



NEWSLETTER

Issue 1, Volume 1

December 2019

Q & A

With IAF new president and Chair,
DLR Executive Board.

A Report

An exclusive report on the ISRO's
flagship Chandrayaan-2 mission to
moon. From mission details to
successful journey.

YP Highlights

Highlights of young professional
programme at International
Astronautical Congress IAC 2019
at Washington D.C.

Azercosmos

An article about beautiful
country Azerbaijan and its space
related activities.



December 2019, Volume 1, Issue 1

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Message

Dear friends,

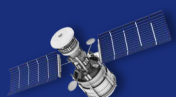
With great pride, it is my pleasure to present to you the inaugural issue of a newsletter specifically for Young Professionals and students in the space industry. Our committee's mission is to inspire the next generation of space professionals and we are constantly looking for ways to expand that beyond the International Astronautical Congress. With this newsletter we are looking at presenting content that is relevant for Young Professionals, be it news items or interviews. In this first issue we are looking back at the 2019 IAC in Washington DC and the success of our Young Professionals Programme, as well as ahead in an interview with the new IAF president Pascale Ehrenfreund, and a lot more. Congratulations to the editorial and communications team of our committee who have put this newsletter together and thanks to everybody who contributed to it.

Patrick Hambloch

Chair, IAF WD/YPP Committee

YP Newsletter is an official information document from IAF-WD/YPP committee.

This is inaugural issue 1, volume 1



The International Astronautical Federation—Workforce Development Young Professionals Programme Committee (IAF-WD/YPP) is one of the administrative committees dedicated to Young Professionals and Students. The committee's scope includes all matters pertaining to international space community workforce development. The committee focuses on early career professionals in all the areas of the aerospace community and provides overall guidance to IAF's Young Professional Programme:

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Minoo Rathnasabapathy

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**Pascale Ehrenfreund, President,
International Astronautical Federation
(IAF) and Chair, DLR Executive Board**

Image: © CERN

Q&A

Please introduce yourself to our readers

My career spans more than 30 years, two continents and professional appointments in five countries, the Netherlands, France, USA, Austria and Germany and functions as a researcher, professor, partner in a start-up, and manager. I am an astrophysicist by training and my research experience and interest range from molecular biology to astrophysics with special emphasis on astrochemistry, prebiotic chemistry and the search for life on Mars. Since more than two decades I contributed as Principal Investigator, Co-Investigator and Teamleader to ESA and NASA astronomy and planetary missions, as well as experiments in low Earth orbit and on the International Space Station. Between 2005 and 2008 I was a Distinguished Visiting Scientist at the Jet Propulsion Laboratory in Pasadena, USA. In 2008 I obtained a Master of Arts in Management and since then, I am on the faculty of the Space Policy Institute at the George Washington University. From 2013-2015 I was the President of the Austrian Science Fund and since August 2015 I am the Chair of the Executive Board of the German Aerospace Center (DLR). Since 2018 I am also the Chancellor of the International Space University ISU. In 2018 at the International Astronautical Congress (IAC) in Bremen I was elected IAF incoming President and I took up duty at the IAC 2019 in Washington, D.C.

How did you first get involved with the International Astronautical Federation (IAF) How did you become IAF President?

I have attended the IAC as scientific speaker and regular organizer of many scientific and policy technical sessions for over more than a decade. In 2016 I was appointed as IAF Vice President for Communication, Publications and Global Conferences. My career of 30 year and broad expertise in space research and space policy, and my longstanding involvement at IACs around the world have led to my nomination as the first woman leading the IAF since its foundation in 1951.

What are the top 3 priorities of your agenda as incoming IAF President?

In a continuously evolving and diversifying space environment with new actors and space entrepreneurs, as well as an increasing number of emerging space countries getting involved, the IAF commits to supporting globalization of space through its manifold platforms and activities. The "IAF Globalization Agenda 2019 – 2022" will focus on 3 main principles:

1. **Support and Facilitate Global Space Governance:** the IAF has been leading the global space dialogue not only as a global space agency might do, but going beyond the scope of an agency by involving all space actors in the discussion, including emerging space countries, industries, academia, space entrepreneurs, societies and even the general public. The Federation will thus 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 endeavors for the benefit of all humankind.
2. **Stimulate and Propel Global Space Economy:** the Federation has the

ambition to play the role of catalyst in stimulating and propelling the global space economy by integrating new space actors, entrepreneurs and specifically also non-space industries and organizations into the global space economic landscape and to foster cross-sector synergies.

3. **Influence and Foster Global Space Advocacy:** building on its almost 70 years legacy of promoting space activities and raising space awareness on a global scale, the Federation will to continue its mission with a renewed impetus and innovative measures responding to the challenges of a globalized world.

The IAF 3G Diversity Initiative is a great basis to encourage more diversity in the space industry, how do you plan to take this even further during your mandate?

The IAF has encouraged participation in its activities from all over the world in order to create a more inclusive environment where different working patterns are accommodated, people can debate, challenge and present ideas, and are supported when undertaking new and innovative work. During my mandate I will keep on striving to let everyone see how diversity and inclusion have practical benefits for the space community. Diversity has been shown to foster creativity and drive innovation, a diverse and inclusive workforce is proven to be the best way to ensure the development of new ideas and having people with different background is a certainty to solving problems. I will be working with Degani Paikowsky, the newly elected IAF Vice President for Diversity Initiatives and New Space Economy to make sure the legacy of my predecessor Jean-Yves Le Gall, IAF Honorary Ambassador and Past President, namely the IAF "3G" International Platform for Diversity and Equality in Astronautics (IDEA) – 3G Geography, Generation, and Gender will drive IAF activities to foster Diversity in the space community.

What concrete actions do you plan to implement at the IAF in order to engage even more with students and young professionals? How do you plan to have more representation of the next generation in the IAF (not only in events but also in the different Committees and other strategic planning activities)

For many years, the IAF has demonstrated its strong involvement in encouraging the creativity and dynamism of younger generations, be they students or young professionals. Through networking events, promotional materials, grant programmes and the dedicated IDEA platform we have enormously increased the number of students and young professionals involved in the IAF or attending IAF events. An additional effort has, however, to be made to have more representation of the next generation in different IAF Technical Committees. At this end, I will work closely with Minoo Rathnasabapathy, Former Young Space Leaders, and current IAF Vice President for Education and Workforce Developments chairing also the Next Generation Coordination Committee (NGCC) into having more younger professionals (YPs) fully engaged in IAF activities. A survey was sent to all

IAF Committee Chairs requesting an estimation of the number of students/YPs in each of their respective committees. The results and analysis of this survey will allow us to fill the gap between Committees wanting more YPs involved and young people not knowing how to reach committees

“Connecting @II Space People”, do you plan to change this motto?

Today, space is global. This motto is now more than ever meaningful. More than 70 government space agencies/offices are in existence worldwide; 13 countries have launch capabilities; more than 65 countries have satellites in space and more than 50% of all space missions are conducted on the basis of international cooperation. These numbers are growing continuously. The IAF is at the heart of this evolution with its worldwide and diverse membership and recognizes the global nature of space through its motto Connecting @II Space People. The IAF is here to connect all space people!



Why do you think the International Astronautical Congress (IAC) is so significant? What do you hope delegates take away for this year's IAC?

IACs are so significant because over the past 70 years, it has helped gather space leaders from countries around the world to exchange ideas, advance space exploration, and learn how we can utilize space for the betterment of humankind. This year in Washington, the IAC has managed to bring forth an impressive gathering of space enthusiasts to celebrate the 50th anniversary of the successful first Moon landing among others. The IAC has become the central gathering for space professionals from all sectors and countries of the world. It is the most significant event and platform for the space community. IACs is the flagship event of the IAF but we also should not forget other global conferences and regional events that are organized on a regular basis around the world.



How do you see the IAC evolving? How do you ensure its sustainability?

The IAC has been undeniably in constant evolution. Over the past few years, many new features and associated events were added to involve more outside stakeholders and communities who are interested in joining the space community. Attendance at the IAC has grown at an impressive rate.

“Support and facilitate global space governance, stimulate and propel global space economy and influence and foster global space advocacy”

As a consequence, the Federation has adapted the programme to reflect our changing space community and renewed priorities. I see the IAC evolving in the same direction of these past years with a special attention to be devoted to the IAC Public Day. Public day has expanded every year, featuring more activities and events that engage the general public, ensuring that the IAC leaves a concrete legacy in every visited country. Sustainability will be ensured by a collective effort in the implementation of the IAF Global Advocacy Agenda 2019 – 2022. The IAC will keep on providing the platform bringing together a diverse community of space leaders and influencers for an open and constructive dialogue, playing the role of catalyst in stimulating and propelling global space economy by integrating new space actors, entrepreneurs and specifically also non-space industry and organizations into the global space economic landscape.

