

NEWSLETTER April 2020

Volume 2, Issue 1

\bigcirc Ce \mathbf{C}

PCANEED WANTIN

In this issue, there is an article about space robotics. How the knowledge of machines with AI and ML help

an efficient manner. Robotics has played an important role in the exploration of Mars and nearby



Young Professional's

* * * Newsletter *

April 2020, Volume 2, Issue 1

Editorial Team

BALBIR SINGH Vice-chair, IAF WD/YPP Communications

ANDREA J JAIME Member, IAF WD/YPP Communications

HUGO SIMOES Member, IAF WD/YPP Communications

CLEMENTINE DECOOPMAN Member, IAF WD/YPP Communications

SCOTT MADRY Member, IAF WD/YPP Communications

CAROL CARNETT Member, IAF WD/YPP Communications



Message

Dear friends.

Since the first newsletter a lot has changed within the IAF, the space industry and the world, really. As you will read on the following pages, this year's IAC will be virtual for the first time ever. As our community at large has to learn how this and other events will function in virtual reality, I assume a lot of the Young Professionals are facing a different reality of uncertainty of what the future will hold. If you are unsure about your future factore with hold. In where this all will take you in the coming months and years, I assure you, you are not alone. We as a committee are working hard on ways to adapt our program for this year's IAC and on supporting the port group time of space professionals in group next generation of space professionals in general. To that end we are planning to release some online content over the summer to inform and guide YPs in these uncertain times.

Meanwhile, please enjoy this newsletter, with interesting articles and interviews, that look back at past achievements, at the present situation and how COVID-19 affects our lives, as well as into the future at the IAC and beyond.

Raber & Hamle Rock

Chair, IAF WD/YPP Committee

***** YP Newsletter is an official information document

from IAF-WD/YPP committee.

This is volume 2, issue 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:

Leadership



Patrick Hambloch Chair, IAF WD/YPP Committee





Kevin Stube

Vice Chair Internal Relations **Technical Programmes**

Merve Erdem Nicholas Fishwick Markus Geiß Guillaume Girard Aieet Hansra **Birgit Hartman** Andrea Jaime Ryan L. Kobrick Ayami Kojima Michal Kunes Joao Lousada Scott Madry Ruth McAvinia

Christopher Nie Twinkle Pandhi Maria Antonietta Perino Arnau Pons Ana Raposo Minoo Rathnasabapathy Kathryn Robinson Bruno Sarli Kaori Sasaki Amalio Monzon Ali Nasseri Amalio Monzon

Vice Chair

Balbir Singh

Vice Chair Communications

Stephanie Schierholz Juergen Schlutz Elizabeth Seward Kevin Shortt Steven Shumsky Jackelynne Silva Hugo Simoes Jan Svoboda Chris Vasko Adi Wasserman Lvn Wigbels Clémentine Decoopman

Friends

Martin Adriaensen Farid Ahmed Camille Alleyne Iulio Aprea Christopher Beauregard Kristen Bloschock Maria Botha So Young Chung

Kate Becker

Vice Chair

Career Development

Members Edward Ashford

Laszlo Bacsardi

Andrea Boyd

Carol Carnett

Jessica Culler

LR Edwards

Alan T DeLuna. Ramon P. De Paula

Angelia Bukley

Chiara Cocchiara

Kathleen Coderre

Matteo Emanuelli

Elizabeth Barrios

Kimberley Clayfield Ariane Cornell Emmanuel David Ken Davidian Stacey Edgington Far as Ghadaki Jeffrey Hendrikse Nicky Jordan

Claudia Kessler Charlotte Kiang Benjamin Lenoir Khalid Manioo Naomi Mathers Anne Meier Nathalie Meusy Stephanie Shierholz

Mary Snitch Jacob Sutherlun Jan Svoboda Chris Welch James V. Zimmerman

Ex-Officio

Emma Boisdur Minoo Rathnasbapathy

Space Robotics, an **Exclusive Report**

16

Space News, as a New Section

22

MBRSC and UAE Space Activities

11

MESSAGE



Dear Friends,

Please allow me to address you in my capacity of IAF President in this challenging period. I hope that you are safe and managing to work remotely in these difficult and complicated times. Though we look at the future with hope, it is hard to predict how the situation will unfold in the upcoming weeks and months. I would like to let you know that the IAF is thinking of you. The Federation has been supporting the space community for more than 70 years, and we are here also now.

The ongoing Covid-19 pandemic has, inevitably, affected our planned activities for 2020, but the IAF remains flexible, innovative and resilient. We are currently working on devising new ways to keep you engaged and connected. Now, more than ever, we understand the importance of a strong supportive community and we are committed to ensure that you feel a part of it Earlier this month we were had to announce the postponement of the GLEX in St. Petersburg and of the IAC in Dubai. However, after much reflection, we have decided that we still want our community to gather around a main event in 2020 and feel part of the great IAF "family", as many of you call it.

I am therefore delighted to announce that we will be hosting an IAC 2020 in virtual format. The 71st International Astronautical Congress – The CyberSpace Edition will take place in your homes and offices around the world during 12 – 14 October 2020. Please make sure to mark those dates in your calendar and stay tuned for additional details on the programme and logistics for the event in the upcoming weeks. I am also pleased to inform you that the new dates for the 72nd International Astronautical Congress, IAC 2021 have been fixed. The IAC 2021 will take place in Dubai, U.A.E., from 25 – 29 October 2021. Please also mark these important dates in your calendar.

Furthermore, the IACs in Paris and Baku will be postponed accordingly. Exact details will be communicated in the coming weeks. Despite the challenges we face due to the COVID-19 pandemic, I am confident that we can emerge from this crisis stronger than before and that we will continue to discover innovative and creative ideas on how to shape a global society with the help of space technologies for a bright future. The IAF is nothing without its community; together we stand stronger and more resilient than ever. I look forward to tackling our future challenges together.

Warmest Regards,

Prof. Pascale Ehrenfreund

President International Astronautical Federation





Dominique Tilmans

Honorary Senator – Belgium, IAF Vice President (Parliamentarian, Users-Communities, Ministerial Relation)

Please introduce yourself to our readers.

I would define myself as a Space enthusiast. My passion for Space started more than 30 years ago, when I saw for the first time in the Belgian countryside near Redu the rocket Europa 2. That monumental object immediately captured my imagination, it evoked images of distant and unknown planets and especially of a future yet to be discovered. However, my career started way earlier with a Master Degree in Political Science -International Relations and Diplomatic studies – at the "Université Libre de Bruxelles". Soon after my degree driven by my curiosity I moved in Iraq to work as project assistant for a Belgian General Contractor involved in the construction of a phosphate fertilizer processing plant. When I came back to Belgium, I made my first step in politics. Very quickly I got my first mandate as Federal Deputy and then as Senator. The portfolio of my activities would span from health care to International Relations and eventually Space. I have been a strong advocate for the high strategic value of space and its wide impact on numerous diverse sectors. During my career as politician I have been appointed Chair of the «Space Group Senate» and the «European Interparliamentary Space Conference». It proves that Politics and Space are not incompatible!!

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

In 2013, I discovered IAC for the first time. At that time I participated in the Beijing edition as representative of the Belgian Senate. I was so surprised by the dimension and the organization of the event. Since then I attended it almost every year and I am planning to do so in the future! Along my career, in all the positions I covered from Switch to Space to Eurisy, from ESPI to Vitrociset Belgium, I have always been very active. I had the chance to interact with experts from different background, from institutions, industry, academia and many many others, creating a solid network of relevant contacts in the sector. This is certainly one of the reasons encouraging Jean-Yves Legall, former President of the IAF and current President of CNES to propose me as a highly suitable candidate for the IAF Vice-Presidency, also because of my vast network among Decision Makers and Users Communities.

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

As Vice-President of IAF, I am in charge of 3 topics on which I am preparing a set of proposals to be submitted for discussions at the next Bureau.

User communities: with regard to the potential user communities I believe there is an avenue of possibilities that IAF in cooperation with relevant partners such as Eurisy needs to explore. My main idea would revolve around a "Road Show" of Space Service-providers where the diverse professional User-Communities will have the opportunity to make their "shopping" and match with different providers all gathered in the same place. This matchmaking event will be the first one with such a downstream focus !

Parliamentarians: in this respect I would suggest a series of meetings addressing the challenges faced by the leading Space Agencies in the world in developing, implementing, operating major space programmes. The final goal would be to support members of Parliaments to better understand the peculiarities and the benefits of such a complex matter as well as the opportunities and the benefits of the sector in order to provide them with the needed information to accompany their Ministers in the decisions to be taken for their Country and their Space Agency.

