



# International Astronautical Federation **News**

*Connecting Space People*

3/2016 (September 2016)

## President's Welcome

Dear IAC Enthusiasts,

Welcome to the September 2016 IAF newsletter! This edition highlights the exciting news on the upcoming 67<sup>th</sup> IAC to be held in Guadalajara, Mexico from 26-30 September.

In only a few weeks from now, we will get the chance to attend an extensive programme of plenaries led by high-level speakers, technical sessions and many associated events such as the UN/IAF Workshop and the IPMC-Young Professionals Workshop. The IAC will also recognize individuals who have made an outstanding contribution to the world's progress in astronautics during its annual Awards Ceremony.



I would like to express my sincere thanks in advance to all the organizing teams, for what promises to be a successful congress, rich in diversity and international cooperation. I am very much looking forward to welcoming all of you to the Congress and enjoying every moment of it.

The newsletter also features the latest on IAF activities and a selection of members' news in the Members' Corner.

I hope you enjoy the newsletter and look forward to seeing you in Guadalajara! See you online with #IAC2016.

**Kiyoshi Higuchi**

**IAF President**



## IN THIS ISSUE

### PRESIDENT'S WELCOME

#### IAF NEWS

- IAC 2016
- IAC 2017
- GLIS 2016
- GLEX 2017
- IAF Capsules
- New IAF Corporate Video

#### MEMBERS' CORNER

#### OUR LATEST PUBLICATIONS

- GLIS Final Report
- IAC 2017 Call for Papers
- IAF Corporate Brochure

#### IMPORTANT DATES SEPTEMBER 2016:

- IAC 2016 online registration fees – **20 September**
- IAC 2016 Paper submission deadline – **8 September**
- IAC 2016 Presentation submission deadline – **16 September**
- International Astronautical Congress – **26 - 30 September**

## IAC 2016

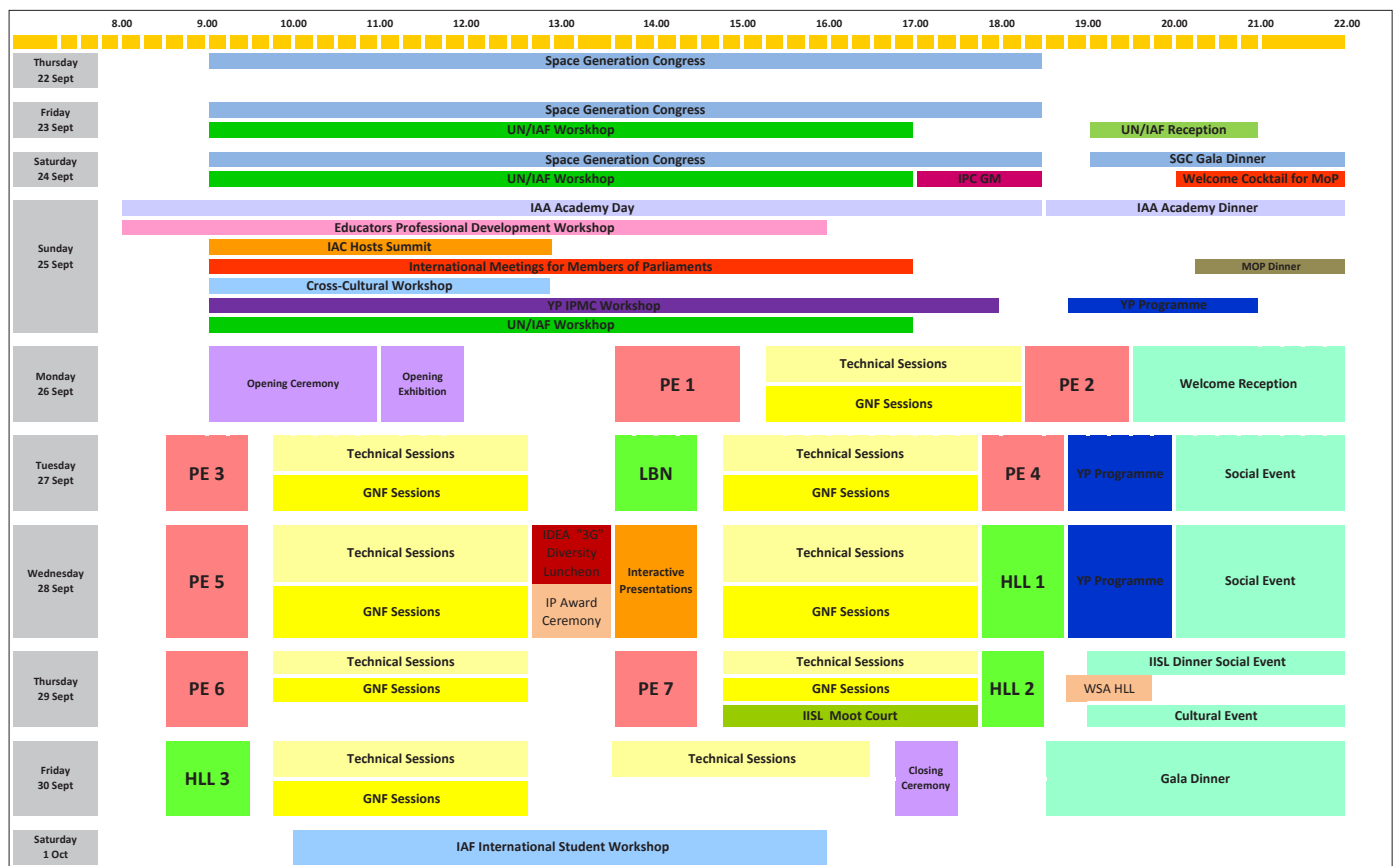
### 4 HIGHLIGHT LECTURES, 7 PLENARIES and 1 LATE BREAKING NEWS