One sentence for your vision for the IAF in the next 3 years?

The IAF leading a Global Space Governance stimulating a Global Space Economy fostering for a Global Space Advocacy for the benefits of all. ■



IAF SPRING MEETINGS

Save the Date:

24 – 26 March 2020

Dear IAF Community,

The International Astronautical Federation (IAF) is pleased to invite you to its annual **Spring Meetings** to take place in **Paris, France** from **24 - 26 March 2020**.

During these three days **IAF Administrative and Technical Committees** meet and the **International Programme Committee (IPC)** selects the abstracts to be presented during the IAC 2020.

The conference will feature an IAF Global Networking Forum (IAF GNF) Programme, an IAF IDEA "3G" Diversity Breakfast and Lunch as well as an attractive social and networking programme.

We look forward to seeing you in Paris!

Best regards,

IAF Secretariat



IAF SPRING MEETINGS 2020 WEBSITE



WHERE:
New CAP Conference Centre
1 – 13 Quai de Grenelle
75015 Paris

CHANDRAYAAN 2

Expanding the boundaries of Human Knowledge

Image: © ISRO

It is in the roots, not the branches, that a tree's greatest strength lies in. The roots of Chandrayaan program traces its root back to a meeting of Indian Academy of Sciences in 1999, where the idea for a moon mission was first kept on the table. After a number of such meetings, including that of Astronautical Society of India in the year 2000, ISRO formed a National Lunar Mission Task Force. One major question that needed to be addressed was, Why the Moon? What is the need to spend billions on conducting experiments on Moon? Moon is the nearest celestial body that we can visit. It can be considered as our stop for deep space missions. The Moon functions as a test bed for experimenting with technologies that have to be used in future space missions. Moreover if the presence of water can be ascertained on the Moon then it will be the ideal place for future human establishments in space.

The feasibility of carrying out a scientific mission to moon was discussed by members of the task force and in November, 2003 the Government gave nod to India's first moon mission, Chandrayaan-1. Before the launch of Chandrayaan-1, an Indian Deep Space Network (IDSN) was created which was essential for this mission and will also be an important asset for future missions like Mars Orbiter Mission and Chandrayaan-2. On October 22, 2008 Chandrayaan-1 was launched aboard PSLV -C11 from Satish Dhawan Space Centre (SDSC)

SHAR, Sriharikota. It carried eleven scientific instruments (payloads), both foreign and Indian, to fulfill a series of objectives and goals. After completing 95% of its objectives, including providing evidence of water in the moon's exosphere, surface and sub-surface, the mission was successfully completed on 28 August, 2009. Though the mission ended before its planned life of two years it laid foundation for mission objectives of Chandrayaan-2. On board Chandrayaan-2, a wide range spectrometer was installed to detect water signature upto 5 microns. The map generated from this experiment will give data regarding the distribution of water on the surface of Moon. Planning for Chandrayaan-2 started when Russian Federal Space Agency and ISRO signed a contract for collaboration in order to design and develop Chandrayaan-2. Mission Chandrayaan-2 started facing obstacles right from its time of inception. As per the contract, the lander for the mission was to be developed by Russia and the original launch date was set in January, 2013. After a number of delays by the Russian Space Agency in delivering the lander even by 2015, ISRO finally decided to develop the lander by itself. The launch was aborted on 14th July, 2019 after a technical issue was detected during the final countdown. Chandrayaan-2 was finally launched on 22nd July, 2019 on a Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mk III) from SDSC SHAR, Sriharikota. Though Chandrayaan-1 was a commendable feat by ISRO, designing and

launching Chandrayaan-2 was a far more complex task. Chandrayaan-2 mission involved combining three different entities namely an Orbiter, Lander and Rover. This single mission aimed at studying the moon as a whole which included exosphere, surface and sub-surface. The Lander and the Rover were present to fulfill the primary objectives of the mission, which was to demonstrate soft landing capability on the lunar surface and subsequently operate a rover on the surface. The creation of the Indian Deep Space Network (IDSN) was essential for providing deep space support to ISRO's space missions starting from Chandrayaan-1. The IDSN was formally launched in the year 2008, before launch of Chandrayaan-1. The IDSN located in Byalalu, Bengaluru consists of 18m and 32m Deep Space Antennas, along with an 11 m antenna facility in order to provide support for earth bound missions. The DSN32 is a fully steerable 32 m antenna with beam wave-guide that operates in S and X band.

SCIENTIFIC GOALS: Chandrayaan-2 was planned to fulfill a wide range of scientific goals. The orbiter is supposed to map the entire lunar surface and create a 3D map of Moon. Moon is linked to the history of our Solar system and is even linked to Earth's history. A clear understanding or let's say a better understanding of the Moon's origin will help us study the beginning of Earth and Solar system. So in order to trace Moon's origin it becomes crucial to carry out elaborate mapping of the

surface. Data sent by Chandrayaan-1 provided evidence of presence of water on lunar exosphere, surface and sub-surface. This needed further studies and so Chandrayaan-2 carried equipment aboard (discussed later in this article) to study the distribution of hydroxyl ions over the areas where presence of water was suspected. Chandrayaan-2 was more widely known for its objective to explore the “dark side” of the Moon. The south pole of the Moon has not been much explored and a significant area of the surface remains in the shadow, thus named the “dark side”.

▶ **GSLV Mk-III on Launch Platform**

The GSLV Mk-III is India's most powerful launcher to date, and has been completely designed and fabricated from within the country.
(Image: © ISRO)

The payloads present on board Chandrayaan-2 aim at carrying out elaborate study of the topography, mineral identification and distribution over the lunar surface. Instruments present will study the seismography and thermo-physical characteristics of the top soil on the surface, along with analyzing the composition of lunar atmosphere especially the exosphere. The payloads over the Orbiter, placed in a 100 km orbit above, will conduct remote sensing study of the Moon and its atmosphere. In-situ studies were supposed to be done by payloads onboard the Lander and Rover. Study at the global and in-situ level will allow detailed mapping and identification of the elements over the lunar surface. In the Lunar Ionosphere aim is to carry out measurements of the electron density. The search for water is to be conducted using methods like Infra-Red Spectroscopy, polarimetry, mass spectroscopy etc. Chandrayaan-2, was given a ride to its designated orbit on the heavy lift Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mk III), India's most powerful launcher developed till date. GSLV Mk III, a three-stage launch vehicle, is capable of inserting satellites of

core ignite and continue to burn even after separation of S200 strap-ons. GSLV Mk III placed the Chandrayaan-2 spacecraft in a (45,475 × 169) km parking orbit. Chandrayaan-2 consisted of an Orbiter, Lander and Rover. Each of these had their own set of Payloads for carrying out respective experiments and analysis. The Orbiter consisted of eight payloads while the Lander and Rover had four and two payloads respectively. The Orbiter is a three-axis stabilized spacecraft, manufactured by Hindustan Aeronautics Limited, having a gross lift-off mass of around 2,379 kg and is capable of generating 1000 W. It carried eight payloads, two of which are improved versions of instruments present over Chandrayaan-1. The orbiter is of cuboidal structure and carries the Lander in a stack configuration. Two solar panels are stored inside the Orbiter structure such that they get deployed once the Orbiter is in its designated spot in the lunar orbit. As a backup for the solar panels, during phases of eclipse and high power supply, Orbiter is equipped with Lithium Ion battery. The following payloads are carried by the Orbiter: Terrain Mapping Camera (TMC) 2, Chandrayaan-2 Large Area Soft X-ray Spectrometer (CLASS), Solar X-ray monitor (XSM), Orbiter High Resolution Camera (OHRC), Imaging IR Spectrometer (IIRS), Dual Frequency (L and S band) Synthetic Aperture Radar (DFSAR), Chandrayaan-2 Atmospheric Compositional Explorer 2 (CHACE-2), Dual Frequency Radio Science (DFRS) Experiment.

The orbiter was planned to have a mission life of one year but due to accurate planning and execution the mission life of Orbiter is now nearly 7.5 years. The OHRC was used to capture images of the landing site before the Lander was separated

▶ **3D view of crater near Lindbergh**

Terrain Mapping Camera-2 (TMC-2) is a follow-on of the TMC on-board Chandrayaan-1. TMC-2 provides images (0.4µm to 0.85µm) at 5m spatial resolution & stereo triplets (fore, nadir and aft views) from a 100 km orbit for preparing Digital Elevation model (DEM) of the complete lunar surface.

