International Astronautical Federation News

Connecting @ll Space People

1/2020 (January 2020)

IAF President's Welcome

Dear colleagues,

It is with great pleasure that I wish you all a happy New Year full of happiness and success in your personal and professional lives. Three months ago, I officially took up the presidency of our beloved International Astronautical Federation during our 70th IAF Congress.

On this occasion, the IAF Bureau reviewed the Federation's performance and achievements. We set new objectives and priorities for the upcoming period and committed ourselves to implement them.

As I stated in Washington, D.C., we will build on the projects of my predecessors to reinforce the commitment of IAF members, by **supporting and facilitating a Global Space Governance,** stimulating and propelling a **Global Space Economy,** and by influencing and fostering the **Global Space Advocacy**.

In the next years ahead I will do my utmost efforts to achieve the implementation of this agenda. First, let's meet at the IAF Spring Meetings in March. Then in St. Petersburg for GLEX 2020 and let's end this new decade with the very first IAF Congress in Dubai.

What a wonderful year ahead!

Pascale EHRENFREUND
IAF President

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INTRODUCING THE NEW IAF VICE PRESIDENTS:
Deganit PAIKOWSKY; Sergey SAVELIEV; Mary SNITCH and Dominique TILMANS

INTERVIEW WITH:
Pascale EHRENFREUND – IAF PRESIDENT

IMPORTANT DATES:

Deadline for nominations:
- Closing of IAC 2020 Call for Plenaries – **31 January 2020**
- IAF Emerging Space Leaders Grant Programme – **10 February 2020**
- IAF Young Space Leaders Recognition Programme – **10 February 2020**
- Call for Special Session Proposals - **13 February 2020**
- IAF Excellence in Industry Award – **14 February 2020**
- IAF Excellence in "3G" Diversity Award" – **14 February 2020**
- Closing of IAF Abstract Mentor Programme – **14 February 2020**
- Call for Hosting IAC 2023: Deadline for notices of intent to submit proposals – **21 February 2020**
- Closing of IAC Call for Abstracts – **28 February 2020**
- Closing of IAF GNF Session Proposals – **30 April 2020**
- IAF Spring Meetings 2020 – **24 - 26 March 2020**
- GLEX 2020 – **9 - 11 June 2020**
- IAC 2020 – **12 - 16 October 2020**
- IAC 2021 – **27 September - 1 October 2021**

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International Astronautical Federation

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The IAC 2019 – An Incredible Journey!

The 70th International Astronautical Congress held in Washington, D.C., United States ended Friday 25 October 2019. More than 6.800 space enthusiasts coming from over 80 countries gathered in the grand city of Washington, D.C. for an intense week of events, meetings, collaborations and discovering. The IAC 2019 started on Monday 21 October 2019 with the Honorable Mike Pence, Vice President of the United States, confirming the USA plans to go forward to the Moon and land the first woman and the next man on the Lunar surface by 2024.

The legacy of Moon exploration was also celebrated by the IAF presenting the IAF World Space Award to the Apollo 11 crew.

On Industry Day, Blue Origin founder, Jeff Bezos was awarded the first IAF Excellence in Industry Award for Blue Origin's amazing accomplishment with the New Shepard launcher. During a fireside chat, moderated by Pascale Ehrenfreund, the new IAF President, Blue Origin formally announced the partnership with Lockheed Martin, Northrop Grumman and Draper to form the national team for NASA's ARTEMIS human landing system to return to the Moon.

IAC 2019 also featured an extensive programme, including countless technical presentations, panel discussion and bilateral meetings. The largest ever IAC Exhibition welcomed several side activities, many of those dedicated to STEM and outreach to the general public and school children. The IAC 2019 also saw the participation of numerous astronauts/cosmonauts and featured a dedicated astronauts panel open to the general public.

At its sessions, the IAF General Assembly welcomed 41 new members, bringing the total membership count to 397 from 68 countries and elected 4 new vice presidents: Deganit Paikowsky (Israel), Sergey Saveliev (Russian Federation), Mary Snitch (United States) and Dominique Tilmans (Belgium). The new IAF President, Pascale Ehrenfreund, took up duty on Friday 25 and announced her IAF Global Advocacy Agenda 2019 – 2022, focusing on supporting and facilitating Global Space Governance, stimulating and propelling Global Space Economy and influencing and fostering Global Space Advocacy. Past President Jean-Yves Le Gall was appointed IAF Honorary Ambassador.

ALL IAC 2019 VIDEOS HERE

ALL IAC 2019 PHOTOS HERE

IAF HIGHLIGHTS 2019

It has truly been an exciting year for the International Astronautical Federation in 2019. Check on http://www.iafastro.org/wp-content/uploads/2020/01/IAF-Highlights-WEB.pdf the IAF 2019 Highlights publication summarizing the main IAF events and activities that took place during 2019 including: SM in Paris, GLEC in Marrakech, ISF in Reggio Calabria and IAC in Washington, D.C.

This has been a year to look into the past and to recognize all of our achievements. Important celebrations have taken place with the 50th anniversary of Apollo 11 and the 70th anniversary of the IAC. But it has equally proven to be a year to look towards the future and the new impressive accomplishments we will be able to achieve together.

Now we begin a new chapter, this year new exciting challenges and events lie ahead.

GLEX 2020 – In the beautiful city of St. Petersburg, the cultural capital of Russia!

Following the immense success of the previous GLEX conference held in Beijing in 2017, it is with great pride and pleasure that the **International Astronautical Federation (IAF)** together with its member **ROSCOSMOS** invite you to take part in **GLEX 2020** in **St. Petersburg, Russian Federation**.

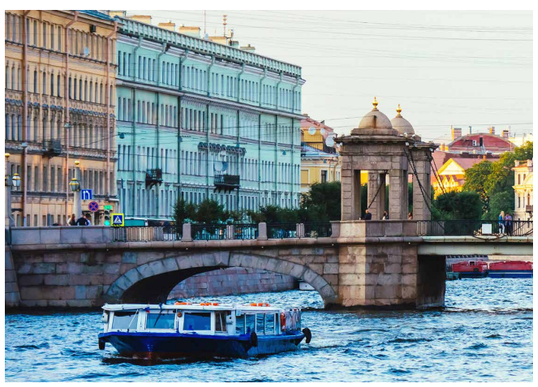
This year's programme promises to be both exciting and fulfilling for everyone, and we look forward to receiving your original contributions to our conference in the form of **oral and interactive presentations** which are innovative, content driven and must be related to space exploration. The Technical Programme of GLEX 2020 is comprised of 13 topics on latest cutting edge research designed to offer comprehensive global discussions that address current issues in the field of **space exploration**. The deadline for submitting your abstracts is **31st January** – so do not miss it!

No additional deadline extension will be provided because of the strict schedule for the review process.

This three-day event will immerse you in a unique experience filled with insightful presentations, **plenaries, keynotes, IAF GNF Sessions, a special 3G Diversity programme and exciting social events** that are sure to connect you with the entire **global space community**.

Your active participation will be the basis of the GLEX 2020 success, and we sincerely hope you will make use of this excellent opportunity to present your papers, ask questions, participate in discussions and gain new insights.

We look forward to meeting all of you in June 2020!



IAC 2020 – The first IAC in the Arab region!

WELCOME TO THE 71ST INTERNATIONAL ASTRONAUTICAL CONGRESS 2020

12-16 October 2020, Dubai, United Arab Emirates

Inspire, Innovate & Discover for the Benefit of Humankind

For the very first time, the IAC will open its doors to the global space community in the United Arab Emirates, the first Arab country to host the IAC since its establishment in 1950. The United Arab Emirates' interest in astronomy and space sciences dates back to the 1970's, when His Highness Sheikh Zayed bin Sultan Al Nahyan met with the NASA team responsible for the Apollo Moon landing. This encounter sparked a national focus on space that began almost three decades ago, eventually leading to the birth of a national space sector.

The IAC 2020 Host – the Mohammed Bin Rashid Space Centre (MBRSC) – member of the IAF since 2012, was established by the Dubai Government to serve as one of the main pillars to drive the establishment of the knowledge economy and sustainable development in the UAE.

مـــــركز محمـد بن راشـد للـــــــفضـــــاء
MOHAMMED BIN RASHID SPACE CENTRE

This is your chance to inspire the next generation, to architect the further development and expansion of the space sector's growing ecosystem. In fact, the IAC 2020 could be your opportunity to contribute in breakthroughs that revolutionise the future of space exploration.

The IAC 2020 comes to the UAE at a fortuitous juncture: it will follow closely on the heels of the launch of the Emirates Mars Mission (Hope Probe), the Arab's first space exploration craft to Mars. It will also mark the anniversary of the return of the first Emirati astronaut from the International Space Station (ISS), and the second anniversary of the launch of KhalifaSat — the first Earth-observation satellite to be produced wholly by Emiratis. These achievements are symbolic of the beginning of a new era in the region; the IAC 2020 will be an opportunity to shed light on how space science and technology can contribute to a nation's progress.

The theme of the Congress – **"Inspire, Innovate & Discover for the Benefit of Humankind"** – has been formulated broadly to enable the programme to cover a wide variety of established fields and current trends across space. This is reflected in the abstract topics, which can be viewed in this first announcement of the Call for Abstracts.

