anyone has been in space for that long, and this latest one-year stay has built upon the foundation of those earlier missions to leverage advances in space technology and health care. International cooperation has been the key to the success of this adventure, involving the ISS international partners, collaborative research investigations between Russia and the USA, and crewmembers from Russia and the USA.

Crewmembers, researchers, and managers will participate to discuss the history, planning, experience and early results of this unique adventure, as well as how it relates to upcoming deep space exploration missions. The moderator will orchestrate an informative dialogue among the panellists and with the audience.

Panellists:

- Mikhail B. Kornienko, Cosmonaut
- Michael B. Stenger, RAS Gagarin Cosmonaut Training Center, Co-Principal Investigators
- William H. Gerstenmaier, Associate Administrator for Human Exploration and Operations, NASA

Moderator:

• John B. Charles, Chief Scientist, NASA Human Research Program

PLENARY 6: REALIZING MARS SAMPLE RETURN THROUGH HUMAN AND ROBOTIC COLLABORATION

Thursday 29 September 2016, 08:30 – 09:30, Guadalajara Hall 9&10



Mars sample return has been a priority of the international science community for years. A scenario requiring international partnerships and multiple robotic missions has been advanced by leading space agencies, however the cost is high. With NASA's Journey to Mars and plans for human missions to the lunar vicinity, it is time to consider whether Mars Sample Return can be realized by collaboration between human and robotic missions. As an example, Planetary Protection is one of the tremendous technical challenges of the mission, and securing a safe landing on Earth of the canister containing the Mars sample is highly critical. Could astronauts retrieve a Mars sample canister which is brought to the lunar vicinity robotically and return it to Earth? Human missions to the lunar vicinity will enable mastery of the challenges of future Mars missions and create exciting scientific opportunities for the decades to come. This panel will discuss the challenges and scientific importance of Mars Sample Return, and whether introducing humans in the loop will bring benefits which trigger the political will to finally realize a Mars Sample Return mission.

Panellists:

- Ellen Stofan, Chief Scientist, NASA
- David Parker, Director of Human Spaceflight and Robotic Exploration, ESA
- Charles Whetsel, Manager of Mars Program Formulation Office, NASA JPL
- Masaki Fujimoto, Director, Department of Solar Systems Sciences, JAXA

Moderator:

• Cheryl Reed, Program Manager, Johns Hopkins University Applied Physics Laboratory (APL)

PLENARY 7: PROJECTION AND STABILITY OF THE ORBITAL DEBRIS ENVIRONMENT IN THE LIGHT OF PLANNED MEGA-CONSTELLATION DEPLOYMENTS Thursday 29 September 2016, 13:30 – 14:30, Guadalajara Hall 9&10

In early 2015 media reported plans by two companies, OneWeb Ltd. (UK) and SpaceX (USA), for the deployment of large low-Earth orbit (LEO) satellite constellations. The OneWeb constellation is planned to consist of 720 Satellites, to be operating at 1,200 km altitude in 18 different orbit planes, to provide global high-speed communication. The SpaceX constellation is planned to consist of 4,000 satellites, to be operating at 1,100 km altitude, to provide global, high-speed internet communication. Both constellations will be deployed in high-inclination orbits.

The proposed Plenary Event will present a panel of experts that will highlight possible effects of large constellation deployments on the current and future orbital debris environment, on possible risks imposed on other space missions during the operation and disposal of such constellations, and on legal aspects of large constellation deployments in the light of existing space debris mitigation guidelines and applicable legal frameworks.

Panellists:

- J.-C. Liou, NASA Chief Scientist for Orbital Debris
- Holger Krag, Head of ESA Space Debris Office
- Michael Lindsay, OneWeb Mission System Engineering and Analysis Lead



• Stephan Hobe, Head of Institute of Air- and Space-Law at the University of Cologne

Moderator:

• Heiner Klinkrad, Former Head of ESA Space Debris Office, Current Honorary Professor, Institute of Space Systems of the Technical University of Braunschweig

LATE BREAKING NEWS

MAKING HUMANS A MULTIPLANETARY SPECIES

Tuesday 27 September 2016, 13:30 – 14:30, Guadalajara Hall 4,5,6,9&10

On the second day of the IAC, during a special keynote entitled "Making Humans a Multiplanetary Species", Elon Musk will discuss the long-term technical challenges that need to be solved to support the creation of a permanent, self-sustaining human presence on Mars. The technical presentation will focus on potential architectures for colonizing the Red Planet that industry, government and the scientific community can collaborate on in the years ahead.