PE/HLL	Timing	Title	Location
PE 1	Monday 13:30 – 15:00	Heads of Agency	Guadalajara Hall 4,5,6,9&10
PE 2	Monday 18:15 -19:30	Satellite Communications Making Connectivity Accessible and Affordable to Latin-American Countries to Reduce the Digital Divide - Host Plenary	Guadalajara Hall 4,5,6,9&10
PE 3	Tuesday 08:30 – 09:30	Space and Climate: How Space Agencies Will Contribute to the Implementation and Follow-up of the Paris Agreement during COP 21 ?	Guadalajara Hall 4,5,6,9&10
LBN	Tuesday 13:30 – 14:30	Making Humans a Multiplanetary Species	Guadalajara Hall 4,5,6,9&10
PE 4	Tuesday 17:45 - 18:45	Innovative Solutions for Making Space Accessible and Affordable – Next Generation PE	Guadalajara Hall 4,5,6,9&10
PE 5	Wednesday 08:30 – 09:30	Living For a Year on ISS: Early Results and Lessons Learned. #YearInSpace	Guadalajara Hall 9&10
HLL 1	Wednesday 17:45 - 18:45	Mars Base Camp by Lockheed Martin Corporation	Guadalajara Hall 9&10
PE 6	Thursday 08:30 – 09:30	Realizing Mars Sample Return through Human and Robotic Collaboration	Guadalajara Hall 9&10
PE 7	Thursday 13:30 – 14:30	Projection and Stability of the Orbital Debris Environment in the Light of Planned Mega-Constellation Deployments	Guadalajara Hall 9&10
HLL 2	Thursday 17:45 - 18:30	The Exploration of Pluto by the New Horizons Mission	Guadalajara Hall 9&10
WSA HLL	Thursday 18:30 - 19:15	IAF World Space Award HLL	Guadalajara Hall 9&10
HLL 3	Friday 08:30 - 09:30	The Saturn System as a Natural Laboratory to Investigate the Emergence of Biology	Guadalajara Hall 9&10

**REGISTER NOW!**

**Check all Official Tours**

## CONGRESS AT A GLANCE





## GLOBAL NETWORKING FORUM (GNF) AT A GLANCE

	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00
<b>Monday 26 Sept</b>		Opening Ceremony		Opening Exhibition			PE 1 - Heads of Agencies	Opening Conference	Heads of Agency Press Conference	Development of Commercial Remote Sensing Satellites and LEO	Russian Cosmonautics: International Aspects	PE 2 - Host Plenary - Satellite Communications
<b>Tuesday 27 Sept</b>	PE 3 - COP21: Space and Climate	Preparing Unity for flight and Galaxy Girl for LauncherOn	Launch, Land, Repeat – The story of the New Shepard	Bringing the Internet to the whole world from Space via satellite	Commercialization of Ariane 6 and Vega C	IRC Lunch	LBN - SpaceX: Making Humans a Multiplanetary Species	Shifting the Landscape for Global Space Industry		New Dimensions of Space –What’s Next?	PE 4 - Next Generation Plenary	
<b>Wednesday 28 Sept</b>	PE 5 - Living For a Whole Year on ISS	WIA-E "Space: New paths towards a balanced and inclusive development"	Science – the fundament and promoter of space activities	WRC-15 allocations spectrum for future	Poster Award Ceremony	IDEA 3G Event	UNISPACE +50 and the Future of Space	Making the Moon Village and Mars Journey Accessible and Affordable for All	Disruptive Space Technology	Space for global challenges	HLL 1	
<b>Thursday 29 Sept</b>	PE 6 - Realizing Mars Sample Return	Space Technology for Emerging Countries – for Latin and South America'	CELSS Integration Experiment and Manned Deep Space Exploration	Technology Transfer – How to Make the Most of It?	Success of commercial space ventures - An inspiration for the next generation	PE 7 - Projection and Stability of the Orbital Debris	Aiming at a resilient and sustainable space security system		Tourism Space Transportation and Space Medicine	HLL 2 - The Exploration of Pluto	HLL 3 - IAF World Space Award	
<b>Friday 30 Sept</b>	HLL 4 - The Saturn System	Astronauts Event	Space Architecture and Systems Engineering: different disciplines or the same?	Space Science From Ground Observatories and Microsatellites at UNAM	Stardust - a fresh look at planetary defense and space debris removal	China Manned Space Programme and Opportunity for Cooperation	Technical Sessions		Closing Ceremony			

## IAC 2016 TECHNICAL PROGRAM

IAC 2016 got a high number of 2185 accepted papers from 1777 authors and 74 countries!

The prestigious technical sessions are the heart of the main congress program. This year’s IAC offers a rich technical program including 170 Technical Sessions (TS) and features high-level keynote speakers and attendees from industry, academia, associations, and government. Complementing the regular technical sessions, new formats of presentation offer stimulating sessions for a variety of audiences.

The IAC 2016 program features a new track entitled – Global Technical Sessions (GTS). The GTS are designed to offer a modern and eclectic platform at the IAC for sharing technical content to an open minded audience on-site but also online! Oriented towards young and talented space professionals, it allows for sharing of information on a global scale with presenters and audience both at the IAC venue and online at their home/work/university locations.

For the first time in IAC history, the authors will have the opportunity to present their work on digital screens. This new format called “Interactive Presentations (IP)” provides an excellent opportunity for presenters to utilise electronic, digital and visual displays to share their work and research, and to interact with delegates on an individual basis. This format may revolutionize how we build collaborations, how we share and significantly improve our overall exchanges of technical information.

We would like to thank all IAC 2016 speakers and attendees. Enjoy your time at IAC: renew old acquaintances and make new ones, be inspired by and provide inspiration to colleagues, take away visionary ideas and add your own into the mix.

See you all in Guadalajara!

## IAC 2016 MEDIA PARTNERS

Official Media Partner



## Supporting Media Partners



## IAC 2016 LATEST NEWS!

### LBN: Elon Musk to Speak at IAC 2016

**Tuesday 27 September 2016, from 13:30 - 14:30**

The 67<sup>th</sup> International Astronautical Congress, to be held in Guadalajara, Mexico, from **26-30 September 2016** will welcome **SpaceX founder, CEO, and Lead Designer Elon Musk**.

On the second day of the IAC, during a special keynote entitled **“Making Humans a Multiplanetary Species”**, 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.

### PE 1: Heads of Space Agencies to Convene for IAC 2016 in Guadalajara

**Monday 26 September 2016, from 13:30 - 15:00**

As each year will be held the Heads of Agencies plenary during the first day of the International Astronautical Congress (IAC). The 67<sup>th</sup> IAC which theme is **‘Making Space Accessible and Affordable to All Countries’** will take place from **26 - 30 September 2016** in **Guadalajara, Mexico**.