This "Call for Abstracts" is a precursor to a subsequent submission of a final paper, which may be presented at the 71st IAC. Authors are invited to submit an abstract regarding an original, unpublished paper that has not been submitted in any other forum. Abstracts must fit into one of the following IAC categories:

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

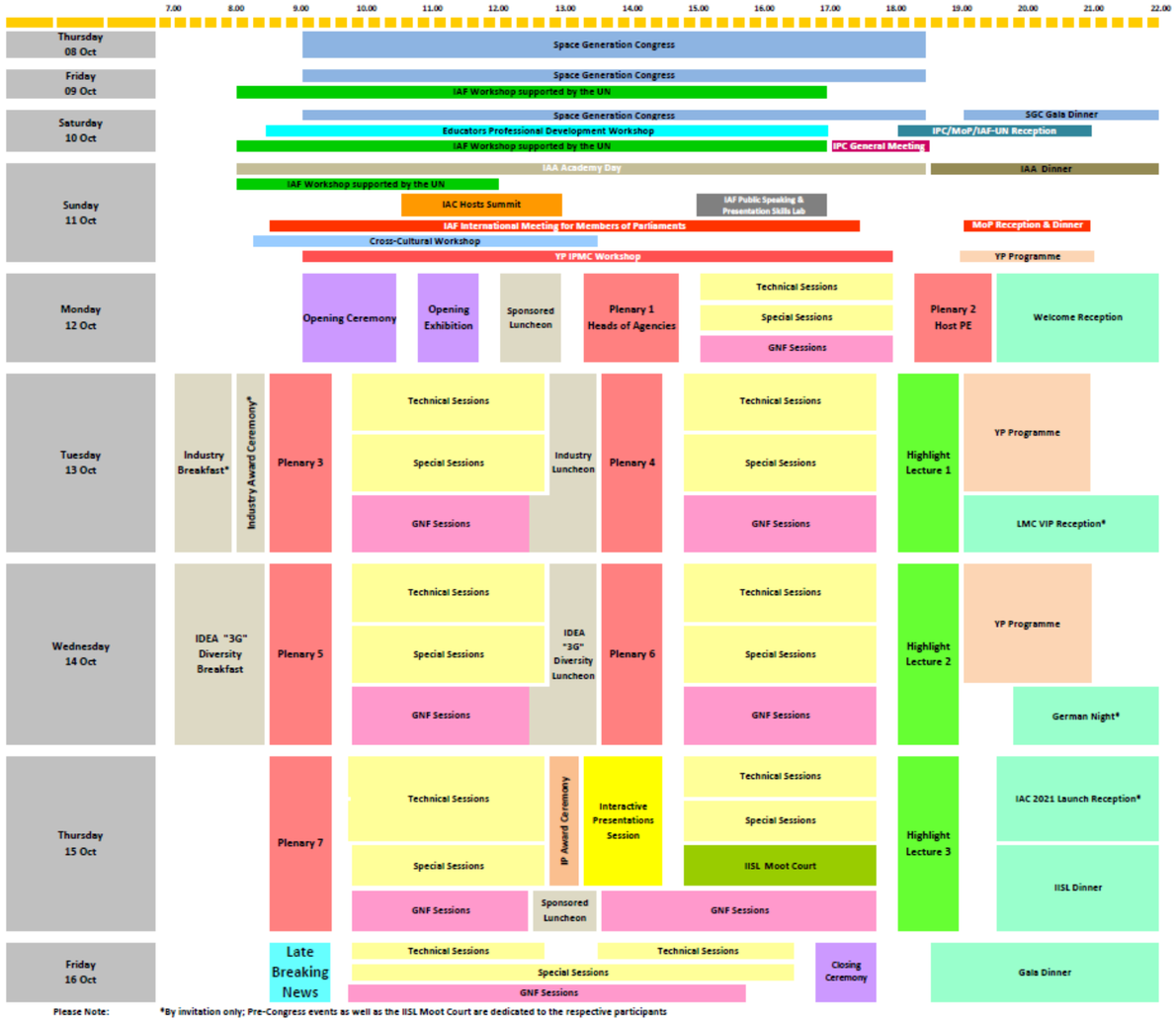
Abstracts must be written in English and the length shall not exceed 400 words. Tables or drawings are not allowed in the abstract.

Submit your abstract through the online IAF portal at www.iafastro.net no later than 23:59 PM CEST on 28 February 2020.

Submitted abstracts will be evaluated by the Session Chairs on the basis of technical quality and relevance to the session topics. Selected abstracts may be chosen for oral or interactive presentation. Any such choice is not an indication of quality of the submitted abstract.

Their evaluation will be submitted to the International Programme Committee (IPC), which will make the final decision during the IAF Spring Meetings to be held in March 2020 in Paris, France. Please note that any relevance to the Congress main theme will be considered as an advantage. Accepted abstracts will be displayed on the Congress website and published in the IAC Congress Proceedings.

We look forward to receiving your abstracts for IAC 2020 and please check the IAF website regularly to get the latest updates on the Technical Programme!



IAC 2020 Site Visit

On 15-17 December 2019 the IAF Secretariat went to Dubai, UAE to perform the traditional site visit and meet with the Host to lay the roadmap for the IAC 2020 preparation.

IAC 2021 – SAVE THE DATE

27 SEPTEMBER - 1 OCTOBER 2021!

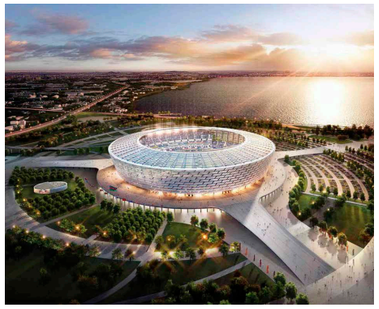
The 72nd IAC will be in the beautiful city of Paris that hosted the first IAC ever in 1950, then in 1963 and lastly in 1982 and now with the IAC 2021 will be holding the record of the city with most IACs hosted.

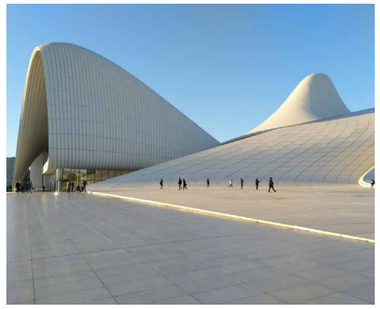
Space for @ll

IAC PARIS 2021

72nd INTERNATIONAL ASTRONAUTICAL CONGRESS

With the theme *Space for @ll* we would like to make this IAC an outstanding occasion to bring together all space communities, alongside the burgeoning global ecosystem and start-ups, entrepreneurs, laboratories, research scientists and manufacturers that could get involved in space activities or benefit from them. Special attention will be paid to students and young professionals, who will be closely associated through dedicated events. And the general public will not be forgotten, as space-themed conferences and exhibitions will accompany IAC.





IAC 2022

azercosmos
customized excellence

At the IAC 2019, the IAF General Assembly selected Baku, Azerbaijan, as Host city for IAC 2022 from Azercosmos – https://iac2022baku.org/

Holding the Congress under the theme *"Global Challenges and Opportunities: Give a Chance to Space"* in Azerbaijan's capital in 2022 will make a significant contributions to the establishment of closer ties with foreign space agencies, companies and organizations, to the development of human capital. During this Congress, Azerbaijan will bring together over 6,000 representatives of the space industry for the first time in its history.

It should be noted that Baku received the right to host the IAC 2022 thanks to the special contribution made by a number of institutions, such as the Ministry of Foreign Affairs, the State Tourism Agency and Azerbaijan Convention Bureau, Heydar Aliyev Center and Baku Congress Center. The victory of Baku over other candidate cities was the result of successful promotional activities, a professional presentation of the country's tourism potential and organizational capabilities.

There is a rich history behind holding IAC in Azerbaijan. The 24th International Astronautical Congress was held in Baku in 1973 for the first time in the Soviet Union upon the initiative of Azerbaijan's National Leader Heydar Aliyev.

CALL FOR HOSTING THE INTERNATIONAL ASTRONAUTICAL FEDERATION CONGRESS 2023

The call for submission of proposals is now open.

The IAF is calling for expressions of interest from member organizations to host the annual International Astronautical Federation Congress in 2023.

The IAC is the one time of the year when all space actors come together. Global, multidisciplinary and covering all space sectors and topics, it offers everyone the latest space information, developments but above all contacts and potential partnerships. Each year, the IAC changes country, theme and local organizer, enabling all to learn more about, and be a part of the world space scene.

In recent years the event has attracted between 4500 and 6500 participants including 3500 full paying participants, retired participants and press representatives as well as more than 1500 students and young professionals. The congress itself is a five-day event with defined pre- and post-congress associated events.

The schedule for the selection of the site of the 73rd IAC is as follows:

• Deadline for notices of intent to submit proposals	21 February 2020
• Deadline for submission of proposals	24 April 2020
• Selection of finalist candidates (if applicable)	June 2020
• Site Inspections	July – August 2020
• Deadline for submission of updated proposals	10 September 2020
• Finalist presentations: during the 71st IAC in Dubai, U.A.E.	12 – 16 October 2020
• Selection of the Host by the IAF General Assembly	16 October 2020

Note: The IAF may – at its discretion – modify the above schedule and notify the concerned organizations of the schedule changes.