Speaker:

• Elon Musk, CEO and Founder, Space X

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 15 - 20 question/answer session.

HIGHLIGHT LECTURE 1: MARS BASE CAMP

Wednesday 28 September 2016, 17:45 – 18:45, Guadalajara Hall 9&10

Mars Base Camp is Lockheed Martin's vision for sending humans to Mars by 2028 – and bringing them home safely. This presentation will analyse the architecture, science objectives and mission profile, all of which build on the deep space capabilities of NASA's Orion and SLS programs.

Speakers:

- Dominic A. (Tony) Antonelli, Space Systems Mars Space Camp initiative, Lockheed Martin
- Steven D. Jolly, Space Systems Mars Space Camp initiative, Lockheed Martin

Moderator:

• Ms. Wanda Sigur, VP and GM, Civil Space, Space Systems Company

HIGHLIGHT LECTURE 2: THE EXPLORATION OF PLUTO AND THE KUIPER BELT BY NEW HORIZONS

Thursday 29 September 2016, 17:45 – 18:30, Guadalajara Hall 9&10



The New Horizons (NH) mission was selected by NASA in November 2001 to conduct the first in situ reconnaissance of Pluto and the Kuiper belt. The NH spacecraft was launched on 2006 January 19, received a gravity assist from Jupiter during closest approach on 2007 February 28, and flew 12,500 km above Pluto's surface on 2015 July 14. NH carried a sophisticated suite of seven scientific instruments, altogether weighing less than 30 kg and drawing less than 30 W of power, that includes panchromatic and color imagers, ultraviolet and infrared spectral imagers, a radio science package, plasma and charged particle sensors, and a dust counting experiment. These instruments enabled the first detailed exploration of a new class of solar system objects, the dwarf planets, which have exotic volatiles on their surfaces, escaping atmospheres, and satellite systems. NH also provided the first dust density measurements beyond 18 AU and cratering records that document both the ancient and present-day collisional environment in the outer solar system down to sizes of tens of meters. NH obtained unprecedented data on Pluto's small satellites (Styx, Nix, Kerberos, and Hydra), adding significantly to the scientific bounty returned from the NH mission. The NH spacecraft was targeted toward the flyby of a small (~20-40 km) KBO in late-2015, and NASA approved the Kuiper belt Extended Mission (KEM) phase in July 2016, enabling the study of an object (2014 MU69) in a completely different dynamical class (cold classical) than Pluto. Other important scientific objectives of the KEM include: observations of more than 20 other KBOs at resolutions and geometries not feasible from Earth, and studies of the heliospheric plasma, neutral H and He, and the dust environment out to 50 AU from the Sun.

Speaker:

• Harold A. Weaver, New Horizons Project Scientist, Principal Professional Staff, The Johns Hopkins University Applied Physics Laboratory

Moderators:

- **Stamatios Krimigis**, Emeritus Head of Space Department, Principal Professional Staff, The Johns Hopkins University Applied Physics Laboratory
- **Ralph McNutt**, Chief Scientist for Space Science, Principal Professional Staff, The Johns Hopkins University Applied Physics Laboratory

HIGHLIGHT LECTURE 3: THE SATURN SYSTEM AS A NATURAL LABORATORY TO INVESTIGATE THE EMERGENCE OF BIOLOGY

Friday 30 September 2016, 08:30 – 09:30, Guadalajara Hall 9&10

Titan and Enceladus comprise a superb natural laboratory for studying the emergence of life, from pre-biotic chemistry in a dynamic geological setting, all the way to contemporary habitability of a salt-water ocean. We are fortunate that both of these important moons are in one planetary system; astrodynamics access to Enceladus is in fact gained by using Titan gravity assists; and Cassini has demonstrated how to conduct operations at Saturn. Mission designs, technologies, and even flight systems can be shared between these targets, making the exploration of both more accessible and affordable than if they were singular. The synergies mean that humanity is poised to follow Cassini back to the Saturn system, this time with the age-old goal in sight of learning how common life may be in the cosmos. The quest to understand how life arises, and where, is an inspiring, provocative, and enduring one.