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. [Read more](#)

### PE 2: Satellite Communications making connectivity accessible and affordable to Latin-American countries to reduce the digital divide

**Monday 26 September 2016, from 18:15 – 19:30**

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. [Read more](#)

### PE 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**

Climate change is one of the most important challenge 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. [Read more](#)



## PE 4: Innovative Solutions for Making Space Accessible and Affordable – Next Generation PE

Tuesday 27 September 2016, from 17:45 – 18:45

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.

[Read more](#)

## PE 5: Spending a Year in Space – Hear how it went at IAC 2016

Wednesday 29 September 2016, from 08:30 – 09:30

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. [Read more](#)

## PE 6: An Experts' View on Mars Sample Return at IAC 2016

Thursday 29 September 2016, from 08:30 – 09:30.

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. [Read more](#)

## PE 7: The Orbital Debris Environment in the Light of Planned Mega-Constellation Deployments at IAC 2016

Thursday 29 September 2016, 13:30 – 14:30

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. [Read more](#)

## HLL 1: Mars Base Camp

Wednesday 28 September 2016, 17:45 – 18:45

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

## HLL 2: The Exploration of Pluto by the New Horizons Mission

Thursday 29 September 2016, 17:45 – 18:30

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. [Read more](#)

Check for more news on our Social Media





## HLL 3: The Saturn System as a Natural Laboratory to Investigate the Emergence of Biology

Friday 30 September 2016, 08:30 – 09:30

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. [Read more](#)

## IAF New Initiative



### IAF “3G” International Platform for Diversity and Equality in Astronautics (IDEA)

#### Background:

The IAF President Elect, Mr. Jean-Yves Le Gall, has developed an Agenda for his term as IAF President which he intends to implement starting from September 2016 for a period of 3 years:



#### THE IAF GLOBAL INNOVATION AGENDA 2016-2019

#### Connecting @ll Space People

This Agenda will be presented to the IAF General Assembly on Monday 26 September 2016, at the IAC 2016 in Guadalajara.

One of the most important points in this agenda is focusing on diversity:

- Foster the Principles of “3-G” Diversity within the Federation and the Space Sector
  - ♦ Geography
  - ♦ Generation
  - ♦ Gender

These are the main pillars of a “3-G” Diversity principle of the Federation. Geographical diversity and global reach have been traditional features of the IAF since its creation. Attracting the young generation has been in the focus of the IAF during the recent years with manifold newly created activities and programmes tuned to this target community. This has resulted in a significant increase of the number of young people engaged and participating in IAF activities. Gender diversity is still an area where strong progress needs to be achieved. Dedicated promotion of opportunities for female space actors within the Federation and the space sector in general, presenting successful role models and encouraging the young generation of the female space community to aim for leadership positions shall help to reach a balanced and inclusive representation within the governance of the IAF, its Technical and Administrative Committees, as well as the IAC speakers’ and authors’ community.

#### Implementation:

Implementing the “3G” Diversity Focus as part of the IAF Global Innovation Agenda 2016 – 2019 calls for the creation of an IAF Platform which will allow the Federation to take a leading role in the effort to promote and advance diversity and equality principles amongst a global space community, become an exemplary organisation in terms of geographical, generational, gender and any other diversity aspects, and live up to its motto Connecting @ll Space People.

The President Elect has decided to create such platform and initiate activities already at IAC 2016 in Guadalajara.

IAF “3G” IDEA 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. On the basis of IAF “3G” IDEA, events of different nature shall be organized during the annual International Astronautical Congress, IAF Global Conferences, IAF Spring Meetings and other occasions, focusing on “3G” diversity topics. Such events can be, but are not limited to:

- Keynotes or lectures
- Moderated panel discussions
- Networking events
- Mentoring sessions
- Social events
- “Diversity” Luncheons or Dinners
- Competitions and awards ceremonies

### Focus of these events shall be to contribute to

- Connecting and engaging space communities in remote areas to IAF activities;
- Further increasing the involvement of and the offer to the young generation within the Federation and its activities;
  - ♦ Reviving the IAF mentoring programme;
- Attracting specifically the female space community to become active and take over leadership within IAF bodies;
- Providing an international platform to connect gender diversity organisations from different countries, such as WIA US, WIA Europe, WIA Canada, WIA Africa, WIA Japan, etc.
- Establishing IAF focus on all diversity aspects and promoting diversity as a basic principle to the entire global space community.

## Welcome to the Inauguration Event at IAC 2016

### IAF “3G” IDEA “Diversity” Luncheon

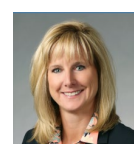
Wednesday, 28 September 2016, 12:30 – 13:30

EXPO Guadalajara, Guadalajara Hall 3 (Speakers/VIP Luncheon area)



#### Programme:

- Opening, Moderation and Introduction as part of the IAF Global Innovation Agenda 2016 – 2019 (10 min)  
**Jean-Yves Le Gall** (IAF President Elect)
- Keynote - Focus on **G**eographical Diversity (10 min)  
**Jan Woerner** (Director General, European Space Agency)
- Keynote – Focus on **G**eneration Diversity (10 min)  
**Dava Newman** (Deputy Administrator, NASA)
- Keynote – Focus on **G**ender Diversity (10 min)  
**Kay Sears** (Vice President, Strategy & Business Development, SSC, LMC)
- Networking time & interview opportunities



## IAC 2016 will Recognize Achievements!

Each year, the IAF confers a number of awards to individuals and groups, who have distinguished themselves in space cooperation and space activities at global level; are engaged with or participate actively in the activities of the Federation. The awards are presented at the annual International Astronautical Congress.

This year, the 67<sup>th</sup> International Astronautical Congress to be held in **Guadalajara, Mexico** from **26 - 30 September 2016** will welcome the 2016 IAF awards recipients on **Friday 30 September** during the Closing Ceremony.

Among them will be recognized the IAF's most prestigious award recipient, **Dr. Yuri Koptev**, ROSCOSMOS, for the **IAF World Space Award**, the **Allan D. Emil Memorial Award** recipient, **Dr. Charles Elachi**, Jet Propulsion Laboratory, California Institute of Technology, the **Frank J. Malina Astronautics Medal** recipient, **Ms. Bénédicte Escudier**, ISAE-SUPAERO and the **IAF Hall of Fame** award recipients, **Prof. U.R. Rao**, **Mr. Norman Crabill**, **Prof. Wang Xiji** and **Dr. Manfred Fuchs**.