**Bidders should have expressed their intention to bid by 21 February 2020. Please note that the intention to bid is not a requirement to submit a proposal and the final date for submission of proposals is 24 April 2020.*

All info on how to apply are on www.iafastro.org

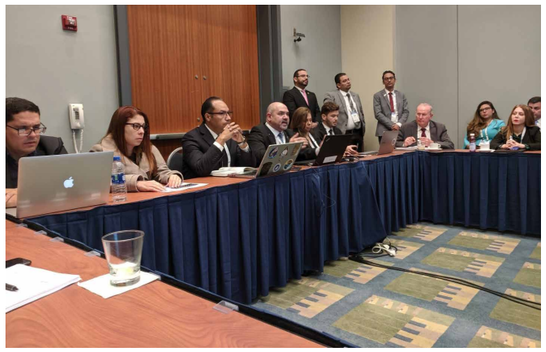
IAF GRULAC Latin American and Caribbean Regional Group

INTERNATIONAL ASTRONAUTICAL FEDERATION
GRULAC
Latin America and Caribbean Regional Group

Relevant activities during IAC2019

1. IAF GRULAC ANNUAL MEETING:

The committee had its annual meeting during the IAC2019 and review the progress on the new memberships, the LATCOSMOS program and the Latinamerican Lunar Program. The committee chairman, Prof. Ronnie Nader (EXA-ECU) and the Vice chair, Dr. Alberto Ramirez (UNAM-MEX) managed the 2-hour session and welcomed new members from Honduras, Costa-Rica, Paraguay, Ecuador and Brazil.

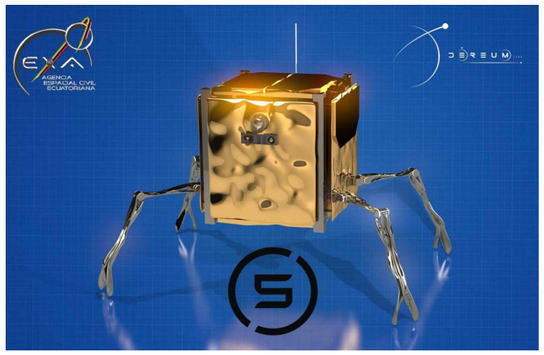


2. PRESS CONFERENCE: SPACEBIT TAPS TWO LATIN AMERICAN INSTITUTIONS TO BUILD THE FIRST WALKING ROBOT THAT WILL ROAM THE MOON IN 2021:

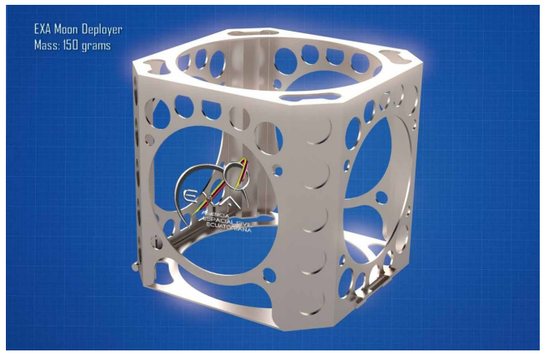
As a direct result of the Latinamerican Lunar Program, Spacebit, a UK company that holds a transport contract with Astrobotic (USA), selected two Latinamerican institutions to build the first walking robot that will roam the moon in 2021: the Ecuadorian Space Agency – EXA (ECU) will build the spacecraft bus of the robot and the deployer and Dereum (MEX) will build the locomotion systems and communication software, EXA also acts as a main contractor and systems integrator. This is the first time in history that Latinamerican institutions, both members of the IAF GRULAC, are selected to participate as technology providers on a lunar mission ever.

The Latinamerican Lunar Program is an initiative from the IAF GRULAC that aims to insert Latinamerican countries in actual lunar exploration missions in order to encourage and foster astronautical activities in the region, it was started in 2018 during the IAC2018 in Bremen, Germany with signing of partnership MOU with Astrobotic.

https://techcrunch.com/2019/10/23/legged-lunar-rover-startup-spacebit-taps-latin-american-partners-for-moon-mission/



QBWalker: the walking robot that will roam the moon in 2021



EXA CSD: the ultra-lightweight deployer that will carry QBWalker on board Astrobotic's Peregrine.

IAF Space Propulsion Technical Committee

This year, 2020, we will inaugurate an evolution of our Space Propulsion sessions giving more room to electric propulsion and bringing more clarity on the various topics of propulsion: liquid, solid, electric, hypersonic air breathing, combined cycle, nuclear ...

IAF Space Education and Outreach Committee (SEOC)

The Space Education and Outreach Committee (SEOC) promotes the development and delivery of quality learning and outreach opportunities for students, educators and members of the IAF so that space, science, and technology become better known and are more accessible to the global community. The SEOC supported the 2019 IAC in Washington DC and will continue to support the 2020 IAC in Dubai.

The SEOC provided a huge number of programs at the 2019 IAC. The E1 Space Education and Outreach Symposium and the E2 47th Student Conference offered a wide variety of presentations from primary school projects to nationwide outreach campaigns.

The 2019 Educator Professional Development (EPD) Workshop was sponsored by the International Space Education Board (ISEB), IAF, and SEOC. The featured speaker was Dr. Jane E. Pollock, co-author of Association for Supervision and Curriculum Development (ASCD) bestseller, *"Classroom Instruction That Works (2001)"* and author of *"The i5 Approach: Lesson Planning that Teaches Thinking and Fosters Innovation (2018)"*. Additional presenters included staff from the Victorian Space Science and Education Center, NASA Commercial Crew Program, and NASA GLOBE. It was a full day of excellent professional development activities for educators. See photos below.

The Student Program was expanded to include two STEM Engagement Days, where over 600 middle school students were invited to converge upon the Walter E. Washington Convention Center and participate in activities facilitated by12 STEM Organizations, as well as see and talk with a panel of NASA astronauts.

The 2019 International Space Education Board (ISEB) Cohort included approximately 70 students. They heard from space leaders and other special guest speakers from around the world; participated in research-related activities; and extended their professional

networks. There was a live college broadcast entitled, “NASA Presents Space and STEM: How Do You Fit In?” It included “watch parties,” which extended the reach to thousands of undergraduate and graduate students in the United States and abroad. This event involved collaboration between the American Institute of Aeronautics and Astronautics, ISEB, SEOC, Space Grant Consortia, and other stakeholders.

The Student Program also included a Young Career Panel, entitled “STEM Careers: Today and in the Future.” The panelists included representation from the Space Generation Advisory Council (SGAC), Workforce Development-Young Professionals Program Committee, and NASA Office of General Counsel, representing Space Law.

We collaborated on crafting the Next Generation Panel and this year’s panelists showcased their ideas at Plenary 7: 10th Anniversary Next Generation Plenary: “Harnessing Citizen Science for the Future of Earth Observation” on October 24.

Representatives of SGAC are active members of SEOC. As part of the official IAC program, SGAC has organized the 18th Space Generation Congress (SGC). It was the most successful to date in terms of the number and national diversity of attendees, scholarships given, the calibre of speakers, and overall conference professionalism. As the only event of its kind, the Space Generation Congress offers the next generation of space leaders the opportunity to network and to examine critical questions that are facing the space and international community at large. The SGC 2019 hosted 150 delegates from 51 different nationalities, 68 of those attendees were given full scholarships to be able to come to Washington DC. The SGC had seven working groups and the delegates were mentored by more than 50 experts from the industry.

After success of the 2019 SGC, SGAC will open its doors to the global space community in the United Arab Emirates with the 19th Space Generation Congress that will take place in Dubai on 8 - 10 October 2020. One of the priorities of SGC 2020 is to plan the event with a particular concern for environmental, economic and social issues based on the Sustainable Development Goals (SDGs). It involves sustainable development principles and practices at all levels of the event planning, including reduction of food waste, reduction of water waste, gender equity, plastic free utilization, use of public transportation and increase of public awareness and engagement with sustainability principles and sustainable living.

If someone is interested in learning more about SGC 2020, or becoming a partner, please visit the website https://spacegeneration.org/sgc2020 or reach out to the organizers at sgcinfo@spacegeneration.org.

New IAF Members

Without the support of its members the Federation would not be able to obtain all its achievement. We are particularly proud to report that 2019 was truly a record-breaking year in terms of the number of organizations which decided to join the IAF.

The IAF General Assembly gathered in Washington, D.C., approved 41 new members, bringing the total number to an outstanding 397 and making the International Astronautical Federation the most important network for the sector.

Please, welcome with us the new IAF Members for 2019.