Ministerial relations: in this domain I would strengthen the position of IAF as major reference organization by organizing high-level meetings with the Ministers of the Countries hosting our events to ensure the right visibility.

How, from your point of view, can the voice of the next generation be heard better by their respective government? How can the IAF facilitate that?

In my opinion, young generations, to make their voice heard, need to make more politics. You could ask yourself what I mean by that? Make more politics to me means be more active in conveying messages to the right targets, would mean to gather appropriate communities, the identify the challenges and obstacles, involve experts, exchange, discuss and come up with organized ideas, with strategy and with clear, pragmatic and attainable objectives. IAF is the right platform to channel the inputs of young people. They could use this platform though the presence at meetings and events to deliver strong messages to challenge politicians, urging them for action!! In addition to me it is key for young professionals to find the right mentor, a person who would not only guide you through your professional path but also provide you with the right motivation to push everyday further your boundaries.

You have launched "Switch to Space" with the aim of connecting Master's students and Young professionals with space leaders. Tell us about it.

With YouSpace we have been in many Belgian Universities accompanied by 3 space leaders during 2 years to meet Student's in Sciences. They explained their academic path, their job aspirations and the reason why they feel passionate about space. It created a real enthusiasm among the students! It was quite surprising to acknowledge that the vast majority of those students, attending the last year of engineering curricula, never thought about working in the space sector and worse they ignored the numerous domains of activity in Space!!! So, what to do? Shall we take note of the situation or act? We choose to act! We decided to launch Switch to Space Initiative on the 8 th October 2018. Our goal is to provide an overarching overview of the numerous space domains and to give the opportunity to the students to network, talk with space experts, and possibly to establish a first contact for a job or internship in one of the leading space companies or organizations in Belgium. But not only, we want to help the students and young professionals to know who does what in the Belgian Space sector and to know better the untapped potential of their country before deciding to go studying abroad. The event was organized in the wonderful Palais d'Egmont in Brussels, it brought together 47 speakers, experts in space matters, distributed over 7 Topics: Political & amp; Legal Affairs/Life Sciences/Space Technologies/EO Applications & amp; Copernicus/Physical Sciences/ Prototyping & amp; Testing/ Galileo & amp; Satellite Communication. If you are interested all the presentations are still available for free download in the website of the Initiative. It was a great success with more than 600 people, of course most of them were Students!! Reason why we decide to launch a "Switch to space 2" to be held on the 5 th October 2020. You are already invited to join us!! One sentence for your vision for the IAF in the next 3 years? In the up-coming years, IAF shall become the largest forum for debating space-based services in the world and gathering decision makers in space matters!!





Image: © NASA

MARS 2020 Perseverance

Less than 100 days away from its lauch, the Mars 2020 Perseverance Rover is designed to better understand the geology of Mars and to search for signs of ancient existence. The mission will collect and store a collection soil samples that could be returned to Earth in the future. It will also test new technologies for possible robotic and human exploration of Mars. As per the article on the "space.com" online website, NASA has been working hard currently to get Perseverance to take shape. For example, on March 26, technicians finished installing the rover's parachute system. The fall would slow down the 2.260 lb. (1,025 kilograms) Perseverance from Mach 1.7 to just 200 mph (320 km/h) in the thin air of Mars on the day of landing, which will be

Feb. 18, 2021, no matter what, when the mission lifts off during this summer's window. Mach 1.7 is 1.7 times the speed of sound, which is about 767 mph, or 1,235 km/h, at sea level here on Earth. Its key objectives are the exploration of a geologically diverse landing site, the assessment of ancient habitability, the search for signs of ancient life, particularly in special rocks known to preserve signs of life over time, the collection of rock and soil samples that could be returned to Earth by a future NASA mission, and the demonstration of technology for future robotic and human exploration. Let us look at the key seven instruments used in this unique rover.

Mastcam-Z, an advanced camera system with panoramic and stereoscopic imaging capability with the ability to zoom. The instrument also will determine mineralogy of the Martian surface and assist with rover operations. The principal investigator is James Bell, Arizona State University in Tempe.

SuperCam, an instrument that can provide imaging, chemical composition analysis, and mineralogy at a distance. The principal investigator is Roger Wiens, Los Alamos National Laboratory, Los Alamos, New Mexico. This instrument also has a significant contribution from the CNES/IRAP, France.

Planetary Instrument for X-ray Lithochemistry (PIXL), an Xray fluorescence spectrometer and high-resolution imager to map the fine-scale elemental composition of materials. Scanning Habitable Environments with Raman & Luminescence for Organics and Chemicals (SHERLOC), a spectrometer that will provide fine-scale imaging and will be the first UV Raman spectrometer to fly to the surface of Mars and will provide complementary measurements with other instruments in the payload. SHERLOC includes a high-resolution color camera for microscopic imaging of Mars' surface. The principal investigator is Luther Beegle, JPL.

The Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE), a technology demonstration that will produce oxygen from Martian atmospheric carbon dioxide. MOXIE's technology could be used by future astronauts on Mars to burn rocket fuel for returning to Earth. The principal investigator is Michael Hecht, Massachusetts Institute of Technology, Cambridge, Massachusetts.

Mars Environmental Dynamics Analyzer (MEDA), a set of sensors that will provide measurements of temperature, wind speed and direction, pressure, relative humidity, and dust size and shape. The principal investigator is Jose Rodriguez-Manfredi, Centro de Astrobiología, Instituto Nacional de Tecnica Aeroespacial, Spain.

The Radar Imager for Mars' Subsurface Experiment (RIMFAX), a ground-penetrating radar that will provide centimeter-scale resolution of the geologic structure of the subsurface. The principal investigator is Svein-Erik Hamran, the Norwegian Defense Research Establishment, Norway

Image: © NASA

Ingenuity, the unique MARS helicopter that is now attached to perseverance, the chopper to be the first aircraft to fly on Mars. With the plaunch of NASA's Mars 2020 Perseverance Rover opening in 14 weeks, the final preparations for the spacecraft is in progress at the Kennedy Space Center in Florida. Over the past week, the assembly, testing and launch operations team has achieved major milestones, fueling the descent stage also known as the sky crane and installing the Mars Helicopter, which will be the first aircraft in history to attempt a power-controlled flight on another world.

During the weekend, 884 pounds (401 kilograms) of hydrazine monopropellent were loaded into the four fuel tanks of the descent stage. As the aeroshell containing the descent stage and rover reaches the Martian atmosphere on Feb. 18, 2021, the propellent will be pressurized by 120 feet (37 meters) of stainless steel and titanium tubing in eight Mars landing engines. The engines will slow down the spacecraft, which will travel approximately 180 mph (80 meters per second) at an altitude of 7,200 feet (2,200 meters) to 1,7 mph (0,75 meters per second) at an altitude of approximately 66 feet (20 meters) above the surface. Maintaining this rate of descent, the stage will then execute the maneuver of the sky crane: Nylon cords roll out to lower the rover 25 feet (7.6 meters) below the descent stage; when the spacecraft senses touchdown at Jezero Crater, the connecting cords are cut off and the descent stage flies off."

The last hundred days before any Mars launch is chock-full of significant milestones," said David Gruel, the Mars 2020 assembly, test and launch operations manager at JPL. ""Fueling the descent stage is a big step forward. While we will continue to monitor and assess its performance as we push forward with the launch preparations, it is now ready to fulfill its mission of putting Perseverance on the surface in Mars." The system that will deliver the Mars Helicopter to the surface of the Red Planet was integrated with Perseverance after the descent stage fueling. The helicopter, which weighs 4 pounds (1.8 kilograms) and has a 4-feet (1.2 meter) diameter propeller, is cocooned within the delivery system. In one of the first phases of the day-long cycle on 6 April, technicians and engineers made 34 electrical contacts between the rover, the helicopter and its delivery system on the rover's belly. After verifying the data and the commands could be sent and received, the delivery system was linked to the rover.

MARS

2020

Ingenuity

Eventually, the team verified that the helicopter could receive an electrical charge from the rover. Until being deployed on the surface of the Jezero Crater, the Mars Helicopter must rely on the rover for power. It will then generate its own electrical power through a solar panel located above its twin counter-rotating propellers. The helicopter will stay encapsulated on the rover's belly for year and will be deployed at the beginning of May — about two and a half months after Perseverance's landing. When the rover is about 330 feet (100 meters) away and the helicopter is conducting comprehensive system testing, a flight test campaign will be performed for up to 30 days.

The Perseverance Rover will look for signs of past microbial existence, characterize the atmosphere and geology of the planet, collect samples for the potential return to Earth, and pave the way for human exploration of the Red Planet.