(Image: © ISRO)



upto 4-ton in Geosynchronous Transfer Orbit (GTO) and for Low Earth Orbit (LEO) it can support 10-ton satellites. GSLV Mk III is called a three-stage launch vehicle because of the following components, S200 solid rocket booster, L110 liquid stage and C25 Upper Stage. The two S200 strap-on motors are located on either side of the L110 core liquid booster. C25 is the cryogenic upper stage and is powered by India's largest cryogenic engine CE-20. The S200 contain nearly 205 tons of composite solid propellant and their 140 seconds functioning phase gives the vehicle initial lift-off. After 140 seconds these strap-ons get separated from the vehicle and fall. After 114 seconds of lift-off, the Vikas liquid engines (2 units) having L110 liquid

from the Orbiter. The Lander of Chandrayaan-2, named Vikram, is in the shape of truncated pyramid around a cylinder. The Lander, weighing 1,471 kg and producing a power of 650 W, contains propellant tank and is stacked on top of the Orbiter. The four legs of Vikram lander are designed so as to provide stability upon landing along with absorbing the energy upon impact thus ensuring safety and integrity of all the systems onboard. Vikram was designed so as to function for 1 lunar day or 14 earth days. The Lander was equipped with five liquid main engines so as to provide soft landing on the Lunar Surface. Vikram was carrying the following four payloads:

► **ISRO Vehicle Assembly Building, Sriharikota**

The whole Chandrayaan-2 assembly is taking place at the vehicle assembly building, one of the ISRO facilities with launch pad at Sriharikota, India.

(Image: © ISRO)



Radio Anatomy of Moon Bound Hypersensitive ionosphere and Atmosphere (RAMBHA), Chandra's Surface Thermo-physical Experiment (ChaSTE) Thermal Probe, Instrument for Lunar Seismic Activity (ILSA), Laser Retroreflector Array (LRA). Based on NASA's rover "Sojourner", the Rover named Pragyan was designed having a weight of only 27 kg and a 50 W power generation capacity.

Pragyan is basically a mobility system, having six wheels, designed to perform low gravity mobility tasks along with carrying out experiments on the Lunar Surface. Pragyan was carrying two payloads

127 × 119 km is referred to as the Selenocentric phase. ISRO has released a statement in November, 2019 that Chandrayaan-3 is being planned for Launch in November 2020 in order to demonstrate the landing capabilities of the Lander. Chandrayaan-3 will not be having an Orbiter as the Orbiter from Chandrayaan-2 is in Orbit and functioning as per the set requirements.

With the crash landing of Vikram, ISRO did an arduous first attempt to land on Moon's south pole but didn't lose the enthusiasm to carry forward the

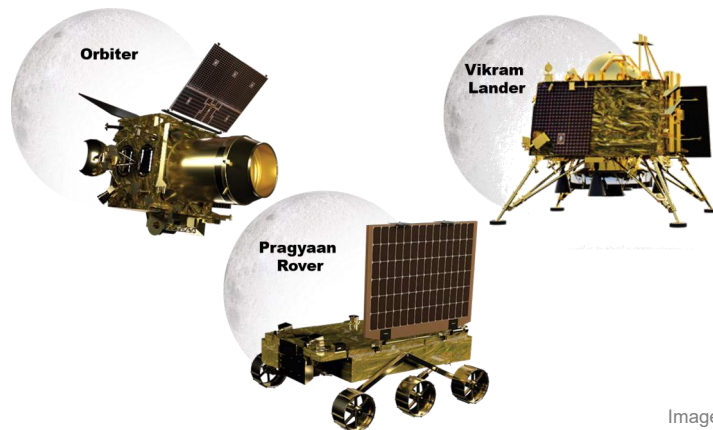


Image: © ISRO

to study the elemental distribution on the surface of Moon: Laser induced Breakdown Spectroscope (LIBS), Alpha Particle Induced X-ray Spectroscope (APXS). After being placed in the Earth Parking Orbit (EPO) or the transfer orbit, over a span of 22 days the spacecraft raised its orbit by means of on-board propulsion. In this Geocentric phase, a single perigee raising burn was carried out along with five apogee-raising burn. The aim of carrying out a number of orbit raising burns was to take advantage of Oberth effect. This strategy was used for launching Chandrayaan-1 and Mars Orbiter Mission also. At the end of these burns the spacecraft was placed in an eccentric orbit (142,975 × 276 km). On 13th August, 2019 Chandrayaan-2 performed Trans Lunar Injection. Seven days later, on 20th August, 2019, for 28 minutes 57 seconds lunar orbit insertion burn was carried out by the spacecraft which placed it in the lunar orbit of 18,072 × 114 km. For the separation of Vikram Lander the spacecraft needed to have a circular orbit of nearly 127 km aposelene and 119 km periselene. This circular orbit was achieved by Chandrayaan-2 on 01st September, 2019 after conducting four orbit lowering burns. The phase in which the spacecraft entered the Lunar orbit on 20th August, 2019 till it achieved a circular orbit of

flagship Chandrayaan programme with required amendments. It is truly said, "To some this may look like a sunset, but it's a new dawn" ■



Balbir Singh is an Aerospace Engineer based in India, currently Senior Assistant Professor (Aerospace) and Vice Chair communications of IAF WD-YPP Committee.



BLUE ORIGIN ANNOUNCES NATIONAL TEAM FOR NASA'S ARTEMIS HUMAN LANDING SYSTEM

Image: © IAF

The Artemis program is an ongoing crewed spaceflight program carried out predominately by NASA, U.S. commercial spaceflight companies, and international partners such as the European Space Agency (ESA), JAXA, and the Canadian Space Agency (CSA) with the goal of landing "the first woman and the next man" on the Moon, specifically at the lunar south pole region by 2024. NASA sees Artemis as the next step towards the long-term goal of establishing a sustainable presence on the Moon, laying the foundation for private companies to build a lunar economy, and eventually sending humans to Mars. Jeff Bezos's Blue Origin is one of the U.S. commercial spaceflight partner in this program. The Space Launch System (SLS) a US super heavy-lift expendable launch vehicle (shown in the figure on the right above), which is under development as of October 2019 will be used as launch vehicle for this program. The SLS will launch the Orion spacecraft (shown in the figure on the right below) and use the ground operations and launch facilities at NASA's Kennedy Space Center in Florida. The proposed mission plan is to have seven missions from Artemis 1 to 7 starting from 2020 to till 2028. The SLS Block 1 launch vehicle will be used for first three missions followed by SLS Block 1B Crew for the remaining four missions. Special space suits have been designed (see page 14). Blue Origin's founder, Jeff Bezos, announces the national team at the 2019 International Astronautical Congress in Washington, D.C. Today, Blue Origin is proud to

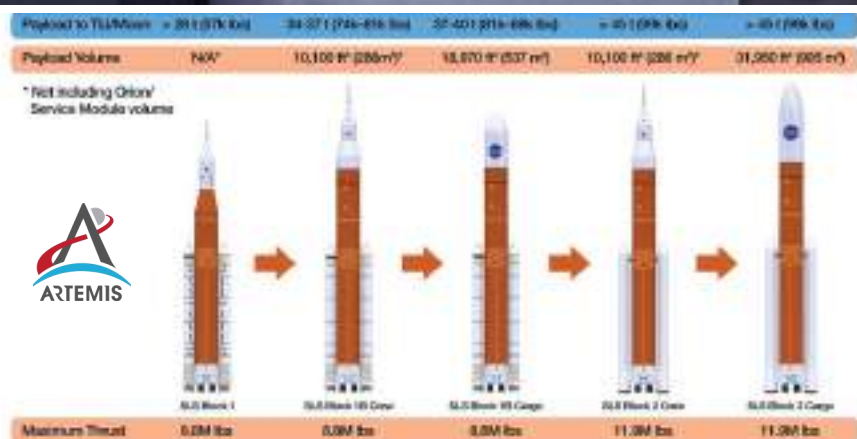


Image: Wikipedia



Image: Wikipedia

◀ Blue Origin founder CEO, Jeff Bezos

Jeff Bezos received the IAF's Excellence in Industry Award at the IAC 2019 in Washington D.C. on behalf of Blue Origin.

announce a national team to offer a Human Landing System for NASA's Artemis program to return Americans to the lunar surface by 2024. As per the news from Blue Origin website, Blue Origin has signed teaming agreements with Lockheed Martin, Northrop Grumman and Draper. These partners have decades of experience supporting NASA with human space flight systems, launch vehicles, orbital logistics, deep-space missions, interplanetary navigation and planetary landings. Our combined experience is uniquely positioned to meet NASA's needs for the Artemis program. Each partner will bring their industry leading solutions to the following roles: Blue Origin, as prime contractor, leads program management, systems engineering, safety and mission assurance, and mission engineering while providing the Descent Element that is based on the multi-year development of the Blue Moon lunar lander and its BE-7 engine. Lockheed Martin develops the reusable Ascent Element vehicle and leads crewed flight operations and training. Northrop Grumman provides the Transfer Element vehicle that brings the landing system down towards the Moon. Draper leads descent guidance and provides flight avionics. "National challenges call for a national