In addition, the IAF will also recognize its **2016 Young Space Leaders** for their outstanding leadership in their academic or early careers: **Ms. Jessica Culler**, NASA, **Ms. Victoria Alonsoperez**, Chipsafer, **Ms. Andrea Boyd**, European Space Agency, **Mr. Amalio Monzon**, Airbus and **Mr. Takashi Ohtani**, JAXA.

If you wish to be updated with IAC 2016 latest news write an email to [media@iafastro.org](mailto:media@iafastro.org) and follow the conversation on social media with #IAC2016

## IAF INTERNATIONAL STUDENT WORKSHOP 2016 – AGENDA

**Saturday 1 October 2016 from 10:00 – 17:00**

To be held at the the Instituto Tecnológico y de Estudios Superiores de Monterrey in Guadalajara, Mexico

### INTRODUCTION

- |               |   |
|---------------|---|
| 10:00 – 10:05 | Introduction by Dr. Eduardo Espadas Aldana, Instituto Tecnológico y de Estudios Superiores de Monterrey |
| 10:05 – 10:10 | Introduction by Prof. Chris Welch, International Astronautical Federation                               |
| 10:10 – 10:15 | Introduction by Prof. Pierre Rochus, Centre Spatial de Liège  |

### PRESENTATIONS

- |               |  |
|---------------|--|
| 10:15 – 10:35 | <b>Linda Abakah-Sikafo</b> , Ghana's Contribution on Space Innovation to Reduce Digital Divide                   |
| 10:35 – 10:55 | <b>Sadhana Jagannath</b> , Human Settlements and Housing Issues: Using Space Technology to Tackle Digital Divide |
| 10:55 – 11:15 | <b>Yalda Mousavinia and Rana Khalil</b> , Open Spaceport: A Next Generation Space Mission Collaboration Platform |
| 11:15 – 11:35 | <b>Maria Guadalupe Santoyo Llamas</b> , Imaging space at the speed of sound                                      |
| 11:35 – 11:55 | <b>Dante Valdovinos</b> , Latin American Space Agency, a possible dream  |
| 12:55 – 13:15 | <b>Juan Carlos Mariscal</b> , UNAM SPACE: Creating Mexican outer space explorers.                                |

### LUNCH

- |               |       |
|---------------|-------|
| 13:15 – 14:15 | Lunch |
|---------------|-------|

### PRESENTATIONS

- |               |  |
|---------------|--|
| 14:15 – 14:35 | <b>Behnoosh Meskoob</b> , Space Outreach Activities in Middle East, one step forward |
|---------------|--|



- 14:35 – 14:55 **Kathryn Robison**, Public Opinion and International Policy Response
- 14:55 – 15:15 **Louis Wei Yu Feng**, Shape Memory Alloys for Space Debris Capture Applications
- 15:15 – 15:35 **Damilola Oladeji**, Urban Flood Mapping in Akure Using Remote Sensing and GIS Approach
- 15:35 – 15:55 **Ogongo Joan Aoko**, Evaluating Land Use and Land Cover Change in Lake Naivasha Basin Using Remote Sensing and GIS Technology
- 15:55 – 16:15 **Rebecca Berkoh-Oforowaa**, Investigation of the Effect of Extreme Rainfall on Agricultural Practices over West Africa

**COFFEE BREAK**

- 16:15 – 16:45 Coffee Break

**AWARD CEREMONY**

- 16:45 – 17:00 Award ceremony Sponsored by Prof. Gengxin Xie of the Chinese Center of Space Exploration Ministry of Education (COSE) and Prof. Zhou Jun of Shaanxi Engineering Laboratory for Microsatellites

**IAC 2016 SPONSORS**

The IAF and the Mexican Space Agency would like to thank all IAC 2016 sponsors for their commitment in making the 67<sup>th</sup> International Astronautical Congress so successful. Your generous contribution is helping bringing to life one of the most exciting space event worldwide!

The expectations for the event are excellent and this is also thanks to your contribution.



If you too wish to become an IAC 2016 Proud Sponsor, please contact: **Giulia Maria Berardi** – IAF Deputy Executive Director  
[giuliamaria.berardi@iafastro.org](mailto:giuliamaria.berardi@iafastro.org) | +33 1 80 05 24 31



**'The IAF is pleased to present its new corporate video. Enjoy!'**

## IAF CAPSULES

Dear IAF Community,  
Check out the brand new IAF Capsules filmed during GLIS 2016 in Geneva!:

Karsten Geier	François Rancy
Norbert Frischauf	Khalid AL-Awadi
Antoine Geissbuhler	Olga Volynskaya
Josef Aschbacher	Cath Westcott
Ingo Baumann	

If you too want to have your IAF Capsule to explain your work within the IAF, and/or your academic research, and/or your vision for the future, and/or your message to the IAF community, and/or your preferred topic quickly summarized, please do not hesitate and contact IAF Communications Assistant at [emma.huis@iafastro.org](mailto:emma.huis@iafastro.org)

## Australia Preparing to Host the IAC “Down Under”

It’s been nearly 20 years since Australia hosted the IAC in Melbourne. It’s wonderful to hear so many of our colleagues share fond memories of the congress and their time in Australia. For those of you that missed the event, we look forward to welcoming you to Adelaide in 2017.

Preparations for IAC2017 are well under way. Stage 1 of the new Congress Centre was opened in 2015 and Stage 2 will open in 2017 in plenty of time to welcome IAC delegates. The Sponsorship and Exhibition Prospectus has been released and exhibition space is filling fast. Registration will open in October following the Call for Abstracts. Please visit the Australian booth in Guadalajara for more information about the Australian Space Industry, participating in IAC2017, getting to Australia, and things to do in Adelaide.

Australia has a long involvement in the space industry. In 2017 it will be 50 years since Australia launched its first satellite from Woomera in South Australia. Since then Australia has been active in space research, developed a sophisticated user community for space-derived



products and services, launched its own satellites, developed instruments and components that have flown on international missions, and supported international missions through the Canberra Deep Space Communication Complex and other ground stations.

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

We look forward to welcoming you to Adelaide 25-29 September 2017

## GLIS 2016 FINAL REPORT



The Global Conference on Space and the Information Society was held in Geneva, Switzerland from 6 – 7 June. The theme for this year’s conference was:

“Connecting the world via space – policies, technologies, applications”

The conference was co-organized by the International Astronautical federation (IAF) and the International Telecommunication Union (ITU). The main purpose of GLIS 2016 was to examine and discuss the different means by which space allows people to connect worldwide and the impact that space policies, space technologies and space applications have on the daily life of people, organisations and governments around the world.