The Mars 2020 Perseverance Rover mission is part of a broader initiative that involves missions to the Moon as a way of planning for human conquest of the Red Planet. Charged with returning astronauts to the Moon by 2024, NASA will establish a sustained human presence on and around the Moon by 2028 through the Artemis lunar exploration plans of NASA.









IPMC YP WORKSHOP

The IAC IPMC Young Professionals Workshop: a chance for you to shape your future. No matter if you are a young or a seasoned professional. If you are working in the space field, the odds are that you may be facing challenges due to generational and cultural gaps in your workplace. As a young professional you might want to solve your – actual or perceived – lack of experience, to boost your career, to find a mentor, to push your innovative ideas to top management and decision makers. As an experienced professional you might want to understand and nurture your younger collaborators, to hear fresh and uncensored opinions on the goods and bads of our sector, to change your organization so that it is more apt to grow and thrive in this VUCA world.

What if we told you that we have created a perfect platform to address all of these needs? We did, and it is called the IPMC Young Professionals Workshop (IPMC YP WS in short). The IPMC is an IAF committee dedicated to project and program management. Its goal is to promote individual, team, and organisational excellence in program management, systems engineering and engineering disciplines. It gathers space agencies, companies, universities and professional societies from all over the world. It sponsors several initiatives throughout the year, to offer training in program management, to share best practices, and to promote knowledge retention and capitalization. Among these initiatives is the Young Professionals Workshop. The YP WS program was initiated in 2012 to gather ideas and proposals from early career employees in the international space community and provide IAF member organisations with greater knowledge, insights, and perspectives that can help them better develop and empower the

next generation of space program employees. The YP Workshops are held annually. Each WS consists in approximately four months of teamwork via virtual meetings culminated by a one-day event held in connection with the annual International Astronautical Congress (IAC). Twenty-five to fifty young space professional delegates, nominated by IAF member organizations, are selected in the spring of each year to take part in the Workshop. The participants are then assigned to discussion groups that focus on a specific research topic. The teams work through virtual exchanges during the summer and then meet during the final event when they present the results of their deliberations to all the workshop participants, as well as to representatives of the IPMC member organizations. Following the workshop, a final written report is prepared and distributed to the IPMC as well as interested IAF member organizations.

We believe the workshop has something to offer for everybody.

As an early career employee, you will be able to experience the challenges of working on innovative topics as members of delocalized heterogeneous international teams. You will learn to extend the boundaries of your core competences while dealing with differences in professional background, culture and personality. You will get a chance to experiment project management in a demanding and time-constrained context and you will benefit from hands-on training and learning partnerships with expert mentors. As a seasoned professional, you can be involved at different levels. You can help define the research topics and create a focus on your areas of interest, you can attend the final presentation and learn about the findings and recommendations created by the workshop delegates, or you can even get involved as a mentor and contribute to the growth of the future space workforce.

The workshop covers a variety of research topics and it is not just addressing aspiring program managers. It has interesting opportunities for the entire spectrum of jobs involved in the space sector, from HR to scientists, from managers to engineers, from artists to physicians. To give you a taste of the themes encountered in previous editions, we researched topics as diverse as Space 4.0 and the Evolution of the Aerospace Sector, Knowledge Management Practices, and Earned Value Management. Candidate topics for this year's workshop are:

- Space Project Management in the world of mobile technology
- Attracting and managing diversity to create successful inclusive teams
- Engaging Young Professionals in large space programs
- Knowledge management for the Generation Z: how do Young Professionals choose to learn?
- Project Management practices for encouraging rapid prototyping and short fused product life cycle for space projects

Last but not least, successful candidates will also be able to experience the WD-YPP program throughout the IAC and network with peers from all continents. 2020 will mark the 10th anniversary for IPMC and the 9th occurrence of the YP WS: join us if you want to make your voice heard and help shape your future of the space sector. Make your managers aware of this opportunity and keep an eye on the official workshop webpage for the upcoming publication of the Call for Delegates. We look forward to having you onboard for our 2020 IPMC YP WS edition!

For more on the IPMC visit <u>http://www.iafastro.org/committees/international-projectprogramme-management-</u> <u>committee-ipmc/</u>

For more on the IPMC YP WS visit <u>http://www.iafastro.org/activities/education/young-professionals-workshops/</u>







The International Astronautical Congress IAC 2020 will be a virtual conference this year, branded as the "IAC 2020 - The CyberSpace Edition." Read the IAF President's letter on IAC 2020 - The CyberSpace Edition on page 3. For more details, go to IAF News on Pages 27-28.



@iafastro

@iafastro





FROM CAROL & SCOTT | CROSS CULTURAL COMMUNICATIONS & SKILL DEVELOPMENT



Scott Madry

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 Strasbourg for over 20 years. He has 30 years of experience in teaching and research and is interested in effective communications and presentation skills.

(madrys@email.unc.edu)



Carol Carnett

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. (ccar888@gmail.com)

Hello all, and welcome to the second of our series of briefs on how to master the IAC, where we will be making some practical suggestions on topics such as submitting your successful abstract, crafting your paper, make a great PowerPoint, and how to give a great presentation. Now that your abstract has been accepted (hooray!) you will need to start working on your paper, and that is what we will cover here. First of all, go to the IAF site

http://www.iafastro.org/wp-content/uploads/2019/04/IAC-2019_Instructions-for-Authors_04.04.2019.pdf, where you will find the IAF Style Guide on page 4 of the Instructions for Authors.

Follow the style guide instructions carefully. Use a two-column format, except for the title, author information, and abstract, and put your paper number first (e.g. IAC-19-F1.2.8). Use Times New Roman 10 point type only. Your paper must be written in English, and cannot be larger than 5 MB when uploaded as a .pdf, which is about 15 pages of text (IISL papers over 11 pages have to pay an additional fee). Graphics may add more, so be aware of the size of the final .pdf. It must be your own, original work, and cannot have been previously published, or currently be submitted for publication elsewhere. You must use the title that was submitted with your abstract, or get permission from your session chair to change it. You will also be required to fill out the copyright information before you can upload your paper.

Writing a good professional paper can be a challenge, especially if you do not have much experience. Many students and young professionals have never written their first professional paper, and it is a learned skill. Writing styles and formats vary widely depending on your community: a paper on astrodynamics or satellite telecommunications will be very differently written that a paper on space history, policy or egal topics. You should review previously published papers in your field in previous IACs to get a sense of the accepted writing style, tone, and structure. But whatever your field, your paper should clearly lay out the purpose, method, results, and conclusions of your work, in that order, and should indicate the substantive contribution of this work to the community. If you are not a native- English speaker, we recommend that find a native English speaker to read and copy edit your paper before you submit it. There are over 40,000 previously published IAC papers available for viewing at:

http://www.iafastro.org/publications/iac-papers/ so look at some examples and follow their structure and tone.

You must submit your finished paper to IAF, and it must be as a .pdf format document no larger than 5 MB. You have already used this website to submit your abstract, so you should still have your login and password. Don't wait until the last minute, as the system can become overwhelmed on submission day. And remember that you must submit a full paper or you cannot present at the IAC. No paper, no podium at the IAC!

Finally, remember that your paper will be read, and hopefully cited, by other space professionals around the world, so take care that you content is accurate, that it is your own work, and that you express your ideas clearly. It is always better to be concise, so drop unneeded words, and do not try to sound 'academic'. State clearly what you have done, how it was done, and most importantly why your results are significant and worthy of publication. It should be a standalone account of your original work.

We will be hosting a free webinar in the coming months where we will discuss this topic further and provide live answer to your questions. It will be posted later on our committee YouTube channel as well.

Because a "Cyberspace IAC" is planned for October 12-14, 2020, you may have the opportunity to present your paper in that virtual forum. Based upon the information that will be provided from the IAF Secretariat, we plan to focus the next brief in this series on how you can prepare, record, and submit your presentation for the cyberspace experience.