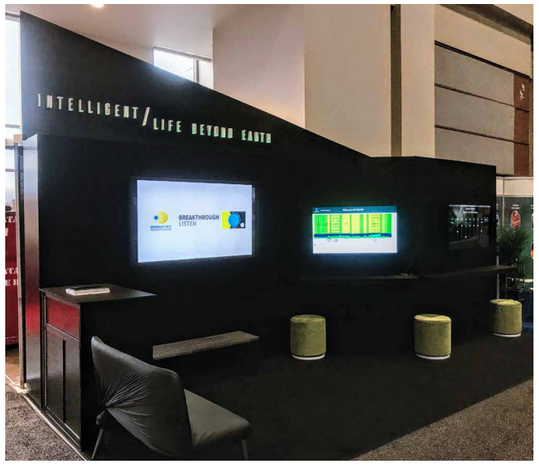
Organization	Category	Country	Region
Aerospace Industries Association	Association	United States	North America
Beijing Infinite Education Inc.	Space Industry	China	Asia
Beijing Interstellar Glory Space Technology Co., Ltd	Space Industry	China	Asia
Beijing Smart Satellite Technology Co., Ltd.	Space Industry	China	Asia
Berkeley SETI Research Center	University	United States	North America
Canadensys Aerospace Corporation	Space Industry	Canada	North America
Colegio Federado de Ingenieros y de Arquitectos de Costa Rica (CFIA)	Association	Costa Rica	Latin America
Council of European Aerospace Societies (CEAS)	Association	Belgium	Europe
Dereum Labs S.A. de C.V.	Space Industry	Mexico	Latin America
Digantara Research and Technologies Private Limited	Space Industry	India	Asia
Disrupting Space LLC	Space Industry	United States	North America
D-Orbit SpA	Space Industry	Italy	Europe
Dynetics	Space Industry	United States	North America
EnduroSat AD	Space Industry	Bulgaria	Europe
Hong Kong Aerospace Technology Group	Space Industry	China	Asia
Institute for Q-shu Pioneer of Space, Inc. (iQPS)	Space Industry	Japan	Asia
Khalifa University of Science of Technology	University	United Arab Emirates	Asia
Lithuanian Museum of Ethnocosmology	Space Museums	Lithuania	Europe
Luxembourg Space Agency	Space Agency	Luxembourg	Europe
Massachusetts Institute of Technology	University	United States	North America
Nanjing University of Aeronautics and Astronautics	University	China	Asia
Nanoracks	Space Industry	United States	North America
National Astronomical Research Institute of Thailand	Research and Development	Thailand	Asia
National Autonomous University of Honduras	University	Honduras	Latin America
National Institute of Aerospace (NIA)	Research and Development	United States	North America
National Space Society	Association	United States	North America
Northwestern Polytechnical University	University	China	Asia
Open Cosmos	Space Industry	United Kingdom	Europe
Qwaltec Inc.	Space Industry	United States	North America
Satellogic Solutions S.L.	Space Industry	Spain	Europe
SIDERALIS Foundation	Association	Ecuador	Latin America
Singapore Technologies Engineering Limited	Space Industry	Singapore	Asia
Space Applications Services NV/SA	Space Industry	Belgium	Europe
Spacebit Global Ltd	Space Industry	United Kingdom	Europe
SpaceBuzz	Association	The Netherlands	Europe
SpaceChain Foundation Ltd.	Space Industry	Singapore	Asia
Technical University of Košice	University	Slovak Republic	Europe
The National Space Science and Technology Center (NSSTC)	Research and Development	United Arab Emirates	Asia
ThrustMe	Space Industry	France	Europe
United Launch Alliance LLC	Space Industry	United States	North America
University Mediterranea of Reggio Calabria	University	Italy	Europe

NEWS!

BERKELEY SETI RESEARCH CENTER

THE SEARCH FOR INTELLIGENT LIFE BEYOND EARTH AT IAC 2019

Since the 1970s, the IAA has been at the heart of the search for answers to one of the most profound questions in science: are we alone in the Universe? The IAA SETI Permanent Committee (PC) is the home for discussion and coordination of the search for extraterrestrial intelligence (SETI), and for planning humanity's response if the search succeeds. Over the years, the SETI PC has grown, in particular with the revitalization of SETI as a field engendered by the launch of the Breakthrough Listen initiative in 2015.



The SETI community booth at the IAC 2019

Many scientists and engineers working in the search for technosignatures (potential signs of technology developed by intelligent civilizations) meet annually at the IAC, attending the SETI PC meeting, as well as lively sessions on SETI science, and the intersection between SETI and society. The IAC 2019 in Washington DC was no exception, but this year the SETI community's presence was more prominent: a panel discussion featuring some of the world's most prominent astrobiologists drew an audience of several hundred people; and a booth (see photo) sponsored by Breakthrough Listen and Berkeley SETI Research Center, in collaboration with the international SETI community, engaged attendees with a range of activities. The meeting also provided the opportunity for Breakthrough Listen to announce a major new partnership with scientists working on NASA's TESS mission, providing enhanced targeting for Listen, as well as searching for interesting anomalies in TESS data.

Video highlights from the SETI booth can be seen at http://bit.do/iac2019

Berkeley SETI / Breakthrough Listen Postdoctoral Scholar Dr. Andrew Czech, speaks to IAC attendees, including Breakthrough Prize Foundation Chairman Dr. S. Pete Worden, at the SETI booth at the 2019 IAC, on the occasion of the launch of a new partnership between Breakthrough Listen and scientists working on NASA's TESS mission.

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

CPU2AL consortium internship connects top students with Alabama industry

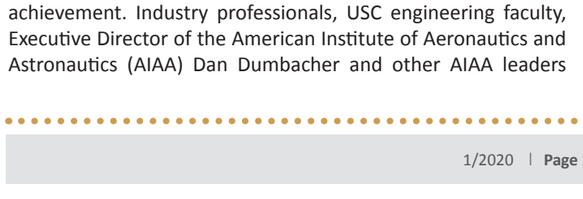
A Low Temperature Plasma (LTP) internship program led by The University of Alabama in Huntsville (UAH) that connects undergraduate and graduate students in STEM fields from nine Alabama partner universities with Alabama-based industries is preparing for its third round of internships in January.

The Corporate Internship Program on Plasma Technology Applications (CIPPTA) is one of four different summer internship programs under a $20 million, five-year grant by the National Science Foundation (NSF) Established Program to Stimulate Competitive Research (EPSCoR) known as Connecting the Plasma Universe to Plasma Technology in Alabama: The Science and Technology of Low-Temperature Plasma (CPU2AL).

The CPU2AL principal investigator is UAH's Dr. Gary Zank, director of the Center for Space Plasma and Aeronomic Research (CSPAR), the Aerojet Rocketdyne chair of the university's Department of Space Science and a member of the National Academy of Sciences.

Mr. Patrick Hambloch, project manager, leads a consortium of nine Alabama universities including Auburn University (AU), the University of Alabama in Birmingham (UAB), Tuskegee University (TU), the University of Alabama (UA), Alabama A&M University (AAMU), the University of South Alabama (USA), Alabama State University (ASU), and Oakwood University, together with an industrial partner, Computational Fluid Dynamics Research Corporation (CFDRC). As the lead institution, UAH interfaces directly with the NSF and all other institutions receive funding through subcontracts with UAH.

CPU2AL has established partnerships with Alabama companies, is reaching out to companies that are past partners and seeks new partners that the researchers of the partner institutions have worked with. Any company that has ties to LTP can contact CPU2AL for project proposals.



USC Viterbi School of Engineering

University of Southern California Rocket Propulsion Laboratory

In April 2019, the University of Southern California Rocket Propulsion Laboratory (USCRPL) broke the student world altitude record and passed the 100-km Karman line, becoming the first student team to send an entirely student designed and built solid-propellant rocket into space. On October 1, 2019, USCRPL received a special honor commemorating this remarkable achievement. Industry professionals, USC engineering faculty, Executive Director of the American Institute of Aeronautics and Astronautics (AIAA) Dan Dumbacher and other AIAA leaders gathered at USC to hear how USCRPL fulfilled its founding mission and to present awards to the students.

USCRPL is one of example of how the USC Viterbi School of Engineering emphasizes interactive, hands-on learning, preparing students for professional-level values of collaboration, learning from failure, and out-of-the-box problem solving. The USC rocket lab has built 21 rockets since its founding in 2005. Its next project, a rocket named Poise, will test a new, more efficient propellant.

(Photo/Michael O'Neill)

Students at the Viterbi School of Engineering, University of Southern California learn as much in the classroom, as they do experientially, and learn from mistakes. The USC student Liquid Propulsion Laboratory (LPL) conducted a static fire of a fully 3D-printed engine, made of a super alloy—Inconel 718. One of the strongest 3D-printed engines ever built by a student group—with 11 kN of thrust—this 3D-printed engine uses a complex cooling method called regenerative cooling to keep it from melting. In a static firing on September 29, 2019; less than a second into firing, an anomaly occurred which caused the pressure in both propellant lines to spike. This ultimately caused an explosion, which partially damaged the engine and engulfed the test stand in flames. Despite the explosion and subsequent fire, the majority of the engine and test stand remained undamaged.

USC Liquid Propulsion Laboratory's 3D printed engine Baileron exploded one-second into a static firing. PHOTO/Ryan Horton.

The explosion prompted students to seek expertise from industry professionals on how to conduct a professional failure investigation, which they will perform throughout the next semester. Per aspera as astra!

SPACE GENERATION ADVISORY COUNCIL

18th and 19th Space Generation Congress

The 18th Space Generation Congress (SGC) was the most successful to date in terms of the number and national diversity of attendees, scholarships given, the calibre of speakers, and overall conference professionalism.

As the only event of its kind, the Space Generation Congress offers the next generation of space leaders the opportunity to network and to examine critical questions that are facing the space and international community at large. The SGC 2019 hosted **150 delegates** from **51 different nationalities**, **68** of those attendees were given full scholarships to be able to come to Washington DC. SGC had **7 Working Groups** and the delegates were mentored by more than **50 experts** from the industry.

After the success of SGC 2019, SGAC will open its doors to the global space community in the United Arab Emirates with the **19th Space Generation Congress that will take place in Dubai on 8 - 10 October 2020**. One of the priorities of SGC 2020 is to plan the event with a particular concern for environmental, economic and social issues based on the Sustainable Development Goals (SDGs). It involves sustainable development principles and practices at all levels of the event planning, including reduction of food waste, reduction of water waste, gender equity, plastic free utilization, use of public transportation and increase of public awareness and engagement with sustainability principles and sustainable living.

If you are interested in learning more about SGC 2020, or becoming a partner, please see our website https://spacegeneration.org/sgc2020 or reach out to sgcinfo@spacegeneration.org.

THRUSTME

ThrustMe, a new member of IAF, announced 19 November 2019, success in testing the first iodine-fueled thruster on-orbit. The company explains that this one-of-its-kind cold gas propulsion system was designed for cubesats to give them the basic propulsive capabilities to extend lifetime and perform collision avoidance manoeuvres for 3U and 6U cubesat platforms. The on-orbit test also serves as space qualifications of ThrustMe's iodine storage and flow control system used in their Electric Propulsion system, for which significant propulsive capabilities are provided to smallsats.