Risk Ambrose
Executive VP
Lockheed Martin
Space

thrilled to be part of a national team with this mix of innovation and experience. We look forward to safely and sustainably returning our nation to the surface of the Moon by 2024." "Northrop Grumman's commitment to put Americans back on the moon dates back over 50 years ago with the



Blake Larson
Corporate VP
Northrop Grumman



Bob Smith
CEO
Blue Origin

delivery of the first lunar lander for the historic Apollo Program," said Blake Larson, corporate vice president and president of Innovation Systems, Northrop Grumman. "Along with our ongoing work on the Space Launch System boosters, astronaut escape system, and the Gateway habitat, we are



Kaigham J. Gabriel
President and CEO
Draper

response. Following are the responses of various leaders from different stakeholders involved in this collaboration as per the information on the website of Blue Origin. We are humbled and inspired to lead this deeply committed team that will land NASA astronauts on the Moon," said Bob Smith, CEO, Blue Origin. "Combining our partners' heritage with our advance work on the Blue Moon lunar lander and its BE-7 engine, our team is looking forward to working with NASA in support of the Artemis program." "Lockheed Martin has been honored to help NASA explore space for more than 50 years, providing deep space robotic missions, planetary landers, space shuttle heritage and the Orion exploration spacecraft," said Rick Ambrose, executive vice president, Lockheed Martin Space. "We value Blue Origin's thoughtful approach to developing human-rated flight systems, and are

proud to be a part of the Blue Origin national team to support NASA's Artemis program and the ambitious goal to return to the moon by 2024." "When the nation needs precision guidance, it calls on Draper," said Kaigham J. Gabriel, President and CEO, Draper. "We guided Apollo to the moon and back nearly 50 years ago. We're ready to do it again with the Blue Origin team for Artemis." ■

▼ Jeff Bezos with IAF President

Jeff Bezos along with IAF president Prof. Dr. Pascale Ehrenfreund during one of the events at IAC 2019. He also received the IAF's Excellence in Industry Award at the IAC 2019 in Washington D.C. on behalf of Blue Origin.



Image: © IAF

70th INTERNATIONAL ASTRONAUTICAL CONGRESS (IAC 2019)



YOUNG PROFESSIONAL PROGRAMME HIGHLIGHTS



The Young Professionals Programme is getting bigger and stronger at the IAC year after year. This year huge number of Young professionals and students attended the Congress in Washington DC, and their active participation in all programme events was remarkable. Specially, the Young Professionals programme targeted to those below 35 years old was a great success: The Global Technical Sessions, accessible from all around the world via a set Webinar, covered the topics of Small Satellites, Human Spaceflight, and many more. The Global Technical Sessions, available for people to join in real time from all around the world via Webinar, covered the topics of Small Satellites, Space Communications and Navigation, Entrepreneurship, and Human Spaceflight. More than 55 people virtually participated in the sessions from the comforts of their homes or offices, in addition to the many located on site in Washington DC. The sessions were recorded and the presentations will be shared on the IAF website in

students and YPs. The Wednesday reception gathered the biggest crowd, as we welcomed the SGAC members and all the ISU Alumni to the first Shark Tank at an IAC, which was entertaining and fun, as well as enriching! In addition to the exciting week, the YP committee also supports the IPMC Workshop and the SGC, both events happening in the framework of the IAC. 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



◀ Cross Cultural Communications Workshop

Scott Madry and Carol Carnett, senior members of the IAF WD/YPP committee moderating the Cross Cultural Workshop event for all the ESL and YSL awardees.

(Image: © IAF)

the future. The YP Plenary marked its 10th Anniversary on Thursday morning with the title "Harnessing Citizen Science for the Future of Earth Observation". 5 brilliant young professionals, coming from different countries and region were plenary speakers in this event with the moderators from Washington D.C. office of Japan Aerospace Exploration Agency (JAXA) and from GLOBE implementation office of UCAR. There were enthusiastic and fruitful deliberations especially for the young professionals who attended in large numbers to benefit from the experience of our plenary speakers from the different industries related to space sciences and technology and motivate themselves. The Next Generation Plenary panelists shared their ideas and work in innovatively incorporating crowdsourcing and citizen science into traditional workflows for the future of Earth Observation. The panelists also address how they envision addressing challenges associated with new technology trends, data quality and the formulation of policies that will facilitate their work.

And finally the YP Networking Receptions, which were well spread through the week, and one of the highlights for the YPs at the IAC. They are the perfect occasion to network, exchange impressions, and learn and get insights from experts in the space sector. This year, the YP Committee organized a meet and greet with NASA Administrator, an ambitious panel about the industrial lunar ambitions, and an informative session on the opportunities that IAF brings to all

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.

The IPMC workshop gathered selected young professionals nominated by IAF members. This year the International Project/Programme Management Committee (IPMC) Young Professionals Workshop was organized on 20 October 2019, Sunday whole day from 9.00 to 18.00. The selected participants seek to gather input from young professionals in the international space community to gain the knowledge they need to better develop and empower the next generation workforce. The IAF member organizations nominated delegates for this workshop represented their views in this international forum this time too. The delegates for this workshop were asked to be physically present at the day of the workshop as well as the International Astronautical Congress and would fit

► Brigit Hartman, IAF IPMC Workshop 2020

IAF IPMC workshop is one of the flagship events of IAF WD/YPP committee at the International Astronautical Congresses every year with participants engaging in excellent discussions. (Image: © IAF)



the profile of a young professional. Young professionals are typically defined as being age 35 and under and having at least one to two years of experience on a project team and/or in the aerospace industry. Delegates attended the workshop were from a diversity of backgrounds (e.g., engineering, management, science, etc.).

This was encouraged in order to produce thoughtful and well-rounded observations and recommendations that will be presented to the IPMC. The delegates will be working in teams on the workshop topics via skype, email, webex, etc. prior to the workshop with kickoff foreseen first week of June. To each workshop topic, a mentor was assigned to help the workgroups advance in their research. The topics for the workshop were defined by the Workshop Organizing Committee and IPMC: Topic 1 Earned Value Management in Project Management of Large Space Projects. Topic 2 Fostering Project Management in the world of Diversity. Topic 3 Challenges faced by teams working on space projects between emerging and legacy space economies. Topic 4 Knowledge Management practices. Topic 5 Project Management practices for encouraging rapid

prototyping and short fused product life cycle for space projects. And not only! Scott Madry and Carol Carnett, members of our committee, offer support to speakers to prepare for their presentations and panel, in the Cross Cultural Workshop, but we will talk more about this next month in the upcoming News Blast (refer to page 13).

This workshop is designed for both native and non-native English speakers. It is a platform that provides all selected IAF Emerging Space Leader ESL grantees and Next Generation Plenary (NGP) speakers with the opportunity to rehearse and review their presentations and to sensitize them to the issues of speaking at large multi-cultural events. In line with IAF motto "connecting @II Space People" and its mission of promoting partnerships in the space community, advancing international development, sharing knowledge and preparing the workforce of tomorrow, IAF felt need to create a global, comprehensive and appealing platform, targeting young professionals, students, experts, decision and policy makers and all actors that could contribute to the networking spirit of such platform.

► IAC 2019 YP Event Calendar

The variety of YP programme events started on Sunday 20 October 2019 to Friday 25 October. The present and future of space is us. (Image: © IAF)

SUNDAY 20 OCTOBER 2019	
08:00 – 13:30	Cross Cultural Workshop* – Room 149A, 149B
09:00 – 18:00	IAF IPMC Workshop* – Room 150B
19:00 – 21:00	Networking Event "YP panel on IAF Opportunities" – Room 207AB Panel: Minoo Rathnasabapathy, Liz Seward, Avid Roman-Gonzalez Moderator: Kevin Stube, VC, IAF's WD-YPP Committee
TUESDAY 22 OCTOBER 2019	
09:45 EST	GTS – Space Communications and Navigation – Room 147B (Broadcast Live Online)
19:30 – 21:30	Networking Event "Industry Panel: The Moon" – Room 107AB Panel: Takeshi Hakamada, Yoav Landman, Maria Antonietta Perino, Ander Solorzano Moderator: Don Dumbacher, Executive Director, AIAA
WEDNESDAY 23 OCTOBER 2019	
09:45 EST	GTS – Student Team Competition – Room 147B (Broadcast Live Online)
11:45 – 12:30	GNF – NASA YP Town Hall – Grand Ballroom C Speaker: Jim Bridenstine, Administrator, NASA Moderator: Jackelyne Silva-Martinez, Mission Planning Operations ISC, NASA
20:00 – 22:00	IAF-SCAC-ISU Joint Networking Reception – Room 207AB
THURSDAY 24 OCTOBER 2019	
08:30 – 09:30	NGP "Harnessing Citizen Science for Future of Earth Observation" – Grand Ballroom B Panel: Avid Roman-Gonzalez, Caroline Juang, Fabiana Milza, Jorge Nicolas-Alvarez, Ufuoma Dylenshade Moderators: Misami Onoda, Director, Washington Office of JAXA Kristin Wegner, Project manager, GLOBE Implementation Office, UCAIR
09:45 EST	GTS – Small Satellite Missions – Room 147B (Broadcast Live Online)
FRIDAY 25 OCTOBER 2019	
09:45 EST	GTS – Human Spaceflight – Room 147B (Broadcast Live Online)
13:30 EST	GTS – Entrepreneurship Around the World – Room 147B (Broadcast Live Online)
* For Selected Participants Only GTS: Global Technical Sessions GNF: Global Networking Forum NGP: Next Generation Plenary	