AN INSIGHT | EMIRATES SPACE PROGRAM (UAESE AND MBRSC)

EMIRATES SPACE PROGRAM

UAE Space Agency and

Mohammed Bin Rashid Space Centr

The UAE Space Agency is involved in the management, investment and promotion of a number of initiatives. Created in 2014, it is responsible for developing, fostering and regulating a sustainable and world-class space sector in the UAE. The Mohammed bin Rashid Space Centre, which is now hosting the International Astronautical Congress (IAC) 2021 after IAC 2020 became a virtual convening because of the COVID-19 pandemic, is working through four main areas to achieve the goals and objectives set for the growth of the space industry in the region: research and development of outer space, satellite manufacturing and systems development, Earth observation through satellite imagery, and ground station services to support other satellites. The first satellite, DubaiSat-1, was launched on 29 July 2009 from the Baikonur launch site in Kazakhstan, and since then the centre has been building on its capabilities in the manufacture of advanced technology satellites for better research and development. DubaiSat-2, the second satellite launched by the Mohammed bin Rashid Space Centre, provides electro-optical images with advanced image resolution technology. The design and manufacturing of DubaiSat-2 was carried out by Emirati engineers along with their Korean counterparts. The DubaiSat-2 project started shortly after the launch of DubaiSat-1, and the satellite was developed and launched in a much shorter period of time than the first satellite. KhalifaSat is the third satellite launched by the Mohammed bin Rashid Space Centre in 2018. This project represents the most technologically advanced satellite developed by MBRSC, yet made exclusively by Emirati engineers, starting a 5-year mission to deliver high-quality, detailed images of the Earth. The completion of the KhalifaSat design, the critical design review, was announced at the beginning of January 2016. All applications and systems inside the satellite have been completed and have been tested for different purposes. The KhalifaSat team is proud to have successfully launched the satellite into orbit. Nayif-1 is the first ever CubeSat built and manufactured by Emirati engineers, originally scheduled for launch in 2016, but delayed waiting for an suitable SpaceX launch vehicle to be planned. The satellite was launched on the Indian Space Research Organization PSLV-C37 launch vehicle in February 2017, which set the world record by launching 104 satellites, the highest number of satellites deployed by a single launcher. The Mohammed bin Rashid Space Centre promote space science and research in the region.



The UAE Space Agency is the official space agency of the UAE government responsible for developing the country's space industry. Created in 2014, it is responsible for developing, promoting and regulating a sustainable and world-class space sector in the UAE.

www.space.gov.ae



The Mohammed Bin Rashid Space Centre (MBRSC), is a Dubai government space organisation working on the UAE space program, which includes various space satellite projects, human spaceflight and the Emirates Mars Mission and to promote space science and research in the region.

www.mbrse.ae



The Emirate Mars Mission, Hope Mars Mission, was announced by Mohammed bin Rashid in July 2014. The goal is to send an unmanned probe to Mars by 2021. Seven months later, half a century to the year after the establishment of the United Arab Emirates, the probe is scheduled to arrive. The Emirate Mars Mission is the first space exploration mission ever to be carried out by the Arab World, and the Middle East is expected to move towards a new era of technological advancement. His Excellency Mohammed bin Rashid Al Maktoum named the probe of Mars as the 'Hope Probe' or 'Al-Amal' in Arabic, because it carries the hopes for scientific development in the region. The launch window for the Hope Probe will fall in July 2020, marking the point at which Earth and Mars will be aligned in their orbits around the Sun and closer to each other. The completion and launch of the Hope Probe at this time is important, as the next alignment will take place two years after 2020. His Excellency Mohammed bin Rashid Al Maktoum said that the Emirate Mars Mission sends three important messages to the world: "The first is for the world: that Arab civilization has once played a major role in contributing to human knowledge and will play that role again. The second is to our Arab brothers: that nothing is impossible and that we can contend with the greatest nations in the quest for knowledge. The third is for those who strive to reach the highest peaks: set no limits to your ambitions, and you can even reach space.



With the beginning of the UAE Astronaut Program at the end of 2017, a national effort to select four full-time astronauts to train and rotate in a long-term effort to carry out scientific research at the International Space Station. 95 candidates were selected from over 4.000 applicants. Following several assessments of astronaut selection process, a group of 39 were selected, who were subject to interviews and psychological assessments. Of the 18 candidates who have passed this process and have been interviewed by MBRSC and members of other organizations, nine final candidates have gone through the final stage of the evaluation. Of these, two astronauts were announced in September 2018 - Hazza Al Mansouri and Sultan Al Neyadi. Two of these astronauts were confirmed in September 2018-Hazza Al Mansouri and Sultan Al Nevadi. It was later announced that Al Mansouri would fly as a prime crew member, with Al Neyadi as his backup. It was launched on 25 September 2019 on board Soyuz MS-15. He returned on October 3.



The UAE's first astronaut was accompanied by Russian cosmonaut Oleg Skripochka and American astronaut Jessica Meir, both of whom would remain aboard the ISS for 204 days as part of Expedition 61/62. Hazza's successful completion of this space flight was only the first step in UAE's future space plans. According to Mohammad Bin Rashid Space Centre, the country is preparing future space visits and the next mission will soon be revealed. The Mars Hope Probe is the next major project for the UAE.

Mohammed bin Rashid Space Centre's strategy would concentrate on the establishment of specialized national cadres and their capabilities in the fields of space science, research, artificial intelligence, robotics and advanced space technologies. The aim of the UAE is to establish the first inhabitable human settlement in Mars by 2117. MBRSC has also opened application for an analogue Mars mission called Mars 2117, Analog missions are vital in preparing humans for future exploration of Mars and other planets. By simulating space-like conditions right here on Earth, analog missions play a significant role in spaceflight research. They enable space scientists to conduct experiments, develop countermeasures for space-hazards, and test new technologies that are designed for space.

- Information Source: UAESA/MBRSC/Wikipedia



Image: © redcross.org

"Work from Home" TIPS CORONAVIRUS COVID-19





Clementine Deecoopman SGAC Matteo Emanuelli SGAC

The on-going global pandemic is having tangible effects on the entire space sector with the bankruptcy of a number of companies, postponement of basically all conferences and congresses and suspension of many scheduled launches and activities. Space agencies, industry and universities have moved to telework, wherever possible. Working from home is indeed becoming the new normal as the situation continues to evolve dramatically.

The result of this forced change of work scenery has many aspects. On a technical level, employers had to run to adapt their IT systems to the new situation, allowing their employees to be connected in great numbers while maintaining the security standards necessary for the space sector.

Working from home, along in many cases with a forced quarantine/lockdown brings as well other challenges: wherever it might be a good environment to perform repetitive or solo tasks, it might hurt the creativity, which is on the contrary may be fueled by exchanging with colleagues on a regular basis. There is obviously no single recipe, but it is important to acknowledge a novel situation and work environment may lead to different outcomes. It is not uncommon to meet someone who is working full time and raising kids while finishing a PhD, volunteering for an organisation, and enjoying hobbies. However, with the global pandemic, you find your daily routine to be completely disturbed. As such, it is really important to maintain a healthy work-life balance. Here are a few tips that can help you:

Designate a "workplace" at home

The frontier between work and private life becomes thinner as nothing really marks the transition anymore. For instance, you no longer have to commute to work (if we consider that moving from the bedroom to the living room isn't commuting). A solution to this is to have a designated "workspace" at home as it can help



you to differentiate between "work" and "private life" moments.

Be flexible

At the beginning, it may take some time for you to adjust to a new routine and hence you should be flexible with your schedule and the schedule of your co-workers. Not everyone is an early bird, or morning-



person, and likewise not everyone's family situation is similar. You may have some familial commitment in the morning which prevents you from working then but allow you to give it more time in the evening.

Follow a daily schedule

It is important to set boundaries to yourself and to establish your daily schedule for meals, work, daily exercise, private calls and hobbies. Of course, the definition of your work day can be flexible depending on your tasks for the day but is necessary if you don't want to find yourself working 24/7. Do you even know what day it is? A Sunday can easily feel like a Monday, right? Allow yourself to enjoy the weekends as you would normally do.



Communicate

As trivial as it may seem, communication is definitely challenged by the situation. Whether you are having continuous calls with your colleagues or spending days without checking in, striking an efficient balance might be difficult and every team will need its own blueprint to come out successfully. It is however certain that a continuous flow of calls and meetings would disrupt



the workflow as would do colleagues continuously entering an office. Remember to dedicate some part of your working day to those tasks that require concentration and let your colleagues know about so you would go undisturbed.

Incorporate some normality

Psychological health of our colleagues should not be forgotten as well. The extreme situation we are all living in demands an increased awareness of the people we previously used to share office spaces for 8 hours or more a day. Thus, it would be good to keep regular informal meetings, taking the time to listen and have chats that do not necessarily need to be work-related but provide a glimpse of normal life.



Accept that you cannot do everything

More than ever, it is necessary to prioritize what is important and what is less important. It can be exhausting just looking at your checklist of tasks and realising everything that needs to be done. It seems no longer possible to multitask and even the smallest tasks can feel overwhelming. Remember that if you cannot do it all, this is completely normal and fine.



SHORT NOTE | COVID-19 TRANSMISSION AND INSECTS



Does small flyers spread/tranmit Covid-19?