Speaker:

• Jonathan I. Lunine, Director, Cornell Center for Astrophysics and Planetary Science, Cornell University

Moderator:

• Brent Sherwood, Program Manager, Solar System Mission Formulation, Jet Propulsion Laboratory

HIGHLIGHT LECTURE 4: IAF WORLD SPACE AWARD HLL Thursday 29 September 2016, 18:30 – 19:15, Guadalajara Hall 9&10

Speaker:

• Yuri Koptev, 2016 World Space Award recipient

EVENTS AT THE IAF GLOBAL NETWORKING FORUM

MONDAY 26 OCTOBER, Guadalajara Hall 8

- Heads of Agencies Press Conference, 15:15 16:00 (see panellists on page 13)
- The Development of Commercial Remote Sensing Satellites and LEO Communication Constellation, 16:15 – 17:15
- Russian Cosmonautics: International Aspects, 17:15 18:15

TUESDAY 27 OCTOBER – INDUSTRY DAY, Guadalajara Hall 8

- GNF Late Breaking News from OneWeb Greg Wyler, 9:30 10:00
- GNF Late Breaking News from Virgin Galactic –George Whitesides, 10:05–10:40
- GNF Late Breaking News from Blue Origin Rob Meyerson, 10:45 11:20
- **GNF Late Breaking News from Planet Robbie Schingler**, 11:25–12:00
- GNF Late Breaking News from Arianespace Stephane Israel, 12:00 12:25
- Industry Lunch (VIP Luncheon Area), 12:30 13:45
 James H. Crocker VP and GM, Lockheed Martin Space Systems Company, International



- IRC GNF: (Format: Industry Executive Conversation) Shifting the Landscape for Global Space Industry – Growing Partnerships in a Competitive Environment – Systems Integration to Big Data, 14:00 – 16:15
- GNF Aspects of New Space Economy, organized by DLR, 16:30 17:45

WEDNESDAY 28 OCTOBER, Guadalajara Hall 8

- WIA-E "Space: New paths towards a balanced and inclusive development", 9:30 10:30
- Science the fundament and promoter of space activities, 10:30 12:00
- WRC-15 allocates spectrum for future innovation, 12:00 12:30
- UNISPACE +50 and the Future of Space, 13:30 14:30
- Making the Moon Village and Mars Journey Accessible and Affordable for All, 14:30 16:00
- Disruptive Space Technology, 16:00 17:00
- Space for global challenges, 17:00 17:45

THURSDAY 29 OCTOBER, Guadalajara Hall 8

- Space Technology for Emerging Countries for Latin and South America, 9:30 10:30
- CELSS Integration Experiment and Manned Deep Space Exploration, 10:30 11:30
- ESA DG Jam Session Event, 10:30 12:00, Guadalajara Hall 7
- Technology Transfer How to Make the Most of It? 11:30 12:30
- Success of commercial space ventures An inspiration for the next generation, 12:30 13:30
- Aiming at a resilient and sustainable space security system, 14:30 16:00
- Tourism Space Transportation and Space Medicine, 17:00 17:45

FRIDAY 30 OCTOBER, Guadalajara Hall 8

- Rosetta's Landing Live transmission from ESOC, 6:00 7:30
- Astronauts Event, 9:30 10:30



- Space Architecture and Systems Engineering: different disciplines or the same? 10:30 11:30
- Space Science from Ground Observatories and Microsatellites at UNAM, 11:30 12:30
- Stardust a fresh look at planetary defense and space debris removal, 12:30 13:30
- China Manned Space Programme and Opportunity for Cooperation, 13:30 14:30

IAF "3G" INTERNATIONAL PLATFORM FOR DIVERSITY AND EQUALITY IN ASTRONAUTICS (IDEA)

Wednesday, 28 September 2016, 12:30 – 13:30 EXPO Guadalajara, Guadalajara Hall 3 (Speakers/VIP Luncheon area)



In the frame of the "3G" Diversity principle, Mr. Jean-Yves Le Gall, IAF President Elect has created a new platform: **IAF "3G" International Platform for Diversity and Equality in Astronautics (IDEA)**, which provides a framework for an intensive and open exchange on diversity and equality aspects within the IAF and amongst IAF member organisations as well as potential IAF members and other organisations promoting diversity.

Speakers:

- Jean-Yves Le Gall, IAF President Elect
- Jan Woerner, Director General, European Space Agency (ESA), Geographical Diversity
- **Dava Newman**, Deputy Administrator, National Aeronautics and Space Administration (NASA), Generation Diversity
- Kay Sears, Vice President, Strategy & Business Development, SSC, Lockheed Martin Corporation, Gender Diversity

If you wish to interview any of the speakers, please contact Emma Huis at media@iafastro.org.