This year at IAC in Washington D.C., in one of the young professional program event organized by the IAF-Work Force Development Young Professional Programme Committee in the frame of the Global second session on Wednesday morning, which was a student competition. The third session was held on Thursday morning with a theme based on "Small Satellite missions" with overwhelming



Networking Forum, NASA administrator Jim Bridenstine discussed NASA's priorities with specific focus on young professionals. This GNF event named "NASA YP Town Hall" was organized on 23 October 2019, Wednesday from 11.45 to 12.00 included dialogues, questions and comments from young professionals sitting in the audience to the NASA administrator moderated by Jackelynn Silva-Martinez from NASA Johnson Space Center, Texas and was one of the successful GNF events at IAC this year.

On the evening of Wednesday, 23 October 2019 at 20.00, the IAF-Work Force Development Young Professional Programme Committee (IAF WD/YPP) teamed up with Space Generation Advisory Council (SGAC) and International Space University (ISU) for a joint reception to celebrate the 50th anniversary of the first moon landing. What next great achievement in space will we be celebrating 50 years from today? The event was very successful with large number of participants. The major feature of the event was "Shark Tank" competition where all contestants compete to pitch the next great human achievement in space to a panel of judges.

The Global Technical Sessions (GTS) were conducted in five theme based sessions and overall response was great. The first session started on Tuesday morning with theme "Space Communications and Navigation followed by

response from participants. Finally the last two sessions were held on Friday morning and afternoon with themes "Human Spaceflight" and "Entrepreneurship Around the World" respectively.

So dear young professionals and students, IAF-WD/YPP committee is a group that focuses on building a united professional network of young professionals ages below 35 working or interested in the field of space sciences and technology. The program will allow you to broaden your professional connections within our community, get engaged with top business leaders of the international space community and gain exposure to new and diverse opportunities, both professionally and personally.

See you next year, and as we tweeted in our @IAFYPP account: "Feel inspired, the present and future of the space sector is us. #IAC2019" ■

◀ GNF—NASA YP Town Hall Event

NASA Administrator Jim Bridenstine was the speaker in the event along with Jackelynn Silva-Martinez from NASA Johnson Space Center, Texas as the moderator.
(Image: © IAF)



◀ 10th Anniversary of Next Generation Plenary

Next generation Plenary (NGP) celebrated its 10th anniversary with young speakers from almost all corners of the world.
(Image: © IAF)

A Series on SCIENTIFIC WRITING



Scott Madry



Carol Carnett

Scott Madry is a research associate professor at University of North Carolina at Chapel Hill and was a faculty member of International Space University in Strassbourg for over 20 years. He has 30 years of experience in teaching and research and is interested in effective communications and presentation skills.

Carol Carnett is an attorney and a teacher of English. She is currently Director of English programs of International Space University summer Space Studies Program and Southern Hemisphere Space Studies Program where she teaches English language skills, including writing and presenting workshops focused on effective English.

"Mastering the IAC Symposia"

The call for abstracts for the next IAC 2020 in Dubai is now finally open. It is time to crack our minds to write down a good abstract about our work, and make it to the final symposium list. But, what are the key elements that will make our abstract the one that the committee will pick up at the Spring meetings?

The story does not end there. If your abstract is selected, you will need to write a high quality scientific paper, good enough that the IAA will choose it among all those in the session to be published in the *Astronautica*. How to write a good paper, so you become that published author in this international journal?

Scientific writing is a technical form of writing that is designed to communicate scientific information to other scientists. Depending on the specific scientific genre—a journal article, a scientific poster, or a research proposal, for example—some aspects of the writing may change, such as its purpose, audience, or organization. Many aspects of scientific writing, however, vary little across these writing genres.

The technical content and its impact and relevance in the sector is important, but many times the way your work is presented make a huge difference on

the perception of the reader. Stay tuned for the next series of articles in the YP Newsletter and the YPP Monthly Newsblast, where our experts Carol Carnett and Scott Madry will reveal some tips to improve your writing and presentation skills.

The "Mastering the IAC Symposia" series will have seven chapters, which will cover from writing a good abstract to delivering a good presentation at the symposium, so you are perfectly prepared for the next IAC in Dubai. There will not be any excuse anymore for not presenting your work in the best way possible at the IAC, do not miss this chance to enlarge your skills!

Each chapter will be followed by an exclusive webinar. These webinars will cover a range of technical topics aimed at providing you with up to date information on scientific writing and skills. Webinars will be run by our subject matter experts and will provide you with the opportunity to ask any relevant questions from the comfort of your laptop or device. Webinars will range from introductory to advanced level.

Please follow us on our Facebook and Twitter pages for more updates information in days to come and happy reading—@IAFYPP ■



New Orion Crew Survival System (OCSS) Suit for Launch and Reentry.

The OCSS is to be worn inside the Orion spacecraft during launch and re-entry, in case of a depressurization emergency. The outer layer of the suit is orange to allow for visibility in the ocean if astronauts need to exit the spacecraft without any assistance from recovery personnel. The suit includes enhanced shoulder joints for better range of reach, and greater fire resistance.

IAC 2022

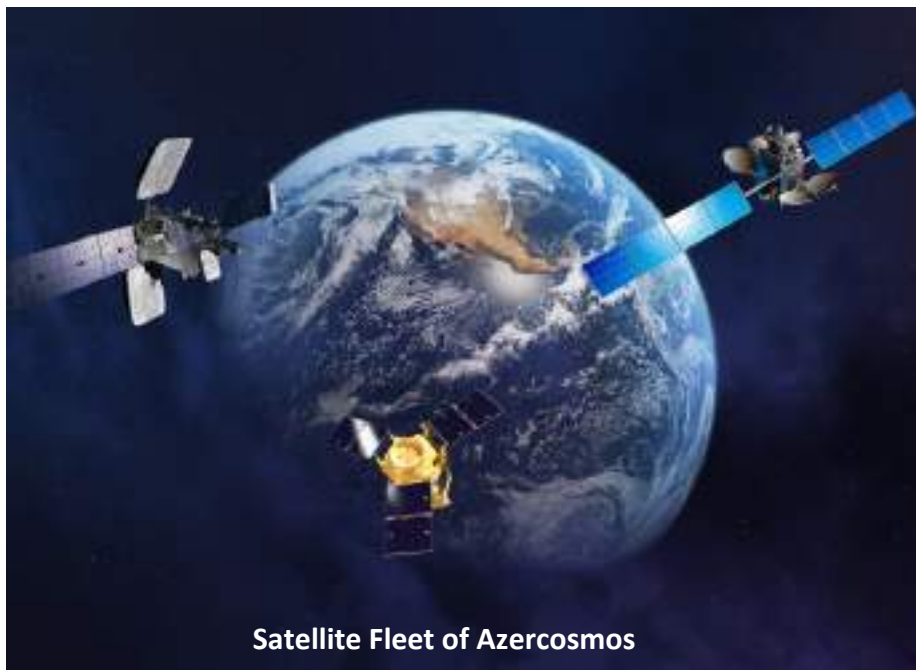


BAKU, AZERBAIJAN

Azerbaijan is a country of unique nature, unmatched culture, and centuries of history with its customs, traditions, and fine cuisine. Apart from being the country of Caucasian hospitality and friendliness, this is a place that will satisfy the expectations of the most sophisticated guest. In Azerbaijan, the eastern colors combine magnificently with the western progress. Historically a part of the Great Silk Road and situated at the crossroads of the geopolitical, economic, and cultural interests of many nations and civilizations, Azerbaijan has, since ancient times, aroused the interests of great minds, scientists, travelers, and historians. So, the nation is no stranger to travelers and traders from faraway lands. References to this amazing land, located on the western coast of the Caspian Sea and in the eastern part of the South Caucasus, can be found in the ancient writings of Herodotus, Strabo, and Claudius Ptolemy. Nestled within the Caucasus mountains, Azerbaijan is not a large country, but it has great ambition, world-class infrastructure, and dazzling venues. Azerbaijan is a modern and progressive country. It has stepped into the XXI century not only as a democratic and independent nation but also politically mature and growing stronger economically. This transition has simultaneously opened the door to a new level of international relations and financial prosperity for the country. Today, Azerbaijan is one of the fastest-growing economies worldwide. Historically, the economy of Azerbaijan has been oil-based, and while staying committed to implementing the ongoing projects in the oil and gas field, Azerbaijan is shifting towards technology, innovation, industry, entrepreneurship, tourism and agriculture as a source of major income. Apart from that, the field of space has always been one of the priority areas Azerbaijan. Azerbaijan's **space-related activities**