The conference consisted of five plenaries:

- Plenary 1: The ITU and its Impact on Space Activities
- Plenary 2: Sustainable Development Goals (SDG) and the Contributions of Satellite Communications
- Plenary 3: Space Economy meets Information Economy
- Plenary 4: Space Services and Security
- Plenary 5: Big Data – Information Society

In addition to these plenaries, A SpaceUp session for young professionals and students was organized the day prior to the conference. The conference was very well appreciated; the participants enjoyed the networking possibilities and the high-level presentations on very specific topics as well as the networking possibilities. Below can be found some of the main recommendations and conclusions from GLIS 2016:

- The border between space and ICT is fading and the focus is on specific services and information provided, regardless if the infrastructure is space or terrestrially based;
- Operators are facing challenges due to fragmentation of national policies and regulations; harmonization and barrier removal are strongly needed;
- Some regulatory limitations in securing spectrum for space activities still exist and enhancements would be required in particular for a more transparent application by individual administration;
- There is a clear need to bring Europe’s know-how online with Copernicus and other Space data. Free, full and open data policies are seen as essential in this context;
- The issue of privacy and protection of personal data raises increasing concerns;
- The Space community must start working on compounding the benefits of the different space technologies to offer integrated applications of satellite based Earth Observation, global navigation, satellite systems and satellite telecommunications;



## GLEX 2017



The GLEX 2017 programme is designed to bring together leaders and decision-makers within the science and human exploration community – engineers, scientists, entrepreneurs, educators, agency representatives and policy makers. It will provide a forum to discuss recent results, current challenges and innovative solutions and it will contain several opportunities to learn about how space exploration investments provide benefits as well as discuss how those benefits can be increased through thoughtful planning and cooperation.

## Members' Corner

**Airbus Defence and Space and the European Space Agency (ESA) launched Bartolomeo, an innovative external commercial payload platform for the ISS**



This new space facility, named Bartolomeo after the younger brother of Christopher Columbus, will be attached to the outside of the European Columbus laboratory module in 2018, providing payload accommodation and operational resources in a unique, unobstructed location on the ISS.

The Bartolomeo platform is envisioned to be embedded into an end-to-end service designed to provide fast, cost-efficient and reliable access to the ISS for private and institutional users on commercial terms. The Bartolomeo all-in-one payload mission service is aimed at customers from areas including Earth observation, technology demonstrators, astro- and heliophysics, material science and new space flight applications.

Payload reservation on Bartolomeo is now open. For further information please visit the Airbus Defence and Space stand at the IAC in Guadalajara, or the website in late September.

**ANU Advanced Instrumentation and Technology Centre Tests Three Australian QB50 Satellites Developed by Five Australian Universities**

In June, the ANU Advanced Instrumentation and Technology

Centre (AITC) tested the three Australian QB50 satellites ahead of their launch from the ISS at the end of the year.



The satellites are a collaborative effort between five Australian universities, The University of New South Wales (UNSW), The University of Sydney, The Australian National University (ANU), The University of Adelaide and The University of South Australia.

As Australia's national space environmental test facility, the AITC was very excited to test these small but highly capable satellites. The AITC provides researchers and industry with a comprehensive one-stop shop for pre-launch testing and will play an important role in the growing Australian space industry. "It is very pleasing to see satellites being built and tested in Australia again. With the new AITC facilities this will be the beginning of a sustained activity in Australia that benefits universities and industry," said Facility Manager, Mike Petkovic.

One of the three Australian CubeSats was developed by The University of Sydney, ANU, and UNSW. It carries an impressive payload of Australian-designed instruments, said collaboration leader Prof Iver Cairns from The University of Sydney. The CubeSat carries radiation counters, a GPS receiver, a photonic spectrograph, and a new probe to measure the ionosphere, which was developed in collaboration with UK and Norwegian scientists. "These first three Australian CubeSats in space will

be doing research with significant public good. For example, they are looking at space weather and solar activity, which are important for vital systems such as GPS, financial systems and electricity grids," said Prof Cairns.



A second CubeSat will carry new instruments to measure atmospheric water and carbon dioxide. It was developed by University of Adelaide and University of South Australia with support from the South Australian Government and the Sir Ross and Sir Keith Smith fund. "The data from the new instruments will be in demand from weather and climate scientists", said Dr Matthew Tetlow from the University of Adelaide.

UNSW have built a third CubeSat, which will carry four separate experiments into orbit, including a specially designed GPS receiver and electronics with the ability to self-repair, said space engineer Dr Joon Wayn Cheong, from UNSW. "If the satellite gets hit by radiation and something breaks, we want to be able to reconfigure another part of the circuit to do that job, as well as fix the broken bit," he said. The satellite will also test the performance in space of a 3D printed nylon/nickel material, and software from mobile phones. "We're running the seL4 (the uncrashable microkernel in mobile phones) in space, to see how it works and if it gets upset by radiation," Dr Cheong said.

The AITC is now preparing for the test of the DST Group Buccaneer satellite, which is being supported by UNSW Canberra.

## Students at Summer School Alpbach 2016 designed space satellite missions to observe the global water cycle



Fifty-eight students from 18 of ESA's 22 Member States attended the 2016 Summer School Alpbach held from 12 to 21 July. This 40<sup>th</sup> anniversary edition was dedicated to 'Satellite Observations of the Global Water Cycle'.

The participants were engaged in an intensive learning experience which lasted 10 days. They attended stimulating lectures on various aspects of space science and technology, and were divided into four teams. They then worked intensely to define and design innovative space satellite missions, all under the supervision of noted scientific and engineering experts within the field. Their satellite missions were aimed at improving the observation of critical elements of the water cycle in order to close the gaps in our understanding process, and to advance the representation of the water cycle in the Earth's system models.

The students presented the following missions to the jury on the last day of the Summer School.

- Team BLUE - PoPSAT (Polar Precipitation SATellite)
- Team ORANGE - SWEAT (Snow Water Equivalent with AlTimetry)
- Team RED - CoastSat (Measuring water quality in coastal regions using remote sensing)
- Team GREEN – WAVE-E (WATER Vapour European Explorer)

The Alpbach Summer School is organised by the Austrian Research Promotion Agency (FFG) and co-sponsored by the European Space Agency as well as by the national space authorities of ESA member and cooperating states and Austrospace, the association of Austrian space industry. A traditional partner is the International Space Science Institute (ISSI).