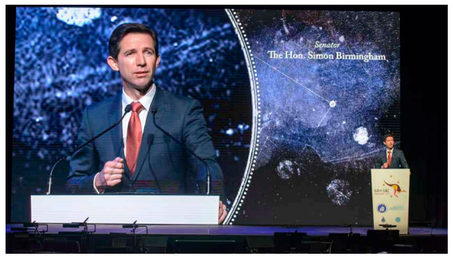
SPACE INDUSTRY ASSOCIATION OF AUSTRALIA

AUSTRALIAN SPACE INDUSTRY - ON THE RISE…

The date is Friday, 25 September 2017. It's the long awaited opening of the 68th IAC. Drawing an extremely large attendance, this IAC is being held for the first time in Australia. With over 5 thousand participants registered for the IAC, the opening event has attracted a large crowd and the room is at capacity. The participants are listening to Senator Simon Birmingham's opening remarks at the beautiful Adelaide Convention Centre. The crowd sits enthralled, with a strong sense of anticipation and excitement. This was the beginning of a much anticipated week. Senator Birmingham discusses space travel, rockets from Woomera and Australia's rich history in space. Looking to the future, Senator Birmingham then makes the announcement that brings the crowd to its feet… the establishment of a national space agency in Australia.

Since that morning only 2 short years ago, Australia has made great progress, both domestically and internationally. Public interest in the space industry in Australia is the highest it has been since the Apollo moon landing 50 years ago, and no-one welcomes this more than Australia's premier industry body, the Space Industry Association of Australia, which worked tirelessly to bring the IAC to Australia.

Membership in the SIAA is growing at an incredible rate, reflecting growth in the public's appetite for all things space. *"We are excited by the possibilities for the space sector in Australia, which is bolstered by our unique geographical advantages, our culture of innovation, and our extensive research and development capability. Australia is very keen to develop and share new space-related technology with the world"* said David Ball, Chair of the SIAA. *"Nobody knows what the future has in store for the Australian space sector, but rest assured Australia is definitely open for business!"*



Founder and Executive Chairperson of Space Trust and Founder Astronaut of Virgin Galactic Monaco based, Namira Salim, released her first single Follow Me To The Moon on 25th October 2019. The song premiered during the Closing Ceremony of the 70th International Astronautical Congress in Washington, D.C. to honor the 50th Anniversary of Apollo 11 in our NewSpace Age and the work of space industry colleagues in returning mankind to the moon and beyond.

Follow Me to the Moon was launched in partnership with the International Astronautical Federation and Space Trust, a non-profit and non-partisan organization founded by Namira, which advocates Space as the New Frontier for Peace on Earth. Space Trust will benefit from part of the proceeds of the song to strengthen partnerships with industry partners.

Follow Me To The Moon was written by Namira and the single is available on all streaming platforms including YouTube, Spotify, Apple Music and iTunes. Following is the link to the official music video for Follow Me To The Moon: http://www.smarturl.it/followmetothemoon"

Planet Announces Winner of Copernicus Masters Challenge at "Space Oscars 2019"

The Copernicus Masters is an international competition that awards prizes to developers who leverage Earth observation data to solve important commercial and social problems. Planet issued a call for submissions to the Planet Daily Change Challenge--a search for novel applications of Planet's daily, global imaging capabilities. After an evaluation by a panel of multidisciplinary experts, we headed to Helsinki, Finland to join industry and institutional leaders at the "Space Oscars 2019"–the Awards Ceremony of the Copernicus Masters–to formally announce our winner, Green City Watch!

Green City Watch, a Dutch geoAI startup that specializes in urban ecological engineering, was initially introduced to Planet when developing their flagship product, Treetect, with the city of Santa Monica in California, USA. To create an automated urban tree inventory with near real-time monitoring capabilities, Green City Watch needed earth observation data with faster revisit rates to enable rapid content acquisition and intelligence. Planet's satellites filled that gap, while Copernicus Sentinel-2 MSI, was used to track the health of urban vegetation.

Shockingly, most cities, including Jakarta, Boston and Tokyo, do not have an up-to-date tree inventory, despite urban areas supporting over 55 percent of the world's population. Instead of planting and maintaining more trees, new research shows cities are actually losing tree cover, just when they need it most.

After learning that the life expectancy of urban trees is just 13 years, while their rural counterparts can live up to 100 years or more, founders Nadinè Galle, Jim Groot and Chris van Diemen felt compelled to apply the latest advancements in Earth observation, machine learning, and computer vision to the increasingly vital discipline of urban forestry. They set out to increase tree longevity, keep cool amid rising temperatures, reverse biodiversity loss, and foster health and well-being in the process.

An up-to-date tree inventory can reveal the age, species, size, location, and condition of each individual tree and act as a prerequisite in planning for and making sound management decisions. However, evidence shows on-the-ground surveys are notoriously expensive to conduct, difficult to maintain, riddled with error, and fail to visualize the up to 70% of privately-owned urban trees, which still offer significant community benefits.

Treetect can mitigate liabilities by tracking maintenance, justify budgets by visualizing impact of under-budgeting planting, maintenance and removal, and protect urban forests by identifying illegal tree removal and locating vacant planting areas. Additionally, it can lay out the foundation for various initiatives that address everything from climate change to public health.

Green City Watch knows trees are just one—albeit a very important—part of the urban ecosystem. In the future, they aim to expand their product offering to map, assess, and monitor all parts of the ecosystem: from lakes to creeks, from parks to gardens, from green roofs to green facades, to shape the cities of the future. In fact, they're already working with the city of Jakarta to score its green spaces on ecological, social and economic performance!

Green City Watch's work is being recognized across the EO community in Europe. Last week they won the overall prize for the Copernicus Masters competition held at the European Space Week in Helsinki, Finland. The award was given by the Director General of ESA, Jan Woerner. Using Copernicus Sentinel satellite data and Planet data, this application combines big data from space with artificial intelligence—measuring the quality of green urban spaces to help make a difference for all those living in cities.

Planet is excited to follow Green City Watch's journey as they build meaningful urban forest monitoring solutions and connect with new customers and markets. Follow @planetlabs and @greencitywatch for more updates!

Azercosmos was Represented at the Bakutel 2019 Exhibition

Azercosmos participated at the 25th Anniversary Azerbaijan International Telecommunications, Innovations and High Technologies Exhibition Bakutel 2019 held on December 3-6, 2019, in Baku, Azerbaijan.

During the event, the technical characteristics and financial indicators of telecommunication satellites Azerspace-1 and Azerspace-2 and the projects implemented in the country throughout the year using the satellite images acquired via Azersky were presented to the participants of the exhibition.

Moreover, employees of Azercosmos made presentations on innovative projects held by Azercosmos this year such as CanSat Azerbaijan student model satellite competition, Azersky Satellite Imagery User Group Competition, NewSpace Business Accelerator Program, and NASA Space Apps Azerbaijan hackathon, as well as the International Astronautical Congress to be held in Baku in 2022.

Within the framework of the exhibition, Azerbaijan's satellite operator Azercosmos and Russia's satellite operator Russian Satellite Communications Company (RSCC) signed a cooperation agreement in the field of satellite communications and broadcasting services. According to the agreement, Azercosmos and RSCC will together use the capacity of telecommunication satellites Azerspace-1, Azerspace-2 and Express AM series satellites to provide services to customers in the countries of Europe, the Middle East, and Africa as well as in Azerbaijan, Russia, and the CIS countries.

The World's Largest Global Hackathon NASA Space Apps is in Azerbaijan

The world's largest global hackathon NASA Space Apps took place in Azerbaijan for the first time, on October 18-20, 2019. The event was organized by Azercosmos, jointly with the ADA University and the U.S. Embassy in Azerbaijan, in collaboration with NASA and Innoland Incubation and Acceleration Center. Around 50 teams from various educational institutions, governmental organizations and private companies have registered for the NASA Space Apps Azerbaijan hackathon. The most promising 25 teams that besides having experience in the hackathons possess mechanical, engineering and math skills, were selected to participate in the event.

During the two-day hackathon, held at the ADA University, a comfortable zone with favorable conditions was created for the teams to work on their challenges. Yoga and fitness sessions, music breaks took place to ease the tension of participants. Besides, the Principal Investigator for the Cassini Mission exploration of Saturn Dr. Anne Verbiscer from NASA, who was a jury, hold a master class where mentioned: "The dynamic processes and technological innovations that are taking place today give us greater responsibility for protecting our planet. The participation of Azerbaijani youth in this NASA's initiative is worthy of appreciation".

According to the challenges put by NASA, the winners of the hackathon presented solutions on such issues as the forest fires, sea and ocean pollution, and plastic waste on Earth. It is worth noting that there is a great interest of Azerbaijani youth in the space industry which is the result of the successful development and implementation of the country's space program.

USA / International / China Moon Collaboration, 'First Women' to Open 2020s Decade on China's Hawaii at **Galaxy Forum Hainan 25-28 February 2020**. Co-sponsored by IAF, CSA / NAOC, Moon Village Association and Canadian Space Agency.

With themes I*nternational Human Moon Landings, and Astronomy from the Moon*, ILOA is hosting Galaxy Forum Hainan 2020 China at the Hilton Wenchang, with direct views of Wenchang SLC spaceport.