Generally the fastest, minute and excellent biting flyers are the mosquitoes. Not every species of mosquito sucks blood from humans, and not every one of them transmits disease. They can identify carbon dioxide in human's breath, sweat, and different organic substances that we produce with the 70-plus forms of odors and chemicals through their detectors/sensors of its antennas. ^[1] As the mosquitoes could smell, Does it means mosquitoes will also get affected by corona virus? let's see. According to "Cameron Webb (NSW Health Pathology)" Mosquitoes can spread a variety of viruses, including dengue, yellow fever, chikungunya, Zika, Ross River viruses and malaria .Yet many other viruses, including HIV and Ebola, cannot be transmitted through mosquitoes. ^[2] The mosquitoes themselves are not contaminated. In fact, it is unlikely that a mosquito can pick up the virus when it attacks an infectious patient due to low proportions of HIV existing in in the biten blood. ^[3] For Ebola, even when scientists inject the virus into mosquitoes, till now there are No such evidences of viral growth was found in any of the tests. Hence the mosquitos are possibly not concerned as natural reservoirs of the Ebola virus.^[4] The new coronavirus is most commonly transmitted by droplets formed due to sneeze or cough of humans, and by touching infected surfaces if retouching to eyes/mouth/nose without sanitizing hands. It is extremely in evident in present scenario that a mosquito could pick up the virus by attacking an infected human, let alone passing it on. ^[5] although coronavirus has been found in blood samples from infected people, there's no evidence it can spread via mosquitoes. ^[6] Even if a mosquito did pick up a high enough dose of the virus in a blood meal, there is no live evidence the virus would be able to infect the mosquito itself. And if the mosquito isn't infected, it won't be able to transmit it to the next person it bites.



Mrs. Spoorthi Singh is an Assistant Professor in the department of Mechatronics Engineering, Manipal Institute of Technology, Manipal Academy of Higher Education, India

^[1] https://www.mentalfloss.com/article/589333/mosquito-facts

 ^[2] https://theconversation.com/can-mosquitoes-spread-coronavirus-134898
 [3] lqbal MM "Can we get AIDS from mosquito bites?" The Journal of the Louisiana State Medical Society : Official Organ of the Louisiana State Medical Society, 01 Aug 1999, 151(8):429-433 PMID: 10554479.

^[4] Michael J. Turell et al, "Short Report: Lack of Virus Replication in Arthropods after Intrathoracic Inoculation of Ebola Reston Virus" The American Journal of Tropical Medicine and Hygiene, Volume 55, Issue 1, 1 Jul 1996, p. 89 – 90, https://doi.org/ 10.4269/ajtmh.1996.55.89.

 ^[5] https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations
 [6] Wei Zhang et al, "Molecular and serological investigation of 2019- nCoV infected patients: implication of multiple shedding routes", Emerging Microbes & Compt. 10, 386-389, DOI: 10.1080/22221751.2020.1729071

SPACE ROBOTICS

Why do we send robots to space? Well, we can send robots to explore space without having to worry about their health. Of course, we want these beautifully designed robots to last. We need them to stick around long enough to investigate and give us information about their destinations. But even if a robotic mission fails, the humans involved in the mission remain secure. Sending a robot to space is also much cheaper than sending a human to space. Robots don't have to eat or sleep or go to the bathroom. They have been able to survive in space for many years and can be left out — no need for a return trip! Plus, robots can do a lot of things that humans can't do. Some can endure harsh environments, such as extreme temperatures or high levels of radiation. Robots can also be built to do things that would be too risky or impossible for astronauts.(NASA). Space robotics is an interesting field that has been developed for space exploration and space missions. Human participation in space exploration has its constraints related to human physical endurance. The long duration of flights and missions, along with the hostile atmosphere in space, restricts human involvement. Unmanned and autonomous missions combined with mission automation have become critical for successful exploration. Robots used in space have outstanding design features and feasible applications. The last quarter of the 20th century brought about rapid advances in space exploration and a strong demand for new technologies that would encourage and sustain these efforts. Space robotics is one of the most significant technologies for human exploration in outer space. There are basically four types of robots used in space: manipulators, mobile, humanoid and flying/floating robots. The cost of putting even one kilogram of payload on Earth's orbit is very high.Economic considerations allow robots to be lightweight structures. Space robots are made of lightweight materials that are flexible and prone to change shape, bending, shaking and vibration. Space-based robots have flexible links and joints. The alignment of robot endpoints with flexible connections and flexible joints is a daunting challenge. Control process algorithms are complex and difficult to implement in real time. They also need powerful processors with large processing memory. These processors and other instruments must be approved for use in space. This equipment may or may not be suitable for use in space applications. Space manipulators have versatile effects in links and joints. The biggest concern with robotic manipulators is the placement of its endpoint. Link and joint flexibility may cause bending and vibration that would cause instability in the control systems. Control techniques built for flexible robots are very complex and difficult to implement in real time. There are many robotic manipulators that have been or are being used in space. However, three of them are of special significance due to their size and sophistication of design. They are the Remote Manipulator System (RMS) used on board the Space Shuttle, the Space Station Remote Manipulator System (SSRMS) and the Special Purpose Dextrous Manipulator (SPDM).



Missions and robots have successfully flown on Earth's orbit, Moon, Mars, and small bodies since 2017. In the context of orbital flights, robotic arms have been the primary tool for extended mobility. In the planetary scenario, most of the current missions used either wheeled rovers or stationary landers, but were fitted with a robotic arm, a drill or a sampler to achieve mobility. Many of the recent missions, particularly for planetary exploration, have accomplished remarkable science; for example, much of what we know about the Moon and Mars has been the direct result of robotic in-situ exploration. NASA has been at the frontier of Mars science through a series of successful planetary rover missions, such as Mars Pathfinder (MPF), Mars Exploration Rovers (MERs) and Mars Science Laboratory (MSL). The instrumentation borne by the NASA Mars rovers has increased considerably over time. The MPF rover Sojourner was a relatively small, life-limited mobile robot, but its main findings in geology (i.e., the likelihood of previous water on Mars, the magnetic properties of Martian soil, and the current Mars climate) rewrote our understanding of Mars. The two similar MERs were much larger and could therefore hold a much more powerful payload of research, including improved remote sensing, and more sophisticated robotic arm carrying instruments for close-in / surface measurement, including the Rock Abrasion Tool, the Microscopic Imager, the Alpha Proton X-Ray Spectrometer, and the Mossbauer Spectrometer.



The rovers also had substantially more advanced mobility and navigation capabilities, allowing the Opportunity rover to cover more than 44 km in more than 4700 sols (i.e. Martian days) as of 2017. The MER rovers have made even more impressive scientific advances in the fields of geology, atmospheric science, and much more. The MSL rover Curiosity is the largest of the three rover missions and is more capable, with the aid of next-generation instruments, of studying geology, the atmosphere, environmental conditions and emerging biosignatures. From a robotic point of view, Curiosity has a range of instruments that use the robotic arm to take close-up measurements, namely the Mars Hand Lens Imager, the Alpha Particle X-ray Spectrometer, and sample acquisition Another notable project is the Japanese analysis. Hayabusa robotic mission, which researched and tested the near-earth asteroid Itokawa in 2005 and returned these samples to Earth in 2010. The Hayabusa Mission received considerable attention to specific issues in Itokawa Science and findings from the returned sample. As an alternative data point, the Rosetta mission of the European Space Agency (ESA) made an extremely bold attempt to control a comet nucleus landing. The Rosetta lander, Philae, had a range of remote sensing and in situ instrumentation for compositional / gas analysis (e.g., Cometary Sampling and Composition and Ptolemy), drilling and sample retrieval (i.e., SD2), and surface measurement (i.e., Surface Electrical Sounding and Acoustic Monitoring Experiment).

Yeah, yeah! They are also called humanoid robots. There are certain things that could be better performed by a robot that acts more like a human being. For example, we would like a humanoid robot to help prepare for a potential human settlement on Mars. With these tasks in mind, NASA's Johnson Space Center has developed a robot called R5 or Valkyrie.



The next US rover to Mars, March 2020, shares a substantial heritage with the MSL rover, but brings entirely new instruments. The project will use the Skycrane deployment system , which uses a rocket-powered hover carrier to lower the rover to the surface of Mars with a tether.

Most current, successfully flown space robots are called robotic agents acting as human proxies in space. Future space missions with increasingly demanding objectives would need higher levels of autonomy, heading towards robotic explorers and robotic assistants.

ExoMars is currently the only European-funded project to make extensive use of robotics in the form of an autonomous rover, an automated exobiology laboratory and a robotic drilling system; it is to be launched in 2020 to complement the ExoMars Phase 1 launched in March 2016. Data from the novel group of instruments on the ExoMars rover will help to ensure effective visual and spectral characterization of the surface of Mars.