A light buffet - sponsored by Lockheed Martin Corporation, IAC 2016 Official Industry Anchor Sponsor - will be offered.



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 2016 has 170 Sessions, each composed of up to twenty presentations. A list of the symposia includes:

- ✤ A1. IAA/IAF SPACE LIFE SCIENCES SYMPOSIUM
- ✤ A2. MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM
- ✤ A3. SPACE EXPLORATION SYMPOSIUM
- ◆ A4. 45th IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) The Next Steps
- ♦ A5. 19TH IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM
- ✤ A6. SYMPOSIUM ON SPACE DEBRIS
- ✤ A7. SYMPOSIUM ON TECHNOLOGICAL REQUIREMENTS FOR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS
- B1. EARTH OBSERVATION SYMPOSIUM
- B2. SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM
- **B3. HUMAN SPACEFLIGHT SYMPOSIUM**
- B4. 23rd IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS
- B5. SYMPOSIUM ON INTEGRATED APPLICATIONS
- B6. SPACE OPERATIONS SYMPOSIUM
- C1. ASTRODYNAMICS SYMPOSIUM
- C2. MATERIALS AND STRUCTURES SYMPOSIUM
- C3. SPACE POWER SYMPOSIUM
- C4. SPACE PROPULSION SYMPOSIUM
- D1. SPACE SYSTEMS SYMPOSIUM
- **D2. SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM**
- D3. 14TH IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT
- D4. 14th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE
- ***** D5. 49th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES
- **D6. SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES**



- **&** E1. SPACE EDUCATION AND OUTREACH SYMPOSIUM
- E2. 45th STUDENT CONFERENCE
- Call the symposium on space policy, regulations and economics
- E4. 50th IAA HISTORY OF ASTRONAUTICS SYMPOSIUM
- **E5. 27th IAA SYMPOSIUM ON SPACE AND SOCIETY**
- **E6. BUSINESS INNOVATION SYMPOSIUM**
- ♦ E7. 59th IISL COLLOQUIUM ON THE LAW OF OUTER SPACE
- GTS. GLOBAL TECHNICAL SYMPOSIUM

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29/09/2016	14:45-17:45	A3.5	D2.6	C1.7	A6.6	B4.6B	B1.5	B3.6/A5.3	C4.6	C2.7	E5.5	C3.4	E1.7	D1.6	E4.2	B5.2	B6.3	A2.5	D5.3	D4.5	B2.8/GTS.3
29/09/2016	09:45-12:45	A3.4	D2.5	C1.6	A6.5	B4.6A	B1.4	B3.5	C4.5	C2.6	E5.4	A1.6	E1.6	D1.5	E4.3A/E4.3B	B2.6	E3.5/E7.6	A4.2	D5.2	D4.3	D6.3
28/09/2016	14:45-17:45	A3.3B	D2.4	C1.5	A6.9	B4.5	A5.1	C3.3	C4.4	C2.5	E5.3	A1.5	E1.5	D1.4	E7.4	B2.5	E3.4	A2.4	E6.3	D3.3	B3.9/GTS.2
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27/09/2016	14:45-17:45	A3.2B	D2.7	C1.3	A6.4	B4.3	A5.2	B3.3	C4.9	C2.3	E5.1	A13	E1.3	D1.2	E7.2	B2.3	E3.2	A4.1	E6.2	D4.2	E2.1
27/09/2016	09:45-12:45	A3.2A	D2.2	C1.2	A6.2	84.1	B1.2	B3.2	C4.2	C2.2	C3.2	A1.2	E1.9	E6.1	E7.1	B2.2	E3.1	A2.2	A7.2	D4:1	E2.3/GTS.4
26/09/2016	15:15-18:15	A3.1	D2.1	C1.1	A6.1	B4.2	B1.1	B3.1	C4.1	C2.1	C3.1	A1.1	E1.8	D1.1	E4.1	B2.1	B6.2	A2.1	A7.1	D3.1	D6.1
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IAC EXHIBITION

Location: Jalisco Halls A - D

The IAC2016 Exhibition will feature over 100 exhibitors from industry, space agencies, research centres and universities, associations and space societies.