[www.summerschoolalpbach.at](http://www.summerschoolalpbach.at)

## Flinders University



Flinders' University's research interests in space were featured in the South Australian Space Capabilities Directory 2016, published in June. These include nanotechnology, science education and policy, earth observation, and geospatial sciences. The Directory, produced by the South Australian government, is available here:

<http://www.defencesa.com/upload/Space%20Capability%20Directory.pdf>

In July, a community space event called the Final Frontier Festival was held in Melbourne. Flinders' Dr Alice Gorman, an archaeologist specialising in the material record of space exploration, presented a talk about environmental management and space junk in Earth orbit. She discussed a risk assessment approach to deciding which historic satellites should receive



protection should any proposals to clean up space junk come to fruition.

## HE Space



After the amazing success of the first Space Camp for Kids in Bremen last year, HE Space organized this summer another two Space Camps for Kids between 11 and 14 years old in Bremen. The children had the chance to build a Mars planet surface, to program Lego Mindstorm Rovers, to perform experiments like little scientists, to build and fly water rockets and a lot more during their journey through the galaxy.



Two Space Camp weeks full of exciting tests were accompanied by lectures from space experts and guided tours through the space companies, which are normally not open for children or the general public. All the girls and boys fancy the excursion to analogue space and even the parents were enthusiastic about the extraordinary stories their kids told in the evenings. We are very happy that our HE Space Summer Space Camp is now a regular feature of the vacation program in Bremen.

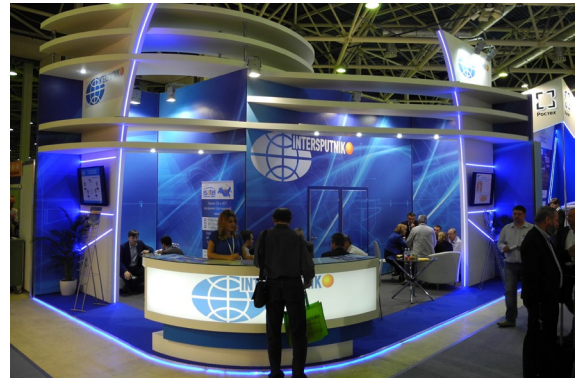
For more information about our education and outreach activities visit our website (link goes to <https://www.hespace.com/hespace-4/education-outreach/>)

## Intersputnik



On November 15, 2016 the Intersputnik International Organization of Space Communications (Intersputnik) will celebrate its 45<sup>th</sup> anniversary. To this event there will be

timed a joint session of the governing bodies – the Board and the Operations Committee – which will be held in Moscow. Intersputnik was established in 1971 by nine countries of the socialist bloc on the initiative of the USSR. It is an international intergovernmental organization, which currently unites 26 sovereign states from virtually all parts of the world.



Intersputnik's core business is to grant users access to the resource of a variety of satellite telecommunications systems. Intersputnik entered into distributor agreements and closely cooperates with such operators as Russia's RSCC, Eutelsat, ABS, SES, JSat, Intelsat, and others. Recently, partner relations have been established with the operators of the Kazsat, Azerspace, and TurkmenAlem satellite systems that have lately entered the market.

Having access to the orbit and spectrum resource in GSO, Intersputnik is implementing satellite projects in cooperation with interested partners. In mid-2016 the ABS-2A satellite was launched to Intersputnik's slot at 75E00. A project is underway to procure a national satellite telecommunications system in Bangladesh using Intersputnik's orbit and spectrum resource.

Intersputnik is an active international actor with the status of a permanent representative at the UN Outer Space Committee, it is a member of the ITU Radiocommunication Sector and a several other nongovernmental organizations in the field of satellite telecommunications. Intersputnik joined the IAF in 2015.

## Lockheed Martin Corporation

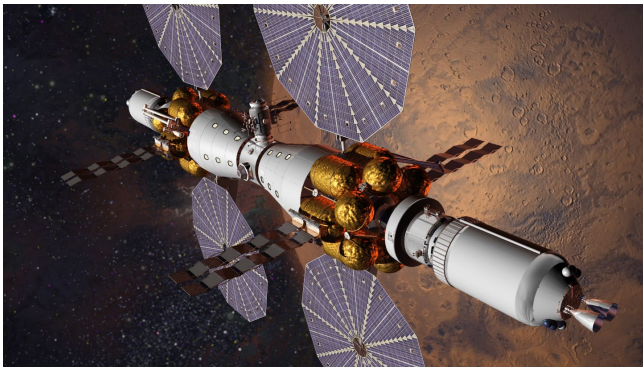


### Mars Base Camp:

At Lockheed Martin, we constantly challenge ourselves and our industry teammates to drive the innovation that helps make grand achievements possible - quickly, safely and affordably.

Mars Base Camp is Lockheed Martin's vision for sending humans to Mars by 2028. The concept is simple: transport astronauts from Earth to a Mars-orbiting science laboratory where they can

perform real-time scientific exploration, analyze Martian rock and soil samples, and confirm the ideal place to land humans on the surface in the 2030s.

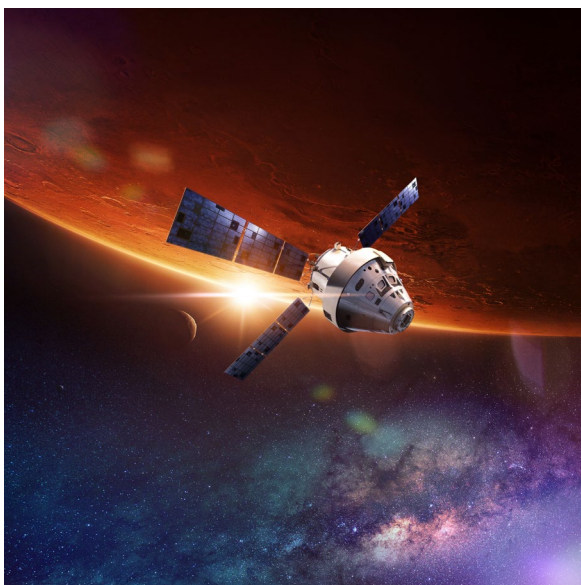


The Mars Base Camp concept is built on a strong foundation of today's technologies – making it safe, affordable and achievable:

- Orion: The world's only deep-space crew capsule, built with long-duration life support, deep space communications and navigation, and safe Earth re-entry capability.
- Space Launch System: Super heavy lift designed to send critical labs, habitats and supplies to Mars.
- Habitats: Building on our NextSTEP research, deep space habitats will give astronauts room to live and work on the way to and at Mars.
- Solar Electric Propulsion: Based on technology already in place on satellites, this advanced propulsion will pre-position key supplies in Mars orbit.