ESA-Roscosmos' Phobos sample return is another robotic project in the PHOOTPRINT analysis aimed at the return of surface samples from Phobos (Mars' Moon). The mission will use robotic elements to explore a low-gravity environment.

Before mankind sets its foot on Mars, bees are more likely to do so, or at least their robotic version. Biorobots machines that mimic the working of biological organisms have entered space exploration with Marsbees, NASA's mission to explore all corners of the red planet, including those where their rovers can not penetrate. Whether walking, tumbling, flying or rolling, robots have an important part to play in space exploration !

References

- 1. https://www.nasa.gov 2. https://www.esa.int
- 3. https://www.jaxa.jp
- https://www.wtec.org/robotics/report/03-Space.pdf.
 https://www.wtec.org/robotics/report/03-Space.pdf.
 https://www.researchgate.net/publication/331385067_Space_Robotics_and_its_Challenges.
 Yang Gao1 and Steve Chien, " Review on space robotics: Toward top-level science through space exploration", Science Robotics Vol. 2, Issue 7, eaan5074, DOI: 10.1126/scirobotics.aan5074.

IAF WD/YPP Committee's Member of the Month **YP Monthly Newsblast**

Are you a young professional? Are you a member of the IAF WD/YPP Commitee You can be nominated as IAF WD/YPP Committee Member of the Month

- Send an email to iaf.wdypp@gmail.com, nominating yourself or a peer, please write to us:
- Nominator's first name, last name and affiliation;
- Nominee's first name, last name, affiliation;
- Up to 100 words to explain why nominee should be the member of the month;

ASTRONAUT CHRISTINA KOCH SPEAKS ABOUT LONG TERM ISOLATION

In an interview given to Loren Grush of the verge.com, she speaks about making history in space and about how to survive long term isolation. Christina Koch returned back to Earth after making history during a nearly year-long stay on board the International Space Station. She had just broken the record for longest continuous spaceflight by a woman, and while she was up there, she performed the first allfemale spacewalk in history with her friend and crewmate Jessica Meir. She said she is so excited about the Artemis mission. It will be an incredible opportunity to lead on a global scale, to apply technologies to go on even deeper space missions like going to Mars and answering some of the biggest philosophical questions of our time - about are we alone?

Full interview of Chrostina Kock can be accessed here: https://www.theverge.com/21250427/nasa-astronautchristina-koch-international-space-station-all-femalespacewalk-isolation



- Source: theverge.com

Minoo Rathnasabapathy

Former Executive Director, Space Generation Advisory Council (SGAC) IAF Vice President for Education and Workforce Development



"I am a Research Engineer within the Space Enabled Research Group at the Massachusetts Institute of Technology (MIT). In this role, I focus on 'sustainability' in two distinct ways; firstly, coordinating projects in collaboration with international development organisations, national governments and entrepreneurial companies to apply space technology in support of the United Nations Sustainable Development Goals. Secondly, I work on the design and development of the Space Sustainability Rating (SSR), a novel incentive for satellite manufactures and operators to consider the long-term sustainability of the space environment. I earned my PhD in Aerospace Engineering from RMIT University (Australia), researching the impact dynamics of novel materials used in aerospace structures. My previous roles include Executive Director of the Space Generation Advisory Council (SGAC), and Aerospace Engineer at MT Aerospace (Germany). I currently serve the Vice President for Education and Workforce Development on the Bureau of the International Astronautical Federation (IAF), member of the World Economic Forum Global Future Council on Space Technology, and am an advisory board member to Via Satellite, and the OnexOne Conscious Initiative Program."

ALASTRONAUTICAL CO

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

I was first introduced to the IAF through the inaugural Emerging Space Leaders Award (previously called the IAF Youth Grant) in 2009, where I was selected to join the International Astronautical Congress in Daejeon, South Korea. Over the past decade, I have been actively involved in the IAF through a number of IAF Committees, presenting scientific papers, chairing and moderating IAC sessions, as well as coordinating the Next Generation Plenary in 2018 and 2019. I was a recipient of the IAF Young Space Leaders Award in 2017, and was elected to the IAF Bureau in 2019.

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

The "3G" diversity initiative – implemented by Past IAF President Le Gall – focused on geography, generation and gender, was shown to be very successful. Under this initiative, there was an increase in the number of IAF scholarships and awards for students and Young Professionals (YPs), and was further reflected in the increase of students and YPs attending the IAC (on average, students and YPs made up 30% of IAC delegates). Building upon the successes of the "3G" diversity initiative, my top three priorities are the following:

- Increase membership and engagement of students and YPs in IAF Technical Committees

The number of students and YPs actively involved in IAF committees does not currently reflect the growing number of this demographic in IAC attendance, abstract submissions or presentations at technical sessions. In a multigenerational sector, it is important that the next generation feel like they 'have a place at the table'. Within just a few years, this up and coming group will represent the largest demographic within the space sector, and it is therefore crucial that students and YPs have an opportunity to become actively engaged in IAF committees, and help to shape the future of the IAF.

- Increase opportunities for participation of students and YPs from emerging space nations

In close collaboration with Dr Val Munsami, VP for Developing Countries and Emerging Nations on the IAF Bureau, it is important to leverage existing initiatives such as the Global Technical Sessions and events such as the Global Conference on Space for Emerging Countries (GLEC). The statistics from IAC2019 showed that delegates represented 2% from South America, 1% from Africa, 2% from the Middle East and 3% from Oceania. In line with President Ehrenfreund's 'IAF Globalization Agenda 20192022', it essential that we act now to provide new pathways of engagement for students and YPs from these currently under- represented regions.

- Advance career-development initiatives and highlight IAF trajectories

For a majority of us, education and professional development does not stop when we turn 36 years old. While my VP portfolio primarily focuses on students and YPs (35 years old and under), it is important to implement activities and initiatives directed at early- to mid-career professionals who seek to upskill, broaden their network, and advance in their respective careers. It is this demographic that will go on to chair IAC technical sessions, organise events on behalf of the IAF, and represent their agency organisation/company as IAF member organisation. By building upon existing programs, the Federation is poised to take leadership role in increasing careerа development initiatives that aim to not only attract the next generation of space professionals, but importantly, ensure their retention in our industry, and the IAF in the long-term.

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 leverage the activities or WD-YPP and the other young professionals and students organisations like SGAC, ISU, AIAA etc. in this effort?

Implementing the three priority areas mentioned above requires a team effort. I will work closely with IAF President Ehrenfreund, IAF Executive Director, Dr Christian Feichtinger, the IAF Secretariat, and Next Generation Coordination Committee (consisting of representatives from a



Image: © IAF

number of IAF Committees including WD-YPP, SEOC, SUAC, IPPC as well as SGAC, Future Space Leaders Foundation, and ISU). A number of actions have already been implemented, and others will be further developed. An example of some of these actions are:

-Conduct an annual survey of the IAF Technical Committees to assess the current number of students and YPs on their respective committees. This will allow us to emphasize the importance of generationally- diverse committees, and identify potential barriers of involvement

- Assess IAF current programs and initiatives directed at students and YPs to see if/how their scope can be broadened to reach currently under-represented regions

- Work closely with IAF members to co-host/coorganise professional development initiatives

- Capture, quantify and highlight 'IAF trajectory stories' from alum of IAF Emerging Space Leaders, IAF Young Space Leaders, IMPC participants and IAF committee members How do you plan to have more representation of the next generation in the IAC (as speakers, moderators etc.) and within the different IAF Committees?

In my humble opinion, there is a fine line between 'representation' and 'tokenization'. I agree that we need more representation in our industry, however, none of us want to be invited to a panel just so the 'next gen' box can be ticked. While our industry is evolving to be more inclusive of gender, generation and geography, it is up to us to be proactive – to reach out to chairs of IAF committees, approach the chair of the technical session you presented at, or ask those really tough questions to a panel – emphasizing our unique perspectives and eagerness to be participants, not spectators in the discussions that shape our industry.

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

Building the leadership pipeline by engaging the next generation of space professionals to support the sustainability and scalability of the IAF.



April 2020

Part of YP Newsletter

Volume 2, Issue 1



May 7, 2020

- Source: NASA

MICROBIAL FINGERPRINT ON STATION

NASA has outlined a recent study that finds precise microbial 'fingerprints' left behind by astronauts at the International Space Station. According to the study, microorganisms transferred from astronaut bodies to the Space environment have held a near resemblance to their source, and scientists have been able to identify which part of the astronaut 's body they came from. NASA explained that researchers were able to use microbes to determine when an astronaut had arrived on the ISS and when they had departed back for Earth. Using microbiome samples collected from an astronaut who spent time at the ISS, researchers found that the surface samples taken from various locations in the ISS most closely resembled those taken from the skin of the astronaut.