date back to the 1970's. By the initiative of the National Leader of Azerbaijan Heydar Aliyev, the 24th IAC was held for the first and only time in the Soviet Union in Baku in 1973. Both by content and the number of participants, this Congress was more representative than all the previous ones. That is to say, more than 1500 participants from 30 countries including USA, Czechoslovakia, Cuba, Argentina, Brazil, India, Japan, Iran, Spain, Italy, France, Sweden, and others gathered together to listen to the reports and presentations on a wide range of space-related issues. The President of the IAF, Luigi Gerardo Napolitano, the President of the International Academy of Astronautics, Charles Stark Draper, and many other prominent figures delivered speeches on scientific and universal importance of the IAC. American astronaut Thomas P. Stafford noted that it was his third visit to the Soviet Union, and every time he admired the hospitality of people and also believed in mutual understanding, joint efforts, and peace. The Congress, held under the theme Space Research: Influence on Science and Technology, laid the foundation of the space sector and astronautics in Azerbaijan. A year after the Congress in Baku, the South-Eastern Scientific Center for Natural Resource Studies – Caspiy was established. Moreover, in December of the same year, with the establishment of the Special Design Bureau of Space Instrument Engineering under the Azerbaijan Academy of Sciences, space-based research activities in the country were launched. Over the next years, about 3,000 Azerbaijani scientists and engineers have been working on the development of equipment for the Space Program of the Soviet Union that were used in the Salut-7 and Soyuz T-11 orbital complexes. Today, three entities from Azerbaijan – Azerbaijan National Aerospace Agency, Shamakhy Astrophysical Observatory, and

Azercosmos are the members of the IAF. Azerbaijan National Aerospace Agency (ANASA) started its operation in 1974 as a Scientific Center Caspiy. In 1981, a Scientific-Industrial Association of Space Research was set up within the Scientific Center. ANASA was established by the Decree of the President of the Republic of Azerbaijan from 21 February 1992. Key activities of the agency included the implementation of the state policy in the field of space study and space research of natural resources, elaboration and implementation of national aerospace programmes, coordination of work and participation in realization of international space projects, application of achievements in the space technology to meet the economic needs and to ensure security of the Republic of Azerbaijan. Being a member of the IAF since 2003, ANASA participated in a number of conferences and Congresses held by the Federation including the Workshop on the Use of Space Technology for Sustainable Development and the 58th IAC in 2007, the Global Space Exploration Conference in 2012, the 11th IAA Symposium on Small Satellites for Earth Observation in 2017, and many others. Shamakhy Astrophysical Observatory (SHAO), named after XIII century Azerbaijani mathematician and astronomer Nasraddin Tusi, of the Azerbaijan National Academy of Sciences was established in 1959. The observatory is set in a beautiful location, popular among tourists. This place was also a part of the technical tour organized for the participants of the 24th IAC in 1973. The observatory, which has been the IAF member since 2004, works on three main scientific directions: the physics of stars, investigation of solar system bodies, and solar physics and solar-terrestrial relations. Current research also includes the effects of space weather, the history of astronomy, theoretical astrophysics, cosmology,



Satellite Fleet of Azercosmos

helioseismology, radio-astronomy, practical astronomy, celestial mechanics, galaxies, and the dynamics of artificial satellites. The development and construction of astronomical devices for the research of celestial bodies have been added to the scope of new activities in recent years. The third entity from Azerbaijan in the IAF is Azercosmos – the first and only satellite operator in South Caucasus that proposed the candidacy of Baku to host the 73rd IAC in Baku in 2022. Azercosmos was established by the Decree of H.E. Mr. Ilham Aliyev, the President of the Republic of Azerbaijan, in 2010. The organization provides satellite-delivered telecommunication and Earth observation services to customers in both the public and private sectors. It strives to establish Azerbaijan as one of the driving forces of the global space industry and is committed to providing customized solutions based on advanced technologies for peace and prosperity.

The team at Azercosmos holds six core values, which are professionalism, team spirit, integrity, curiosity, agility, and compassion. According to the amendment to the Decree of H.E. President Ilham Aliyev dated May 2010, functions on the coordination of works carried out within international space projects and participation in them, cooperation with relevant international organizations and space agencies of foreign states in using outer space for peaceful purposes were transferred from ANASA to Azercosmos. Thus, Azercosmos is the successor of the legacy of all international activities carried out up to the present day by ANASA and responsible to represent Azerbaijan in the international arena since 2017. Today, the activities of Azercosmos are carried out in five main directions: supporting the socio-economic development of Azerbaijan, supporting national security, expanding commercial activities, supporting space R&D activities, as well as representing the country in the international space arena. Azercosmos operates three satellites. In February 2013, in cooperation with the Malaysian satellite operator MEASAT, American manufacturer Orbital Sciences Corporation, and French launch service provider Arianespace, Azercosmos launched its first-ever telecommunication satellite – Azerspace-1. Located at 46° East longitude, the satellite has a wide coverage area including Europe, Africa, Central Asia, and the Middle East. It is designed to provide

broadcasting and telecommunications services and create platforms to meet government and corporate customers' demands.

In December 2014, within the framework of the strategic partnership with Airbus DS, Azercosmos took over the rights to operate and commercialize SPOT-7 (later rebranded to Azersky), an optical Earth observation satellite, and started its commercial activities. This satellite acquires direct and unlimited high-resolution satellite imagery from any part of the world on a daily basis. Azersky satellite services are used in agriculture, cartography, urban planning, updating cadastral data, environmental monitoring, security, and other areas. In September 2018, Azercosmos launched its third satellite – Azerspace-2. Built for Azercosmos by SSL, Azerspace-2 is a telecommunication satellite located at 45° East longitude. This satellite enhances the capacity, coverage area, and spectrum of service offerings of Azercosmos to support the demand for government and network services in Europe, Central and South Asia, the Middle East, and Sub-Saharan Africa. It is ideally designed for smaller antenna and has cross connectivity between East,

West, and Central Africa, as well as Europe and Central Asia. Besides their direct commercial benefits, the country's satellite projects also serve as the basis for the transfer of advanced technologies to the country and acquisition of knowledge, skills, and practices for the independent implementation of space-related projects as a next step. To share accumulated experience, grow the knowledge and skills necessary for the development of satellite components in Azerbaijan in the years to come, Azercosmos, together with the Ministry of Education of the Republic of Azerbaijan, annually holds CanSat Azerbaijan model-satellite competition. Furthermore, the rocket modeling competition – Rocketry Azerbaijan that took place within CanSat competition in April 2019 is the first of its kind in the country and will be held annually in the future. During this competition students of top local technical universities build and launch rocket models at the Main Satellite Ground Control Station of Azercosmos. In addition, to identify and support innovative start-up projects and products in the space sector and related industries, Azercosmos conducts the NewSpace Business Accelerator Program. Within the program, Azercosmos provides technological, industrial and business mentoring and offers seed funding for early-stage space start-ups. Moreover, selected start-ups get an opportunity to present their products in global markets and participate in international exhibitions and conferences together with Azercosmos. To stimulate Earth Observation services, since 2016, Azercosmos has been carrying out projects in Azerbaijan and a number of CIS countries on an annual basis. Within these projects, both independent researchers and organizations engaged in research activities are provided with satellite imagery obtained via Azersky free of charge to implement their scientific research covering areas such as geography, dendrology, botany, zoology, soil science, agrochemistry, etc. Azercosmos was one of the main partners to hold the international ActInSpace Hackathon, organized by CNES and ESA, in Baku for the first time in 2018. Our representatives were actively involved in the work of the hackathon as mentors, experts, and jury members. After the final, a number of members from participating start-up teams were offered internships at Azercosmos. Considering students' great interest and the past ActInSpace success, Azercosmos developed its activities in this



direction and held the NASA Space Apps Challenge in Azerbaijan in October 2019, the aim of which was to engage coders, scientists, designers, technologists and space enthusiasts in developing innovative solutions to NASA's toughest challenges. In view of the development of local human resources and strengthening ties between professional and academic worlds, Azercosmos closely cooperates with the number of universities in Azerbaijan, including the National Aviation Academy, French-Azerbaijani University (UFAZ) and others. These universities, together with Azercosmos educate their students to meet the demand of today's space industry as prospective highly skilled professionals by offering specially designed courses, opening joint R&D labs, and holding joint events and internships.