This world-class Conference will have representatives from national, commercial, independent and international entities, including Apollo 11 Buzz Aldrin (invited), Christian Feichtinger, Giuseppe Reibaldi, Rick Tumlinson, Maria Antonietta Perino, Bodo Ziegler, Naoki Sato, Jayant Murthy, Chris Sallaberger, Bernard Foing, Mikhail Sachkov, Minsup Jeong, Vidvuds Beldavs, Boonrucksar Soonthornthum and many others.

The First Women on the Moon luncheon panel features

Astronaut Naoko Yamazaki, Shawna Pandya, Aline Decadi and others. There will be a *Hainan Cultural Performance* and lunch panel featuring *Hainan / Space & Astronomy Education* with students from Hainan, Mainland and Beijing; and a special highlight, Wenchang SLC possible tour is being planned.

Galaxy Forum Hainan will also focus on Mars, Artemis Moon South Pole Landings, China Long March 5 Rocket.

Please visit www.galaxyforum.org for more details and to Register; we hope to see you in Hainan!

MANT
Hungarian Astronautical Society

Space Day passed, H-SPACE 2020 conference is coming!

In conjunction with the World Space Week, a traditional event organized by the Hungarian Astronautical Society (MANT) is the Space Day in each October. This year we celebrated the 20th anniversary of the International Space Station (or around the 20th, since the anniversary depends on what exactly we consider the beginning). Maybe surprisingly for a small country which is formally not part of the ISS collaboration, a whole afternoon could be filled with interesting presentations about the Hungarian involvement in various scientific and technical fields. During the ISS history, there were a couple Hungarian-led experiments on board, ranging from material science to psychology. Arguably the most significant field of Hungarian contributions is radiation dosimetry, and there are also telecommunications equipment working on the station. The Space Day was held in the historical building of the Academy of Sciences in Budapest on October 17, and was attended by an exceptionally large audience.

At the end of October, the delegation represented our Society at the 70th IAC in Washington, D.C. was the most populous ever.

Towards the end of the year, the preparations for the H-SPACE 2020 international conference (http://space.bme.hu) have begun. Together with our organizer partner, the Budapest University of Technology and Economics (BME), we published the call for papers. The registration for the conference to be held in Budapest on Feb 26-27, 2020 will open soon, in early 2020. Certainly special attention will be paid to the second and third Hungarian satellites (SMOG-P and ATL-1) that were launched successfully in early December. Both PocketQubes developed largely by BME staff and students are healthy and operational, a unique feat so far in this picosatellite category.

SPACELAND

30% shares of SpaceLand City's **400% return-in-5 years** are available to investors, with further benefits from the low-tax regime of OECD-white-listed **Mauritius**, within the strategic corridor between Africa and South-East Asia.

Such revenues will derive from the unique business of the first "Space-themed eco-system" with its *low-gravity-STEM-inspired* research, educational and commercial high-end services: setting the first ***Microgravity Economy hub***, this tropical landmark project also features luxury *near-zero-energy-buildings* (NZEB) flats, business offices and facilities for Zero-G sciences, technologies, renewable energies and smart leisure.

Its new *holistic work & life-style* will unfold in a dream location with futuristic habitation and work environments eco-friendly matched with tropical forests, sandy beaches and crystal-clear lagoons: designed by senior engineers with chairs in prestigious universities, led by Italian architect Celeste Petraroli (former Olympics media building design supervisor), the City's NZEB technologies implement state-of-the-art thermal-stabilizing vertical-green facades beautifully coupled with the *in-situ* reddish stones recalling the beautiful colors of Mars.

The local Martian-like soil is also functional to generate red-planet analogs with amazing testing and educational equipment for the City's Center of Excellence for Low-G Research, Education and Training (see speech at the United Nations by frm.Head of State and Unesco-L'Oreal Laureate Scientist: https://youtu.be/2RthuFMcdfg).

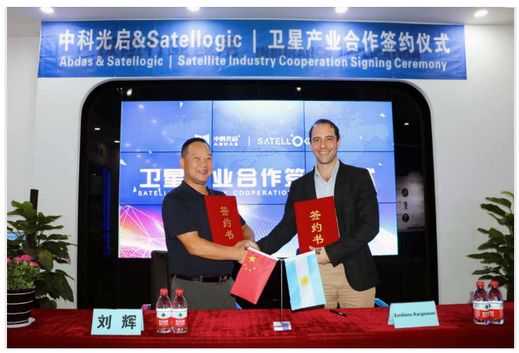
This breath-taking "town of the future", at 30 minutes from the airport, will also facilitate the preparation of people and hardware for weightless R&D flights and aerospace tourism, including the *Indian Ocean islands'* first *astronauts* to board SpaceLand sub-orbital research flights led by ESA Zero-G Flight Veteran Doct. Carlo Viberti (ASI sub-orbital astronaut-engineer nominee, ASI Prot. CE-CE-2008-132).

It all capitalizes on SpaceLand's *world records* set on flights mostly from the NASA Space Shuttle L.F. with disabled, kids and elderly, for the first time engaged in *state-of-the-art zero-G ICT experiments and bio-sampling* carried out by SpaceLand also for *Nobel-Prize* winning scientists (see www.SpaceLand.it)

The City's microgravity STEM research facilities, labs and SME incubators will also provide academia and innovators with unique opportunities (see also https://www.lemauricien.com/article/celebrations-la-remontee-palpable-de-lutm/), ranging from life/material/health sciences and pharmaceutics to cutting-edge technologies, e.g. weightless biomining, tele-robotized agriculture, 3D-biomanufacturing for fall-back applications in everyday's life, supporting all social classes.

A recent license by the USA Government, helping SpaceLand study spaceplane landing for future UN research spaceflights, is a further added-value for investors: the trendsetter SpaceLand City will indeed become a *tropical gate to the edge of knowledge*, implementing most of the U.N. sustainable development goals for Africa, while generating large returns to citizens and stakeholders: interested investors are welcome to write to SpaceLand@SpaceLand.it

Satellogic Signs Agreement with ABDAS to Deliver Dedicated Satellite Constellation for Exclusive Geospatial Analytics in Henan Province, China



Satellogic is partnering with ABDAS to deliver access to a dedicated fleet of satellites for the Henan province of China. This partnership will provide them with multispectral imagery for monthly remapping of sites they define within their departmental territory. High-resolution geospatial insights will contribute to the monitoring of agriculture, strategic interests and strengthen governmental decisions. Total contract value exceeds $38 million.

Satellogic's Dedicated Satellite Constellation (DSC) service offers the opportunity to develop a national geospatial imaging program at unmatched frequency, resolution and cost, giving customers access to geospatial analytics and insights with no capital outlay and no technical or operational risks. The company's DSC Program is aimed at municipal, state and national governments eager to gain complete control of a fleet of satellites over an area of interest. With access to a dedicated satellite constellation, governments of all sizes are now able to develop unique Earth Observation programs to support key decisions and manage policy impact, measure investment and socio-economic progress, and foster collaboration, data and information sharing and innovation.

Read a thought piece from Emiliano Kargieman on Dedicated Satellite Constellations

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SECURE WORLD FOUNDATION

Save the Date:

Summit for Space Sustainability

June 2-3, 2020
Washington, D.C.

Please join Secure World Foundation and its partners at the second Summit for Space Sustainability, a high-level multi-day event focused on inspiring action towards space sustainability. A unique gathering of global stakeholders from government, industry, and civil society, this event will feature keynotes, interactive sessions, panels, and networking designed to highlight opportunities and challenges for developing solutions for space sustainability.

Please visit www.swfound.org to join our mailing list for updates.

gmv

GMV's avionics system greenlighted for microlauncher use

Developed by GMV for Miura 1, the system passes its first qualification phase, a pre-launch condition

The system's scalability and modularity make it flexible and adaptable to many different types of launch vehicles

The system's technology affordably guarantees the launcher's required performance standards

Madrid, 18 December 2019.- After a long field-testing campaign the GMV-developed avionics system for PLD Spaces' MIURA 1 launch vehicle has successfully passed its Qualification Acceptance Review (QAR), clearing it for fitting in this suborbital launch vehicle, one of the essential prelaunch conditions.

Since 2017 GMV has been working on the design, development and qualification of a complete avionics system for the space probe MIURA 1. This system takes in all vital avionics items for a classic launcher, such as the power subsystem; data management subsystem; guidance, navigation and control (GNC) system; onboard software; payload management; telemetry plus the autonomous tracking technology and the termination system.

Key features of the avionics system designed and developed by GMV in collaboration with PLD are its modularity and scalability. Other fundamental aspects are its use of COTS parts and the availability of advanced technology that guarantees the required performance at an affordable cost.

This notable event is the payoff from the systems' busy field-testing campaign. In October, after the system had successfully passed its design review, work began on functional verification with thoroughgoing validation activity carried out on GMV's Tres Cantos avionics testbed. Next step was its environmental qualification tests (vibration and thermal tests) on ALTER's site. In mid-December, after all recorded data had been analyzed in depth, the system's full functionality was duly confirmed.

The avionics system is one of the most critical parts of any launcher. It collects and works up information from the sensors and takes due and timely decisions accordingly for the actuators to carry out the launcher's required maneuvers.

Design and development of these avionics systems are also especially complex in such a fiercely competitive market involving the participation of a host of very different types of organizations, from the well-known launch service providers to the newcomers to the microlauncher world.

GMV has managed to maintain the functions of a classic launcher (Ariane, Vega, etc) while duly adapting them to a smaller vehicle with different performance features. GMV has risen to this challenge by applying new technology and design processes, thereby not only cutting costs but also shortening development times. In less than three years development has moved on from definition of requirements to qualification and complete system acceptance by the European Space Agency (ESA).