April 17, 2020

CREW DRAGON - 2 DEMO MISSION

SpaceX and NASA are targeting May 27 for the Falcon 9 launch of Crew Dragon second demonstration mission (Demo-2) from historic Launch Complex 39A at NASA's Kennedy Space Center in Florida as part of NASA's Commercial Crew Program. NASA astronauts Bob Behnken and Doug Hurley will be the first two NASA astronauts to fly onboard the Dragon spacecraft as part of the Demo-2 mission to and from the International Space Station, which will return human spaceflight to the United States since the Space Shuttle was retired in 2011.

SpaceX has achieved a range of crucial milestones for NASA's Commercial Crew Program in preparation for Demo-2. In March 2019, SpaceX completed an end-to - end test flight of Crew Dragon without NASA astronauts on board, making Dragon the first American spacecraft to dock autonomously with the International Space Station and safely return to Earth.

- Source: Space X



May 5, 2020

GENERAL YEVGENY MIKRIN PASSES AWAY

Yevgeny Mikrin, Rocket and Space Corporation Energia Designer General – First Deputy Director General, Member of the Russian Academy of Sciences, Professor, Doctor of Technical Sciences, Soviet and Russian scientist in mechanics and control processes passes away. He was 65. His passing is an irreparable loss for Russia's rocket and space industry, as well as the country's science.

Yevgeny Mikrin was an outstanding scientist, designer and organizer who immensely contributed into developing the crewed and cargo spacecraft control system development, multimodule space complexes, automatic spacecraft of various purposes. Since 1981 he has worked for Energia.

April 2020

Part of YP Newsletter

Volume 2, Issue 1



May 5, 2020

MOU BETWEEN ISRO AND UT TEXAS ABOUT SSA

The Memorandum of Understanding was signed by Mr. R. Umamaheswaran, Scientific Secretary on behalf of ISRO, and Mr. Mark Featherston, Director of Sponsored Projects, on behalf of the University of Texas, Austin, USA. The MoU was signed in the presence of Dr.Moriba Jah, Professor in-charge of SSA collaborations, University of Texas, Austin, Mr.Harikrishnan, ISRO Technical Liaison Officer, Indian Embassy, Washington and Mr.Deva Arul Daniel, Associate Director, DSSAM, ISRO Headquarters, Bengaluru, India. This MoU will pave the way for collaborations between the agencies in mutually beneficial projects related to R&D in SSA activities and observational facilities for SSA.

-Source: ISRO



April 17, 2020

ISS EXPEDITION - 63 HEROES

Christopher John "Chris" Cassidy (born January 1970) is a NASA astronaut. Chris Cassidy achieved the rank of captain in the U.S. Navy. He was the Chief of the Astronaut Office at NASA from July 2015 until June 2017. He is 500th US astronaut, 322nd astronaut of the world and has performed two spaceflights totaling 181 days and 23 hours, conducted six spacewalks lasting 31 hours and 14 minutes. Anatoli Alekseyevich Ivanishin (born January 1969) is a Russian astronaut. His first visit to space was to the International Space Station on board the Soyuz TMA-22 spacecraft as an Expedition 29 and 30 crew member, launching in November 2011 and returning in April 2012. Ivanishin was the Commander of the International Space Station for Expedition 49. He is 112nd Russian cosmonaut, 522nd cosmonaut of the world. Ivan Viktorovitch Vagner (born July 1985) is a Russian engineer and cosmonaut who was selected in October 2010. He graduated from the Baltic State Technical University in 2008, before working as an engineer for RKK Energia. This is his maiden spaceflight beginning as a Flight Engineer on Soyuz MS-16 and Expedition 62/63.

- Source: Roscosmos/wikipedia



May 7, 2020

PERSEVERANCE PUT IN LAUNCH CONFIGURATION

Engineers working on NASA's Perseverance rover mission at the Kennedy Space Center in Florida have begun the process of placing the Mars-bound rover and other spacecraft components into the configuration they'll be in as they ride on top of the United Launch Alliance Atlas V rocket. The launch period for the mission opens on July 17 - just 70 days from now. Called "vehicle stacking," the process began on April 23 with the integration of the rover and its rocket-powered descent stage. One of the first steps in the daylong operation was to lift the descent stage onto Perseverance so that engineers could connect the two with flight-separation bolts.

April 2020

Part of YP Newsletter

Volume 2, Issue 1



April 24, 2020

CHINA'S MARS MISSION NAMED 'TIANWEN-1'

The first Mars mission in China, scheduled to take place in the coming months, was named Tianwen 1. According to CNSA, the country's first Martian probe will conduct scientific investigations about the Martian soil, geological structure, environment. atmosphere as well as water. The robotic probe will consist of three parts – the orbiter, the lander and the rover. The rover will have six wheels and four solar panels, and will carry 13 scientific instruments. It will be more than 200 kilograms in weight and will work about three months on the planet, said Sun Zezhou, the probe's chief designer at the China Academy of Space Technology. Ye Peijian, a leading scientist in deep-space exploration at the academy, said the probe will land on the Martian surface before July 2021.



May 5, 2020

ESA EDUCATION NEW WEBSITE FOR KIDS

ESA Education is launching *Expedition: Home*, a one-stop website for kids and parents to do fun space-based activities and keep learning while at home. The minisite features plenty of activities for three age ranges: 3-6, 6-12 and 12-18 years old. With *Expedition: Home*, you and your family will be able to:

- Try our special selection of hands-on space activities: Build, Experiment, Move, Watch, Draw & Colour, Program, and Explore.
- Have fun with Paxi, our alien mascot, with interactive media and minilessons for the younger explorers.
- Meet an ESA expert each week and learn about their fascinating work.
- Participate in the special home edition of our school projects, running from 12 May to 4 September.
- Participate in our Weekly Space Challenges, running from 12 May to 4 September.
- And much more

- Source: CNSA/Xinhua

-Source: ESA



May 6, 2020

TOM CRUISE MOVIE ABOARD ISS

Get ready for the concept of a film that's out of this planet. Actor Tom Cruise and Elon Musk's SpaceX are partnering with NASA to film an action movie in outer space. Representatives for Cruise and SpaceX did not respond immediately to requests for feedback, but NASA Administrator Jim Bridenstine reported the news in a tweet below.

"NASA is excited to work with Tom Cruise on a film aboard the space station!" he wrote. "We need popular media to inspire a new generation of engineers and scientists to make NASA ambitious plans a reality."

April 2020

Part of YP Newsletter

Volume 2, Issue 1



May 7, 2020

STEVE CARELL GETS TIP FROM GEN. J RAYMOND

Gen. Jay Raymond is the US Space Force's chief of space operations, the real world equivalent of Carell's character Mark Naird, who is a more reluctant leader of the fictionalized military branch. During a teleconference hosted by the Space Foundation on Wednesday, Raymond was asked what he thought of the trailer for the show.

"The one piece of advice I'd give Steve Carell is to get a haircut," Raymond joked. "He's looking a little too shaggy if he wants to play the Space Force chief."He went on to say he was hoping that Bruce Willis might play his role in the show. "But Steve Carell is a great actor, and I love this show," Raymond said. "We're looking forward to watching."

- Source: cnet.com/space.com



May 8, 2020

ASTRONAUT URINE FOR MOON BASE

From human waste to superplasticiser, astronaut urine could become a useful resource for making a robust type of concrete on the Moon. A recent European study sponsored by ESA showed that urea, the main organic compound found in our urine, would make the mixture for lunar concrete more malleable before hardening into a final, sturdy shape for future lunar habitats. Researchers found that adding urea to the lunar geopolymer mixture, a construction material similar to concrete, worked better than other common plasticisers, such as naphthalene or polycarboxylate to reduce the need for water.

"The science community is particularly impressed by the high strength of this new recipe compared to other materials, but also attracted by the fact that we could use what's already on the Moon," says Marlies Arnhof, initiator and co-author of the study from ESA's Advanced Concepts Team.

- Source: ESA



April 30, 2020

DEPLOYMENT OF FIRST GUATEMALA SATELLITE

On April 29th, 2020, the CubeSat developed by a team from the Universidad del Valle de Guatemala was successfully deployed from the Japanese Experiment Module "Kibo" of the International Space Station. This CubeSat, named "Quetzal-1" was selected as the winner of the Second Round of KiboCUBE programme. The live streaming of the deployment was broadcasted online, and many people in Guatemala watched the successful deployment of their first national satellite through live streaming. uetzal-1 was developed as Guatemala's first satellite, and the Universidad del Valle de Guatemala will operate the CubeSat after its deployment from "Kibo." The knowledges earned from the observation data of Quetzal-1 will be applied in Guatemala's future remote sensing technology.