Baku – the capital of Azerbaijan, manages to acquire a modern look without losing the charm of the ancient city and carefully reserving the legacy of the past. In this fascinating city, East and West mix so seamlessly. For more than a thousand years, from a small fortress arising in the middle of the Great Silk Road, Baku has turned into a large modern metropolis, while retaining its special oriental flavor. This reinforces an outward-looking attitude underlined by Baku's international importance as a petroleum and business city, a role that it has held for well over a century. When it comes to people living in the city, the population comes from a remarkable human melting pot that straddles four great cultures – Turkic, European, Russian, and Persian – all flawlessly integrated into a harmonious whole. Bakuivians are real lovers of strolling, socializing, and being 'seen' along the balmy Caspian-side Boulevard or in our fountain-filled parks. Flat capped old men, skinny-jeaned lads with front combed mop tops, scampering kids marshaled by mothers in 4-inch heels or chic

Islamic scarves – all rub shoulders in a city that's determinedly multicultural. Mosques, churches, and synagogues are dotted between coffee shops and pubs, boutiques, and galleries. In Baku, it's not hard to feel the warmth and humanity of Azerbaijani culture, a mélange of Turkic, Persian, and Russian influences forged into a proudly distinct whole. When you delve deeper, you find a cultural history tracing back to Paleolithic times with pagan temples, early Medieval Christianity, and forward-thinking Islamic and Russian traditions. Moreover,

Baku is a city awash with art galleries, theatres, and music venues, and the love of literature is reflected in the many streets named after local writers and poets. Here tourists taste local wine in a medieval caravanserai, sip fragrant Lankaran (a region of Azerbaijan) tea in a silk-draped cavern teahouse while puffing on an apple-flavored shisha pipe, watch Caucasian dancers wafting arabesques in vibrant chiffon as their men-folk high kick in pointy-toed heavy leather boots to the blood stirring wail of the "zurna" flute, or get lost in the magic of a Gara Garayev Ballet, swing dance at the Baku Jazz Club, or fall under the spell of the national "mugham" (national music of Azerbaijan).

Baku's unique location at the crossroads of East and West, rich historical and cultural heritage, combined with modern infrastructure and heartfelt hospitality all positively contribute to its appeal as an emerging Business Events hub. As a result, the number of convention facilities and related infrastructure has increased rapidly. Along with excellent accessibility, high-quality hotels, unique dining venues, and authentic on-site experiences, numerous world-class facilities are offering the ideal condition for large-scale events of up to 70,000 participants. Lately, Baku has become a

recognized international center for multiculturalism and intercultural dialogue. The city regularly hosts political and religious events, and cultural leaders and professionals from around the world. So, it is a no mere coincidence that with its experience and earned reputation Baku was selected as a city to host the largest and the most remarkable space event – the 73rd International Astronautical Congress in 2022. ■



IAC 70TH ANNIVERSARY

This year, the International Astronautical Congress, IAC, marks 70 vibrant years since its first meeting in Paris, France, in 1950. The first IAC was attended by a bold group of 20 space enthusiasts coming from 8 countries who sought to encourage improvement in international cooperation in the aftermath of the horrendous second world war responsible for the deaths of millions of people. It was in this context that the IAC opened an international conversation to create a space-faring world. They did so by acknowledging that proper dialogue would be the best way to promote cooperation, advancing international development and sharing knowledge. Seventy years have passed since the first meeting, the IAC has come a long way and manage to rise to the challenge thanks to the incredible work of the IAF. The IAC could never have lasted for so long without the excellence of all those within the IAF who made enormous efforts to establish the foundations of an international space community and transform the IAC into a brand name. Congratulations to us all, past and present delegates of the IAC, for showing how in Space and on Earth there are no boundaries. Happy Septuagennial anniversary dear space friends, cheers to the next 70 years!



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.

ALI NASSERI

Former Chair, Space Generation Advisory Council (SGAC)
Vice Chair, IAF Space Education Outreach Committee (SEOC)



Who is Ali Nasser in 4 hashtags?

#SpaceGen
#AerospaceEngineer→Educator→Physicist
#IAFYSL
#SciComm

Why space? How you entered the space sector?

From when I was a kid, I was interested in science and used to do my own experiments. For example, one time I kept a nail in a damp environment for four years, just to see how rusting progresses! I attended an astronomy summer course when I was eight, and that made me interested in all things space. After that, I got a telescope which helped me get more into astronomy. I also started following activities on the Mir Space Station and on hubble. I remember seeing the launch of the ISS, and spending high school following the news of what was going on in space like hubble turning fifteen. When it was time for university, Aerospace Engineering was my third choice of major actually, but I got into that choice. My school was very focused on space, and in the second year I had the opportunity to join a lab to work on multidisciplinary design optimization of space launch systems. That continued.

Your first contact with the IAF?

In 2011, I attended my first IAC in Capetown, where I presented my first ever poster which was focused on my undergraduate research. But I was not really part of the IAF community and committees until 2013, when I won the Emerging Space Leaders Grant Programme. As part of the grant program, we had meetings with the IAF presidents and with some of the committee members and young professionals. This helped me better understand the structure of the IAF, and join two committees in 2015.

A significant person you met through the IAF?

Oh, there's just so many people. And I think that is what makes this community unique!

Any experience/opportunity (around the IAF) that changed your professional career?

First thing that in a way changed my mind and was connected to the IAC, was SGAC. I became part of SGAC in 2012, and they supported me to go to IAC 2012. My experience was so positive that I joined the SGAC team, and tried to contribute to that organization. SGAC also linked me with many contacted within the IAF Community, which in turn helped when attending IAC. The other one was the

“while the technical sessions were great, I did not take anything other than knowledge away from that”

Emerging Space Leaders grant program. It helped me connect with another set of people within the IAF Community, and also get a better understanding of how the IAF works. It led me to join the Space Education and Outreach Committee (where I am currently the vice-Chair) and the WorkForce Development-Young Professional Programme Committee.

A recommendation to the YPs for the next IAC?

While technical sessions are great (I know it, because I coordinate two symposia during the IAC!), make sure to take part in the networking events. The connections you make at a person to person level is what you really take away from a conference like this. In fact, life changing ideas tend to develop more over food and drinks, than in a presentation. I remember during my first IAC, I did not do that and while the technical sessions were great, I did not take anything other than knowledge away from that. For my second IAC in 2012, I won the SGAC SGLA award, and as part of that met SGAC members before IAC, which helped me connect with even more people at IAC. And those people are now people that I meet at different conferences or meetings that I go to, and help me achieve much more than I can do alone.

A life motto/quote you like and/or follow?

- There is no such thing as an unsolvable problem. (Sergei Korolev)
- I have learned to use the word 'impossible' with the greatest caution. (Wernher von Braun)

What is intriguing about these two quotes, other than the fact that I believe in them, is that these two guys were competing with each other in two very different environments, and yet their views are so close to one another.

Any final thoughts you want to share?

If you are not already contributing to the IAF or other organizations like SGAC, consider doing so! Of course, you have to find the right organization that matches your personality, but when you do it not only changes your professional career, but it also gives you opportunities you might not have even dreamt of!



NEWS



**IAF President
Prof. Dr. Pascale Ehrenfreund
made Knight of the Legion of
Honour.**



Dr. Pascale Ehrenfreund



Applications are invited for 2020 Emerging Space Leaders (ESL) Award Program. For more Details: [Click here](#) Deadline: 10 February, 2020



The IAF is soliciting nominations for 2020 Young Space Leaders (YSL) Recognition Program. For more Details: [Click here](#) Deadline: 10 February, 2020, 15.00 CET (Paris time)



The IAF is soliciting nominations for 2020 IAF Excellence in Industry Award. For more Details: [Click here](#) Deadline: 14 February, 2020, 15.00 CET (Paris time)



The IAF is soliciting nominations for 2020 IAF Excellence in "3G" Diversity Award. For more Details: [Click here](#) Deadline: 14 February, 2020, 15.00 CET (Paris time)