Opening

Monday 26 September, 11:30 – 12:30

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

Weekly opening hours

Monday, 26 September 12:00 - 18:00 Tuesday, 27 – Thursday, 29 September 9:00 - 18:00 Friday, 30 September 9:00 - 15:00

IAC CLOSING CEREMONY

Friday 30 September, 16:30 – 17:30, Guadalajara Hall 9&10

The Closing Ceremony provides a formal closing of the activities of the 67th IAC. 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 Charles Elachi, in recognition to his 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 Bénédicte Escudier, 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 Norman Crabill, Wang Xiji, U.R. Rao, and Manfred Fuchs 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 Jessica Culler, Takashi Ohtani, Victoria Alonsoperez, Andrea Boyd, and Amalio Monzon for their contributions in promoting astronautics.
- 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 signature of the **IAC 2017 contract** will take place and the **Congress flag** will be handed over to the next host country – Australia.



Mexico and Space

The knowledge of the skies has a long tradition throughout Mexico's history. From preHispanic times to the XX Century dawns, observatories were created and helped to learn the movements and cycles of cosmic objects. By the middle of the XX century, space projects arise in Mexico, which brought Mexico into the design of sounding rocket launchers and communication systems, which has contributed with a new focus to our vision of the universe, since we do not only want to observe it but also to reach it and use it.

The history of Mexican space development is intertwined just like in other countries, with the development of aeronautics. This is how work in aviation brought advances in 1949 forming a group of Mexican technicians that started studies on rocketry. Our country made its first step on space activities with the launching of high atmospheric research sounding rockets in 1957, and later in 1960, with the creation and operation of the Guaymas, Sonora, tracking station.

With the creation of the National Commission for Outer Space (CONEE) in 1962, important work in rocketry and telecommunications was made, which allowed the creation of specialized teams and physical infrastructure to enter the activities that were being developed in the world at that time. This activity was interrupted with the disintegration of CONEE 1977. A second national effort in the space arena was the creation of the Mexican Institute of Communications (IMC) 1987, which coordinated the design and operation of communication satellites, which ran the same fate and was dissolved in 1996.

Since then to this date, there have been specific aerospace developments, in collaborations between higher education institutions such as UNAM, IPN, CONACyT centers, and the University of the Mexican Army and Air Force (UDEFA), with some international groups. On the other hand the Ministry of Communications and Transportation (SCT) have promoted activity on telecommunications, with the participation of some private companies. These efforts, backed by public and private institutions along with many individuals, allowed that today, with the promulgation of the law that creates the Mexican Space Agency on July 30th, 2010, brings forward the dream of many generations of Mexicans who have made contributions to the national aerospace development.





IAC 2017 Adelaide, Australia, 25 – 29 September 2017 Unlocking Imagination, Fostering Innovation and Strengthening Security

The IAC 2017 will for the very first time, take place in the beautiful city of Adelaide, Australia. More information will soon be available on the IAF website: http://www.iafastro.org/evenements/iac-2017/ and on the IAC 2017 website: www.iac2017.org.





Practical information

PRESS BRIEFING

Sunday, 25 September, 18:30 – 19:30 Location: Fray Alcade, Business Center 2, Expo Guadalajara

MORNING MEETINGS

Monday, 26 – Friday 30, September, 8:00 – 8:30 Location: Jalisco Hall E1 You will also receive daily agenda emails every morning.

CONGRESS VENUE



Having been in the Mexican exhibition industry for more than 21 years, the **Expo Guadalajara** is an eminent exhibition center in Mexico City. Known for its highly specialized services and state-ofthe-art facilities, the center has been the favorite destination for many of the country's leading exhibiting companies. Its Hall Guadalajara is distinctive in Latin America and provides around 14,000 sq mt column-free and air-conditioned space. It offers 20 well equipped rooms meant to be used for meetings, workshops and as showrooms for the exhibitors. Located in a strategic position, the Expo Guadalajara serves as the key venue for most business activities and also acts as a viable podium for maximum interaction between buyers and exhibitors.

A floorplan is available on the next page.

For more information on the venue, visit: http://iac2016.org/Accommodation.html#general

INTERNATIONAL PRESS CENTRE

Location: Jalisco Hall E1 Opening hours: Saturday, 24 September, 13:00 – 20:00 Sunday, 25 September – Thursday, 29 September, 07:30 – 20:00 Friday, 30 September, 07:30 – 17:00



EXPO GUADALAJARA

https://www.iac2016.org/Exhibit.html#exhibit





CONTACTS

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*Note: The IAC2016 Press kit is published on 13 September 2016 and doesn't take into account any subsequent changes in the IAC programme or participants.