Dear IAF Community,

Following the growing escalation of the Covid-19 outbreak around the world, the IAF is saddened to inform you that the International Astronautical Congress - IAC in Dubai will not be taking place this year, but will be postponed. We are in the process of re-assessing the overall schedule of IACs and will inform you within the coming weeks about the new dates. As a consequence, the Call for Applications to Host the IAC in 2023 is suspended and a new Call for Hosting IAC 2024 will be opened in November 2020. The health and safety of our community is of utmost importance to IAF. This is a very challenging time for everyone and we appreciate your understanding and support. Also, the Global Space Exploration Conference - GLEX 2020 in St. Petersburg, and the Global Space Conference on Climate Change - GLOC 2021 in Oslo will be postponed by a year to 2021 and 2022 respectively. New dates will be communicated in the coming months. Having worked so intensively with our International Programme Committees, volunteers, speakers, authors, sponsors, exhibitors, and partners preparing these events over the past years, we are genuinely disappointed to be forced to postpone, and we would like to thank all our partners for their contributions, support and strong engagement. The IAF will

continue to serve our community with manifold events and activities in the future and live up to our motto "Connecting @II Space People", even if only virtually during these challenging times. As the past IAF Virtual Spring Meetings have been reminding us, great things happen when the community comes together and connects at the IAF. #StaySafe!

Kind regards,

PACEM HOMINUMO

NEWS

IAF Secretariat



PROGRESS

ANNOUNCING THE WINNERS OF THE IAF ONLINE COMPETITION FOR YOUNG INFLUENCERS **#IAFEXPLORERS**



@AstronautAbby © 6 9



@Thearabianstargazer 6



@astro_giulia 1



@MirandaJaMor Ø @MirandaLunaDeUrano You



@Pinkrocketship 0

PACEM HOMINUMOUR PROGRESS

NEWS



IAC 2020 – The CyberSpace Edition

Dear IAF Community,

Since its first edition in 1950, the IAC has been THE place for all space people to come together and discuss about the latest developments in space. In these challenging times, when physical meetings are near-impossible, the Federation, more than ever, is determined to play its unifying role for the space community. And this is why we have decided to organize the 71st International Astronautical Congress, IAC 2020, as a Cyberspace Edition and to offer it without registration fee, free of charge for a global community.

This will allow us to also reach out to new communities and stakeholders that would normally not have the means and/or time to physically travel to an IAC. The theme of the IAC 2020 – The CyberSpace Edition will be "IAF Connecting @II Space People": virtually and for free, we will embrace resilience by being connected together.

OVERALL STRUCTURE AND CONGRESS AT A GLANCE

The IAC 2020 – The Cyberspace Edition's structure and programme will be leaner and simpler than a regular IAC in line with its virtual format. The two and half days of the IAC 2020 will be revolving around specific themes:

- Monday Opening/Agency Day
- Tuesday Industry Day
- Wednesday Diversity/Outreach Day

For congress at a glance see next page no. 27. The programme is being consolidated these days, more info will be communicated in the following weeks.

For the time being, please note that authors whose abstracts have been selected by the IPC during the virtual IAF Spring Meetings in March will be asked to submit a full manuscript with a presentation and a recorded video file. All the materials that will be prepared and submitted for the Technical Programme including accepted abstracts, papers, presentations and videos will be published in the proceedings of the 71st IAC and made available to the participants with a password-restricted access.

We are extremely excited about this new chapter of the International Astronautical Congress and we look forward to build this first CyberSpace Edition with the support of you all. We are in this together!

Feel free to contact us should you have any questions:

On the Technical Programme: support@iafastro.org On Media Related issues: media@iafastro.org On the IAC 2020: Info@iafastro.org

Warmest regards,

IAF Secretariat

Hosted By







Hosted By









Clementine Deecoopman

Executive Director

For the past 20 years, SGAC has been representing students and young professionals passionate about space around the world and now more than ever we want to make sure to keep our community united.

SGAC's activities are now significantly impacted by the COVID-19 as most of our events are being cancelled or postponed and with them the scholarships, the promotional efforts, and the collaboration with our partners and sponsors. While this is only for a certain period of time, SGAC needs to seek solutions to maintain its community alive.

Hence, a call for an Action Team has been launched and more than 30 volunteers from 19 countries around the world joined to help our organisation to continue engaging and inspiring our network during these challenging times. As we represent youth passionate about space around the world, we need to be creative in gathering our members virtually, through webinars, workshops and competitions online, engaging communications campaigns and much more.

SGAC has powerful resources to rely on, thanks to our amazing network of volunteers all around the world, an active alumni community of experienced leaders in space, and continuous partners who have been supporting us over the years. We have worked tirelessly over the last couple of weeks to be creative in gathering our members virtually.

Initiatives stemming from this Action Team include:

- 1. We have coordinated the #SGACStaysAtHome Resources Database;
- 2. Our Project Groups are organising numerous webinars highly attended by our members;
- 3. SGAC sent a message of hope to our community through this amazing video;
- 4. We are engaging with the SGAC Alumni through #AskMeAnything coffee hours.

SGAC traditionally hosts events around the world to bring our community together, and in light on the current situation, we have postponed all SGAC in-person events. In addition, following the growing escalation of the Covid-19 outbreak around the world, the IAF has also announced that the International Astronautical Congress (IAC) in Dubai will be postponed in 2021 but that a new online event will be taking place this year: IAC 2020-The CyberSpace Edition.

SGAC is a long-standing partner of the IAF, and since the Space Generation Congress (SGC) runs in conjunction with the IAC, the SGC in Dubai will be held next year in conjunction with the IAC 2021 from 21st to 23rd October 2021. We are currently working actively on an alternative to this year's Space Generation Congress with more information to follow over the coming weeks.

Best Regards

Clementine Decoopman

Executive Director Space Generation Advisory Council (SGAC), Vienna



SGAC welcomes a new Co-Chair and a Deputy Executive Director

We have exciting news! We warmly welcome to the team our new SGAC Co-Chair, Harriet Brettle and our new SGAC Deputy Executive Director, Davide Petrillo!

We are happy to announce that Harriet Brettle will be the new Co-Chairperson of the Space Generation Advisory Council! She will be working alongside the Chair, Arnau Pons (Spain).



Harrier Brettle SGAC Co-chair

Harriet Brettle is the Head of Business Analysis at Astroscale where she is working to develop a commercial solution to the threat of space debris. She has been an active member of the Space Generation Advisory Council (SGAC) – since 2016, serving as executive secretary, strategic partnerships coordinator and most recently as programming lead for the 2019 Space Generation Congress. Harriet is a co-founder of the London Space Network, organising monthly networking events to strengthen the UK space community.

She has a master's in planetary science at the California Institute of Technology. Prior to Caltech, Harriet worked in finance at the Bank of England and the Federal Reserve Bank of New York, undertaking risk analysis of global financial institutions. Harriet has a keen interest in public engagement with space science, interactions between different fields relevant to space exploration, and the future of the new space economy. After a very thorough selection process that lasted two months, the Selection Committee has chosen Davide Petrillo to become the Deputy Executive Director (DED) of SGAC!



Davide has a M.Sc. in Aerospace Engineering from the University of Padova (Italy). His professional experience brought him to London (UK) as a Business Manager for Alten Ltd and previously in Milano (Italy) as a Business Analyst for Accenture, global management consulting company that provides strategy, consulting, technology and operations services. Previously, he was the Team Leader of FELDs Experiment selected by the European Space Agency (ESA) for the Drop Your Thesis! 2014 programme. FELDs tested a tethered electromagnetic soft docking technology in microgravity conditions at the Drop Tower of the Centre of Applied Space Technology and Microgravity (ZARM) in Bremen, Germany.

Davide Petrillo Dy. Executive Director

In 2015, he won the "Hans Von Muldau Team Award" for the best team project that took place in Jerusalem at the 66th International Astronautical Congress (IAC). Davide joined SGAC in 2016 and has been appointed as part of the 3rd E- SGW organizing team, the SGC 2018 organizing team specifically focused on the organization and management of the Special Track "Bridging the Space Divide" Working Group, Space Generation Congress 2019 Deputy Manager (Washington D.C., USA) and Space Generation Congress 2020 Manager (Dubai, UAE).



Connecting @ll Space People

100 Avenue De Suffren 75015 Paris France

Tel : +33 1 45 67 42 60 Fax: +33 1 42 73 21 20

Next Issue: August 2020



www.iafastro.org info@iafastro.org