2019 IAF Emerging Space Leaders



Alexander 



Alexandra 



Ana-Mia 



Angeliki 



Aqeel 



Avid 



Charlotte 



Di Wu 



Divya Rao 



Elena 



Faviola 



Femi 



Hansley 



Ivan 



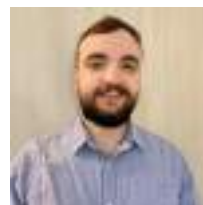
Izrael 



Jiten 



Jorge 



Martin 



Mpho 



Nicole 



Rigoberto 



Tess 



Thomas 



Usman 



Yasir 



2019 IAF Young Space Leaders



Olga Stelmakh-Drescher



Matteo Emanuelli



João Lousada



Avid Roman-Gonzalez



Mia Brown

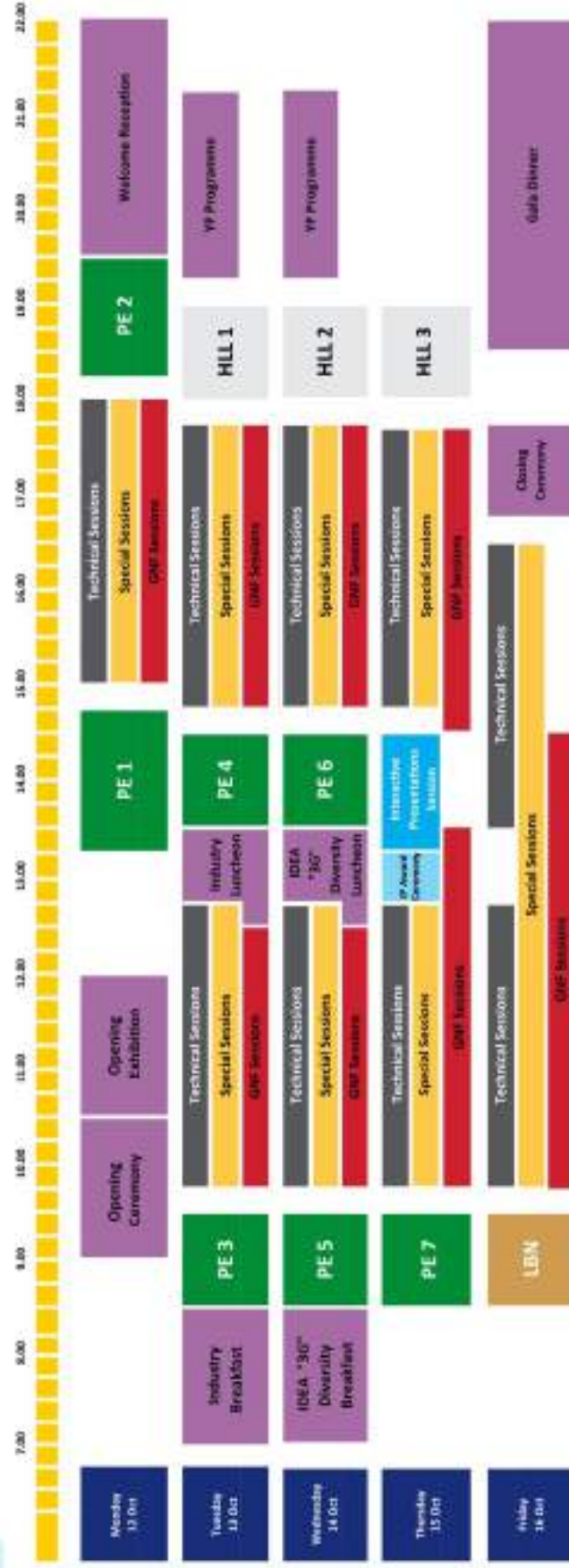
HOW TO ACTIVELY ENGAGE IN THE IAC

The International Astronautical Congress (IAC) is a five day congress taking place during the September/October timeframe each year in a different location around the world. The upcoming IAC 2020 will be held in Dubai, United Arab Emirates, between 12-16 October 2020.

The IAC is not only a Congress, but a gathering of the international space community that, every year, contributes to and shape a different and exciting programme. There are several different ways that you can actively be part of the congress and this guide will help you better understand which role you can play at the IAC and the various deadlines to meet. Here below you can find the IAC Congress at a Glance with the general schedule for the main IAC events: Plenaries, GNFSessions, Technical Sessions, Special Sessions and the Interactive Plenary Sessions.

Should you have any questions please do not hesitate to get in touch with the IAF Secretariat at info@iafastro.org

Be Part of the Conversation at IAC 2020!










Connecting @Il Space People



*Calls to Open
22 November 2019!*

BECOME AN ACTOR AT IAC 2020

	PLENARY PROGRAMME			TECHNICAL PROGRAMME		
	Plenary Events	GNF Sessions		Technical Sessions	Special Sessions	
Who can Apply?	   IAF Member Organizations representatives	 IAF Member Organizations or newly applying Member Organizations		  Open to Everyone	 Open to Everyone	
How to Apply?	Fill in Plenary Application Form and send to ia Plenary@iafastro.org	Fill in GNF Application Form and submit to gnf@iafastro.org		Fill in online Abstract Submission Form at www.iafastro.net	Fill in online Special Session Application Form at www.iafastro.net	
Who Selects?	IPC Steering Group	IAF Vice President for GNF		International Programme Committee (IPC)	IPC Steering Group	
When is the Deadline to Apply?	31 January 2020	30 April 2020 (Upon Availabilities)		28 February 2020	13 February 2020	

PLENARY PROGRAMME

ELEMENTS



Plenary Events

Restricted to IAF Member Organizations' representatives
No other events in parallel

IAF Global Networking Forum (GNF)

Restricted to current or newly applying IAF Member Organizations

Topic to be of interest to a **large** segment of Congress attendees



500-1000 Delegates

12 Total Slots
7 PEs
2/3 HLLs
1/2 LBNs

Evaluation Criteria:

- Topics (Industry, Exploration, Next Generation, Emerging Countries, Environment...)
- Event Format:
 - PEs: 4/7 Speakers and a Moderator
 - HLLs: 1/2 Speakers and a Moderator
 - LBNs: flexible format
- Originality of the proposal, as compared to recent IAC Plenary Events
- Timeliness of the topic with respect to current events in Astronautics
- Relevance of the proposal to the theme of the congress
- Quality and profiles of the proposed presenters
- Ability of the proposers and organizers to obtain the proposed presenters and execute a quality event



200-400 Delegates

Evaluation Criteria:

- Topics (Industry, Exploration, Culture, Diversity, Legal and Policy, Development, etc.)
- Event format:
 - panel discussion
 - lecture/keynote
 - workshop
 - competitions
 - corporate promotional events
- Relevance of the proposal to the theme of the congress
- Quality and originality of the proposal
- Relevance with regards to the current space sector developments
- Ability of the organizers to obtain the proposed speakers and execute a quality event
- Possibility for the organizer to sponsor the session

+/- 40 slots

TECHNICAL PROGRAMME

ELEMENTS



Technical Sessions (TS) & Interactive Presentations (IP)

Open for everyone

Special Sessions (SpS)

Open for everyone

Topic to be of interest to a **targeted** segment of the Congress attendees



50-250 Delegates



20-200 Delegates

TS: +/- 1700 slots
IP: +/- 500 slots

Evaluation Criteria:

- Topics
 - Science and Exploration
 - Applications and Operations
 - Technology
 - Infrastructure
 - Space and Society
- Direct applicability of the abstract submission to astronautics
- Scientific merit, originality and attractiveness of the subject
- Compliance with the word count and format requirements for abstracts
- Event Format:
 - oral presentation of 10-20 minutes
 - interactive presentation of 10 minutes

Evaluation Criteria:

- Multidisciplinary topic
- Novelty and originality of the topic
- Innovative event format:
 - panel discussion
 - group discussion
 - workshop
 - campfire
 - fishbowl
 - sprints
- Focus on audience engagement
- Quality of contents
- Qualification and experience of the organizers
- Relevance to the theme of the Congress

+/- 20 slots



The IAF General Assembly selected Paris, France as Host City for IAC 2021 on Friday 5 October. The Hosting Organization is the Centre National d'Études Spatiales (CNES), a member of IAF since 1981. Paris 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.





December 9, 2019

IAF WD/YPP Committee - Call for Members (Communications Team)

The Workforce Development and Young Professionals Programme committee of the International Astronautical Federation is looking for new team members in the area of communications.

Our committee is the focal point for Workforce Development matters of early career professionals in the IAF, organizing a number of activities at the annual International Astronautical Congress and beyond — including the Young Professionals Programme.

The committee is composed of several teams, each focussing on different aspects of our portfolio, including setting up and organizing our events and communicating with Young Professionals around the world.

Our Communications team, under the leadership of Vice Chair Balbir Singh, is responsible for creating monthly news blasts that are sent to YPs via email, newsletters that are released a couple of times per year, the social media presence of our committee, and information sent out to the YPs ahead of and during the IAC.

To strengthen the skillset and increase the workforce of the team, we are looking for experienced candidates that are willing to help us out in the following areas:

- Graphic design — for banners, images, flyers, etc.
- Writing — for news articles, news blasts, newsletters, social media articles, etc.

If you are interested to join the committee and support our Communications Team or know somebody who would, please send a resume and motivation statement to Patrick Hambloch (patrick.hambloch@uah.edu) and Balbir Singh (balbir.s@manipal.edu).

Thanks,

Patrick Hambloch,
Chair, Workforce Development and Young Professionals Programme



INTERNATIONAL ASTRONAUTICAL FEDERATION

Connecting @ll Space People



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