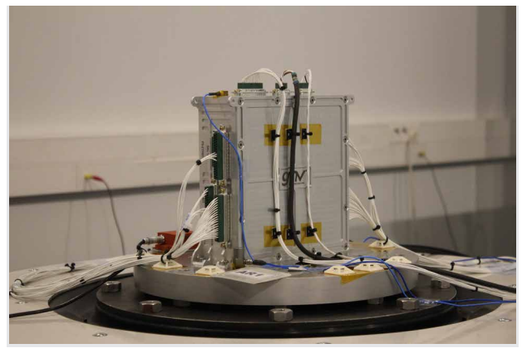
This development represents another stride forward in GMV's avionics business, as the first time the company has made, integrated and qualified a complete system. Since 2009 GMV has been participating in the integration of several of ESA's avionics system, such as the Advanced Generation European Vehicle, VEGA, and the IXV reentry vehicle. GMV has also taken part in launcher-avionics research projects, such as the European Commission's technology demonstrator SPARTAN (Space Exploration Research for Throttleable Advanced Engine) and ESA's New Generation Launcher and Space Transportation Advanced Avionics Testbed (NGT-ATB).

About MIURA 1 and MIURA 5

MIURA 1 is a launch vehicle developed by PLD Space. At a commercial level, this rocket will serve as an economical and reusable space access vehicle, for technological development and scientific experimentation in space conditions. At a technological level MIURA 1 will be the technological demonstrator and forerunner of a much bigger and more ambitious vehicle, MIURA 5, whose mission will be to place satellites of up to 300 kg in earth orbit.

PLD- and GMV-brokered development of avionics for MIURA 1 and MIURA 5 kicked off back in January 2017. Since then the two companies have been working as a technology alliance, making industrial investments accordingly.

In 2018 ESA's Future Launchers Preparatory Programme (FLPP) set up a contract for co-funding with the private sector the development and qualification of MIURA 1's avionics system, which had to be easily scalable and reusable for other launchers, including small and microlaunchers.



HERA WILL GO AHEAD

Following the results of the Space+19 Ministerial Conference held in Seville, Spain, end of November 3019, the Hera asteroid mission is finally going to fly.

HERA will be humanity's first-ever spacecraft to visit a double asteroid, the Didymos binary system, and it is part of the Agency's broader planetary defence initiatives that aim to protect European and world citizens.

Under the leadership of GMV-Spain, an international team will be in charge of the HERA GNC/AOCS subsystem development and design, the "brain" that will drive the HERA spacecraft along its challenging journey.

As responsible of the mission analysis and GNC/AOCS subsystem, GMV is now developing and testing an autonomous vision based solution, which will allow the spacecraft autonomously navigate in the vicinity of the asteroids in safety conditions.

With the scope of guaranteeing a safe mission as much as possible, GMV has re-created within its robotic facility ***platform-art©*** a "real scenario" of the HERA mission to test in closed-loop the GNC system with the maximum accuracy. This is also guaranteeing by the use of a flight model of the HERA's camera. Don´t miss the video explaining this test:

https://www.youtube.com/watch?v=p2SPs4of4sI

GMV's contribution to Hera

New Milestone for the GMV's Autonomous Decision Making in very long traverses (ADE /OG 10) System

On November 12th GMV's HQ in Tres Cantos (Madrid) has hosted the EU's H2020 Autonomous Decision Making in very long traverses (OG10-ADE) System Preliminary Design Review (PDR).

The ADE OG10 system is one of five projects selected for European-Commission funding in the second phase of the space robotics Strategic Research Cluster (SRC) PERASPERA, the European Commission's biggest H2020 robotics program. The main purpose of this second SRC's phase is to integrate the common technology building blocks previously developed in on-ground demonstrators in the first phase. This will help to drive the development of future space robotics applications for orbital and planetary use (phase 0/A studies) to meet not only the future needs of space exploration and exploitation but also potential spin-off and spill-over effects to other areas of robotics activity on Earth, such as agriculture, the automotive sector, the nuclear or underwater sector.

The GMV's lead ADE/O10, building on the autonomy framework developed within ERGO (OG2), aims to further advance towards the development and testing of an Autonomous Decision Making system capable to drive a rover capable of autonomously performing planetary long-range journeys (building up to 1 km in under 6 hours) while obtaining opportunistic (not planned) scientific data. ADE will guarantee a quick response and optimum use of robotic on-board resources. The system will combine the capabilities of PERASPERA's first phase building blocks: OG1-ESROCOS (European Space Robot Control Operating System) OG2-ERGO (European Robotics Goal-Oriented Autonomous Controller), OG3-InFuse (data fusion) and OG4-I3DS (sensors).

By successfully passing this new milestone the project has completed this phase of defining the ADE's common architecture. The milestone has also defined the validation the scenario for the ADE demonstrator and identified the necessary equipment and testing components to be used during the Mars analogue tests planned end of 2020.

As formal ADE's coordinator, GMV has lead the meeting, attended by members of SRC PSA, the consortium and the European Commission.

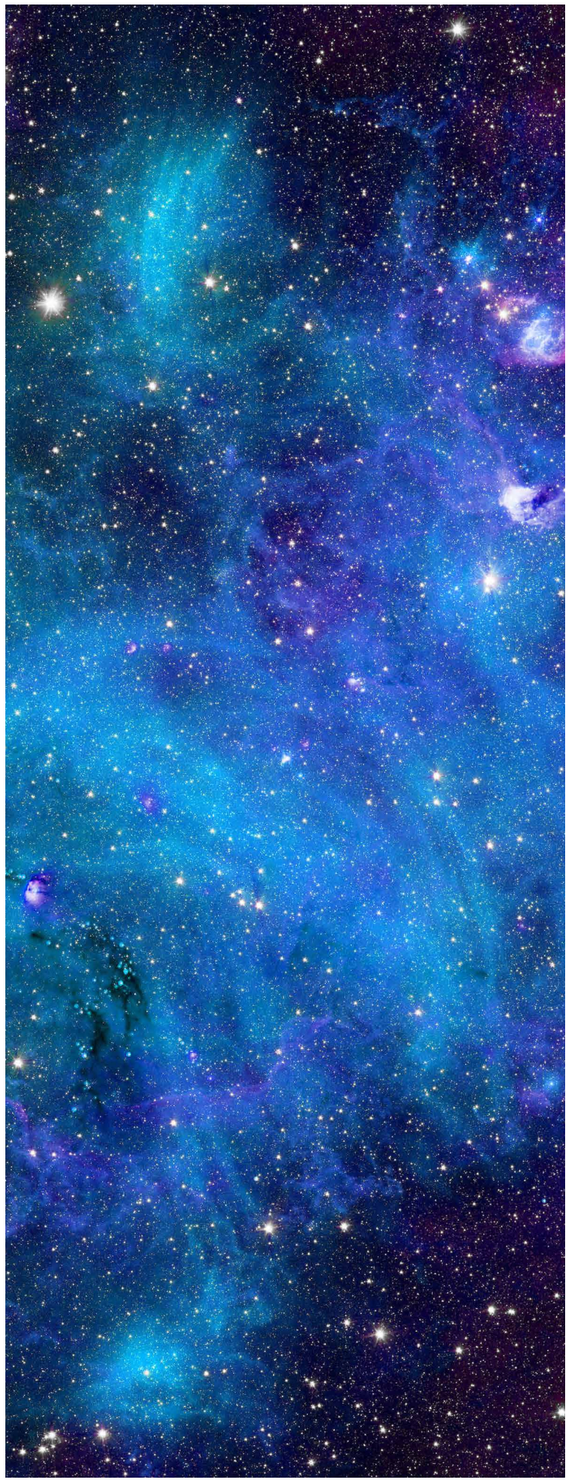
SNC SIERRA NEVADA CORPORATION

Sierra Nevada Corporation

Owned by Chairwoman and President Eren Ozmen and CEO Fatih Ozmen, SNC is a trusted leader in solving the world's toughest challenges through best-of-breed, open architecture engineering in Space Systems, Commercial Solutions, and National Security and Defense. SNC is recognized among the three most innovative U.S. companies in space, as a Tier One Superior Supplier for the U.S. Air Force, and as one of America's fastest growing companies. SNC's 55-year legacy of state-of-the art civil, military and commercial solutions includes delivering more than 4,000 space systems, subsystems and components to customers worldwide, and participation in more than 450 missions to space, including Mars.

Dream Chaser Spaceplane & Shooting Star Cargo Module

Owned and operated by SNC, the Dream Chaser spaceplane is a reusable, multi-mission space utility vehicle. It is capable of transportation services to and from low-Earth orbit and is the only commercial, lifting-body vehicle capable of a runway landing. The Dream Chaser Cargo System was selected by NASA to provide cargo delivery and disposal services to the International Space Station under the Commercial Resupply Services 2 (CRS-2) contract. All Dream Chaser CRS-2 cargo missions are planned to land at Kennedy Space Center's Shuttle Landing Facility. The Shooting Star cargo module is a 15-foot attachment to Dream Chaser that provide extra storage for payloads, flexible mission options and facilitates cargo disposal upon re-entry into Earth's atmosphere.