To learn more about the Mars Base Camp vision visit [LockheedMartin.com/marsbasecamp](http://LockheedMartin.com/marsbasecamp)

### Orion:



Lockheed Martin is the prime contractor building the Orion spacecraft for NASA. Orion will transport astronauts to destinations in deep space such as asteroids, the moon and

eventually Mars. Orion is a safe-haven that will keep humans alive for deep space missions lasting up to 1,000 days, and then return them safely back to Earth.

During Orion's next mission, Exploration Mission-1 (EM-1), Orion will travel thousands of miles beyond the moon over the course of about three weeks. EM-1 is NASA's first "proving ground" mission and part of a series of increasingly challenging missions on the Journey to Mars. The uncrewed Orion will travel into a Distant Retrograde Orbit, breaking the distance record reached by the most remote Apollo spacecraft, and then 30,000 miles farther out. As the final mission before astronauts are on board, the mission will test system readiness for future crewed operations.

Lockheed Martin and NASA are working together to meet the targeted 2018 EM-1 launch date. Engineering teams are currently assembling the crew module inside the clean room at Kennedy Space Center, and the service module is undergoing a series of critical mobile, acoustic, and integration tests.

To learn more about Orion visit [LockheedMartin.com/orion](http://LockheedMartin.com/orion)

## In Memory of Dr. Herve Moulin - 1946-2016



Dr. Herve Moulin, the internationally well known space historian, passed away on April 7, 2016. He was Vice Chair of the IAF/IAA/IISL Advisory Committee; was an active member of the IAA Space History Committee; and in 1999 co-founded the French Institute of Space History (IFHE). He was also on the Board of Directors of the Rocket Research Institute Inc., (RRI), and served from Paris as Director of International Activities.



Rocket Research Institute, Inc.

The RRI first met Herve Moulin in 1971 at the IAF 22<sup>nd</sup> Congress, in Brussels, Belgium. There he presented, at the Safety in Youth

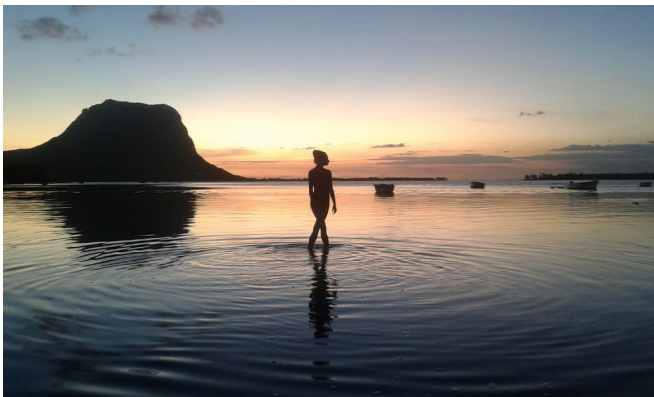


Rocket Experiments (SYRE) Session, *"A Program for International Student Participation in the French ANCS/CNES Aerospace Club Activities,"* which began in 1963. As noted in early CNES publications, these clubs had been inspired in part by the years-earlier American privately-supported supervised RRI student programs. Thus began an over-40-year Trans- Atlantic collaboration of information on space-science related student educational programs.

Dr. Moulin received his Doctorate from the Sorbonne in 2012. His thesis was entitled *"La politique spatiale française, 1945-1975; Independance, innovation et dynamiques europeennes."* Among his most popular volumes for space history research is *"History of Rockets and Astronautics; International Academy of Astronautics History Symposia at the International Astronautical Congresses, Abstracts and Index 1967-2000,"* Volume 31. Published by Univelt, Inc. A bibliography of Dr. Moulin's publications is being prepared by the RRI, Inc.

## SpaceLand

The SpaceLand group has identified a strategical terrain in the beautiful island of Mauritius to generate the world's first Center of Excellence for Microgravity, in synergy with major international players.



Equity investors are converging with venture capitals from all over the world on this unique development, given the high "investment/return" ratio conservatively estimated for the SpaceLand Center business plan which has been recently approved by the State's Board of Investment, with the support of the Government at its top-level.

The whole operation hinges around a cost-effective made-in-Italy design of more than twenty weightless and low-gravity educational and training systems open to the general public, including drop-towers and underwater test facilities; this open-door approach will enable anybody entering the SpaceLand Center to learn about space technology and science, familiarize with weightlessness and develop expertise and experiments both for low-gravity and zero-gravity STEM disciplines and for testing orbital and planetary surface operations addressing Moon, Mars and asteroids-related reduced gravity conditions.

The objective is to fully democratize the access to the new "Space-knowledge era" in terms of education, social-economic-oriented techno-innovation and initiatives co-funded by private investments to ameliorate the quality of life and creating high-tech, high-skill jobs inspired by Space. Business at the Center, providing economic growth to the territory, will also be generated by the transfer of state-of-the-art technology and science results from the microgravity and satellite sectors as well as from the astronauts' world into the everyday's life, benefitting in particular the elderly, disabled, children and long-term bed-resting people the elderly, also searching for new therapies and medical drugs to extend life-expectancy for anybody thanks to microgravity R&D.

A major series of high-profile TV productions on the fascination of Space is also envisaged at the Center, in synergy with international TV producers.

Given the uniqueness of such a program, an international award has been granted by Chinese entrepreneurs to the SpaceLand's CEO Doct. Carlo Viberti during a recent event near Singapore, in front of more than 1500 enthusiasts from 11 Asian Countries.

After the success of previous events endorsed by the V-President of the European Commission (e.g. <http://www.asi.it/it/eventi/convegni/spaceland-expo-congress>), due to the amount of requests for more preparation time for science papers, technological reporting and Space Art exhibits, the fourth SpaceLand Congress has been moved to the beginning of 2017.

Last but not least, a new OPEN Moon-gravity and Mars-gravity flight campaign is being organized for 1-5 December.