Introducing the New IAF Vice Presidents

Deganit PAIKOWSKY

IAF Vice President for Diversity Initiatives and New Space

- **What would you focus on during your mandate as IAF Vice President?**

Under my portfolio as a VP are Diversity Initiatives and New Space Economy. I am delighted to have these two issues under my portfolio for the next three years as a VP, because I see "new space economy" as another kind of diversity which needs our attention in order to further advance space activity. Therefore, I intend to focus together with my colleagues at the Bureau and the wonderful staff of the IAF on developing tools and initiatives to incorporate and highlight new-space actors in the IAF and make the IAF more attractive for them.

This is of course in addition to further advancing the 3G and IDEA initiatives that have been successfully applied in the past three years.

- **Why do you think it is important to volunteer for the IAF?**

Being a multi-stakeholder organization in which space agencies, large and small industries, academia and associations are interacting, the IAF exemplifies the diversity in global space activity. Therefore, I find the IAF to be a unique platform for advancing space activity worldwide. I believe this is the power of the IAF which should be further advanced.

As a young Ph.D. student attending the events of the IAF, in particular the IAC, had an invaluable effect on my research. It provided great opportunities to closely observe the dynamic between governmental and private actors and enrich my perspectives. Therefore, I am humbled to serve on the IAF Bureau and contribute to its success.

Sergey SAVELIEV

IAF Vice President for Relations with International Organizations

- **What would you focus on during your mandate as IAF Vice President?**

In my capacity of IAF Vice President for Relations with International Organizations, I will do my best to work together with my colleagues in the IAF Bureau. Our primary task is to support the implementation of the IAF President's agenda. This covers promoting and facilitating the Global Space Governance, stimulating and bringing up the Global Space Economy, influencing and fostering the Global Space Advocacy. For these purposes, the IAF will keep its cooperative ties with International Organizations (such as UNOOSA, GEO, ITU, etc.) to build our joint vision of a Space-faring world cooperating for the benefit of humanity. Promotion of the space dialogue on global level, of the space awareness and space economy will also be supported by IAF-organized international events:

- Global Conference on Space Exploration - GLEX 2020 in St. Petersburg;
- South East Asian chapter of the International Space Forum at Ministerial Level in Kuala Lumpur;
- IAF Congress - IAC 2020 in Dubai.

As I take office in the Russia-based IAF member organization, I will take special emphasis on supporting GLEX 2020, which is one of the most awaited events of the year, bringing together leaders and decision-makers within the science and human exploration community – engineers, scientists, entrepreneurs, educators, agency representatives and policy makers. Space leaders will converge in St. Petersburg to discuss recent results, current challenges and innovative solutions as well as to learn about how space exploration investments provide benefits through thoughtful planning and cooperation. This great meeting will be a platform for interesting conversations to further advance knowledge about space and will give more visibility to the IAF in the region, as well as giving Russian organization invaluable experience in hosting large-scale space-related international forum.

- **Why do you think it is important to volunteer for the IAF?**

In my opinion, volunteering in IAF activities is a very important thing for anybody interested in space-related topics. It is accessible for any person regardless of gender, age and nationality. It gives a unique opportunity to meet different people from decision-makers of different space powers to renowned space industry and science veterans as well as aspiring youth, and to share opinions with them. It also gives a rare opportunity to be fully involved in the development of space activities, making one's own share in fulfilling our biggest ever dream: bringing space to the humanity, expanding it to the boundaries of the known world and beyond.

Mary SNITCH

IAF Vice President for Relations with International Organizations

- **What would you focus on during your mandate as IAF Vice President?**

As VP for Global Conferences, Communications and Publications, my first responsibility is to develop a long-term strategy to advance the impact and relevance of the IAF around the world. This includes introducing the IAF into developing countries and into market S&T sectors outside of Space. Enhanced outreach to developing geographical regions will strengthen the IAF base for new venues to host Global Conferences. And these regions in turn become potential Hosts to future IACs. None of this can be accomplished without continuing to enhance IAF's excellent publications, communications and position across social media.

- **Why do you think it is important to volunteer for the IAF?**

Having been closely involved in the IAF for many years, I recognize the Federation for its unmatched leadership and prestigious status in the global space arena. No other global S&T organization offering the same diverse network of leaders from industry, government and academia. The opportunities for a young leader to excel in the IAF community is limitless.

Dominique TILMANS

IAF Vice President for Parliamentarian and Ministerial Relations and User Communities

- **What would you focus on during your mandate as IAF Vice President?**

Being Vice-President of IAF is a great honor! But it is also a unique opportunity to stimulate new ideas and actions at international level, and I will work on it.

The rise of the space sector over the last decades has been spectacular and quite instrumental in allowing both great technological advances and considerable improvements in our daily lives on Earth.

- **Would everything be perfect?**

Focusing essentially on the scientific and technical challenges at stake, one dimension has been neglected, whose potential is only now beginning to be realized, which is the need to include politicians, parliamentarians and civil society in this fantastic adventure.

- **We have to get out of the circle of initiates!**

Too many people still think that space is expensive, too expensive and that the money invested in this sector would be better invested in the many needs on Earth!
You might object that they already use many applications, every day, and that they can even save their lives! That's true, but they ignore it!

- **Why is it important to raise awareness among civil society about the use of space applications?**

I see two reasons:
The more End-users practice applications, the greater the need to develop new ones and the more new start-ups will emerge that will create jobs. But not only, the more users are convinced of the usefulness of space, the more popular it will be and the more popular it will be, the more those who have the power to decide and allocate budgets... will be interested in space!

We must communicate more on what space does well and convince politics and public of the good use made of public funds.

- **Take action!**

It won't be easy, and I measure the challenge ahead of me! But I am full of energy!

After 27 years of active politics, I have spent a long time with politicians and the public, listening to their criticisms and understanding the reasons for their lack of interest.

The work to come will be long but it will be necessary to be a pedagogue! We will have to explain that space is not only an opportunity for each of us on Earth, it is also an opportunity and a chance for all of us!

Interview with Pascale EHRENFREUND – IAF President

Born in 1960, Prof. Ehrenfreund obtained degrees in Astronomy and Biology at the University of Vienna. She was appointed as a Fellow of the European Space Agency (ESA) at the Leiden Observatory in the Netherlands, upon completion of her doctoral studies. Between 2001 and 2005, Ehrenfreund held a professorship in Astrobiology at the University of Amsterdam and the University of Leiden, where she remains a Visiting Professor today. In addition, between 2005 and 2008 she was a Distinguished Visiting Scientist at the Jet Propulsion Laboratory in Pasadena, USA, which is part of the California Institute of Technology. Further, Ehrenfreund obtained a Master of Arts in Management and Leadership in 2008. Since then, she has been Professor of Space Policy and International Affairs at the Elliott School of International Affairs, George Washington University, and Lead Investigator at the NASA Astrobiology Institute. She was the first female President of the Austrian Science Fund (2013-2015), from which she stepped down upon her appointment at DLR, where she has been Chair of the Executive Board since 17 August 2015.

Pascale Ehrenfreund, took up duty as IAF President at the IAC 2019 and announced her IAF Global Advocacy Agenda 2019 – 2022, focusing on supporting and facilitating Global Space Governance, stimulating and propelling Global Space Economy and influencing and fostering Global Space Advocacy.

1. At the IAC 2019, you took up duty as new IAF President. You are the very first woman to cover this role. Do you feel it is still important to point this out?

Well, the space sector is still male dominated and women in high level positions can act as role models and certainly inspire young women to enter the STEM field. It is an important progress that there is a female president after 70 years and also that the number of female IAF Vice Presidents is currently 5 out of 12.

2. What your* IAF Global Advocacy Agenda 2019 – 2022 *will be focusing on?

The IAF Global Advocacy Agenda 2019 – 2022 will focus on 3 main principles:

- Support and Facilitate Global Space Governance
- Stimulate and Propel Global Space Economy
- Influence and Foster Global Space Advocacy

The IAF will continue to provide THE platform to enhance Global Space Governance, bringing together a diverse community of space leaders and influencers for an open and constructive dialogue leading to concrete global partnerships and joint endeavours for the benefit of all humankind. The IAF also has the ambition to play the role of catalyst in stimulating and propelling global space economy by integrating new entrants in the domain of space and new users into the global space economic landscape and to foster cross-sector synergies. Furthermore, the IAF will expand its effort by reaching out to and inspiring the general public and decision makers through new dedicated activities and initiatives, such as ambassadorship programmes and reinforced public outreach strategies.

3. Clay Mowry was appointed as your Special Advisor on IAC Evolution, how do you see the IAC evolving in the future?

The IAF is at the heart of the space sector evolution with its worldwide and diverse membership and recognizes the global nature of space through its motto *Connecting @ll Space People*. The steadily increasing participation to the IAC is a challenge, also for the future host organizations; that applies also to an efficient organization of the IAC congress that increases in topics and sessions and new formats. The IAF commits to supporting globalization of space through its manifold platforms and activities but has to cope with a continuously evolving and diversifying space environment with new actors and space entrepreneurs as well as an increasing number of emerging space nations getting involved. Although the IAF is building on its almost 70 years legacy of promoting space activities the Federation has to respond with renewed impetus and innovative measures in the future. Clay Mowry will help the Federation to address these necessary measures.

4. IAF Honorary Ambassador and Past President, Jean-Yves Le Gall, left an outstanding legacy with the IAF "3G" IDEA Platform. Where would you like this "3G" movement to go during your Presidency?

Certainly, we will continue to develop the very successful IAF "3G" (Geography, Generation, Gender) International Platform for Diversity and Equality in Astronautics (IDEA) which has opened the doors for emerging space countries and new communities. The 3G Agenda has not only increased the participation of new IAF members but also led to a high number of participation of young professionals (> 40 %) at the IAC 2018.







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The next IAF newsletter will be issued in March!