Welcome to SpaceLand! Info for both Congress and Flights on [www.SpaceLand.it](http://www.SpaceLand.it)

## PoGO+ has successfully landed after a 12-day flight

**Another successful stratospheric balloon flight to study the polarization of gamma-rays from pulsars was successfully flown from Esrange Space Center in July. The PoGO telescope launched the 12 of July, successfully landed the 19 of July on Victoria Island in northern Canada.**

A new successful stratospheric balloon flight is accomplished from SSC's Esrange Space Center, this time to Canada. The light-weight Polarized Gamma-ray Observer (PoGOLite) experiment is designed to measure the polarization of soft gamma rays in the 25 keV - 80 keV energy range.

The flight was based on a re-flight of a modified design and hardware that flew in 2013 with the same mechanical and electrical interfaces. SSC built the gondola structure, featuring a mass of approximately 1900 kg, carrying the payload and its solar

panels, including integration of the power and communication system. SSC was also responsible for the complete balloon flight system, the launch from Esrange Space Center the flight to Canada and for recovery of the experimental modules. A Raven SF-39.57 balloon type was used, carrying the 2-ton payload.

### PoGo Lite background and mission.

The PoGo Lite features a number of high technology instruments and polarized gamma rays are expected to be measured from a wide variety of sources including rotation-powered pulsars, accreting black holes and neutron stars, and jet-dominated active galaxies.

The first PoGo Lite experiment was flown from Esrange in July 2013, carrying a telescope in a circumpolar flight westwards from Esrange over Canada to Norilsk in Russia. It studied the polarisation of gamma-rays from pulsars. Due to the specific conditions during the Arctic summer with continuous daylight, nearly constant solar heating and stable stratospheric winds, it was possible to keep the balloon on course at a constant altitude with a minimum of ballast and to conduct day around experiments using the day around arctic summer light. The duration of the flight was 12 days. Scientific results are being examined.

PoGoLite is a Swedish-lead project headed by the Particle and Astroparticle Physics group within the Physics Department of The Royal Institute of Technology (KTH) as a founding members of The Oskar Klein Centre for Cosmoparticle Physics at AlbaNova University Centre in Stockholm in cooperation with the Hiroshima University, ISAS/JAXA, Waseda University, Tokyo Institute of Technology, as well as SLAC/KIPAC and University of Hawaii.

SSC's Esrange Space Center Launch services

More than 500 sounding rockets and 550 stratospheric balloons have been launched from Esrange Space Center. This gives the Center a leading position on the world map of launching facilities

Guillermo Bosch, SSC's SVP for Sales and Marketing.



## WIA-Europe Breakfast

**28<sup>th</sup> September 2016, 7:00 - 8:30**

Interested women and men are kindly invited to attend this exclusive networking opportunity.

Meet and exchange with colleagues and friends to support WIA-Europe's Vision

***"where we Europeans collaboratively created and aerospace sector with an inclusive representation."***

### The place to be - WIA-E breakfast at 67<sup>th</sup> IAC!

Following the long-lasting tradition Women in Aerospace Europe offers a breakfast at IAC in Guadalajara:

**Wednesday, 28.09.2016, Guadalajara Hall 7, 7:00-8:30 am**

Starting at 7:00 a.m. you can enjoy the first coffee or tea of the day whilst listening to our one-and-a-half hour program. The event will open to you the possibility for networking, meeting old acquaintances and get to know new counterparts.

### Welcome address

- **Simonetta di Pippo**, Director United Nations Office for Outer Space Affairs UNOOSA, Honorary President Women in Aerospace Europe, WIA-E
- **Kiyoshi Higuchi**, President International Astronautical Federation IAF
- **Francisco Javier Mendieta Jimenez**, Director General Mexican Space Agency AEM
- **Pascale Ehrenfreund**, Chair of Executive Board German Aerospace Center DLR



***"Women in Aerospace Europe aspires to contribute in shaping the role of women and changes perceptions"***

## SPEAKERS

- **Jan Wörner**, Director General European Space Agency ESA
- **Simonetta di Pippo**, Director UNOOSA, Honorary President WIA-E



## Save the date!

### WIA-E panel "Space: new paths towards a balanced and inclusive development"

Come and follow our panel discussion on benefits of space research and applications for daily life and nowadays' emerging challenges. On **Wednesday, 28.09.2016, Guadalajara Hall 8, 9.30-10.30**, the Director of AEM, Mr. Mendieta, will discuss with four panelists urgent topics like the management of migration challenges, health promotion in remote areas and developing countries through tele-health approaches, benefits of medical research in microgravity and – overarching – careers of young women in the space arena. We are proud that Simonetta di Pippo, Director UNOOSA, Barbara Ryan, Secretariat Director GEO as well as Sandy Magnus, Executive Director AIAA and Mino Rathnasabapathy, Executive Director SGAC followed our invitation for this discussion.



## WIA-E panel | SPACE speakers

- **Francisco Javier Mendieta Jimenez**, Director General AEM
- **Simonetta di Pippo**, Director, UNOOSA, Honorary President WIA-E
- **Barbara Ryan**, Secretary Director, Group on Earth Observations GEO
- **Sandy Magnus**, Executive Director, American Institute of Aeronautics and Astronautics AIAA
- **Mino Rathnasabapathy**, Executive Director, Space Generation Advisory Board SGAC

## 32m Dish – Call for proposals



National Space Centre is inviting proposals to re-purpose the 32m C Band Antenna at Elfordstown.

## OUTLINE

- This is the largest antenna in the country and would cost in excess of €10m to built today.
- It was originally constructed in 1984 to take transatlantic telephone traffic from Europe to the US.
- The big dish was retired from use in the mid 1990's when the underground transatlantic cables were laid.
- While no longer of mainstream commercial interest, these dishes are extremely powerful research tools.
- Globally several have been repurposed and now serve as radio telescopes in either a standalone capacity or as part of large telescope arrays and are put to uses such as exploring celestial objects e.g. galaxies and interstellar clouds; tracking of space debris; extra terrestrial intelligence searching; outreach and education.

## PROPOSALS

- Proposals from all potential partners will be considered, whether commercial, research or outreach.
- All partnership structures will be given consideration.
- Local, national and international participants are welcome.

## PROCESS

- Interested participants are invited to submit a very short project outline online below.
- We will provide further technical details as required.
- The call will remain open for just over 3 months, closing 30 November 2016.
- When the call closes, full discussion with feasible projects will commence.

## Further Information:

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Website: <http://nationalspacecentre.eu/32m-dish-call/>



