



NEWSLETTER

Volume 2, Issue 2

August 2020

SPACEX

Ambitious
explorations



August 2020, Volume 2, Issue 2

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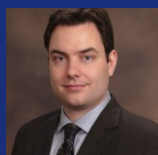
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Message

Dear friends,

I hope you are all looking forward to this year's IAC - The Cyberspace Edition. We are working hard on delivering a young professionals program you can all enjoy. This year it will of course look different than in previous years but we are still trying to make it as informative and fun as usual for our YP's. Nonetheless, we hope to see you all in person again at next year's IAC in Dubai.

While our whole committee is preparing for the IAC, our communications team has also worked hard on the newsletter you are currently reading. It contains a great mix of different articles and news from different parts of the space industry. While you enjoy this newsletter, feel free to share your feedback using the hashtag #wdypp.

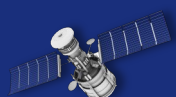
See you soon!

Patrick Hambloch

Chair, IAF WD/YPP Committee

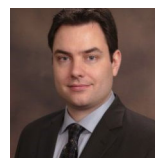
YP Newsletter is an official information document from IAF-WD/YPP committee.

This is volume 2, Issue 2



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



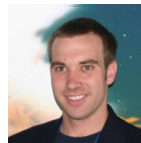
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MESSAGE



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





Andreas Lindenthal

Head of Business Operations Space Systems
Airbus Defence and Space

Please introduce yourself to our readers.

I am a “space guy” since my early days of spaceship Enterprise. I have studied Space Engineering in Berlin and have worked during my entire career in space business, meanwhile since 33 years. I am 58 years old and have two daughters.

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

I have been engaged in associations for space engineering already during my study times, e.g. with the German DGLR. Due to my interest and motivation I could take management positions in the space industry which immediately brought me into aspects of diversity, international cooperation and education, ISU activities, promotion of space activities worldwide. IAF and the

extremely valuable IAC has always been platforms for activities in this direction.

You have been through many leadership roles in your career in the space business but how did your career start? What did you want to be when you finished your studies? Was your brilliant career always part of your development plan?

During my study in Berlin and very much supported by my former professor who was a former NASA manager, I could very much focus of systems engineering and project management. The long term destination has always been kept in the focus: managing space programs, industry, institutions into the next stages of spaceflight adventures. Thanks to the substantial support and guidance I got from Airbus Space Group during the years, I could continuously develop in this direction.

How was the moment or turn in your career from being an employer of a company to managerial and executive positions? Did you have any mentor or sponsor at the time?

Doing general management was my intention and ambition already when I left university. I was then pretty difficult to explain to your peers and managers that you want to be a project manager or line manager soon. However, I selected my employer against the criterion to which extend program management training are offered for young managers and could make sure that I could join such a training course 2 years after I joined the company. This was the background, together with many trainings, studies, extra work, to qualify for first management positions afterwards.

What was your biggest challenge in your career? What inspired and motivated you the most?

Change management is very challenging but essential for any positive development of our business. If it is changing of business portfolio, adapting capacities to markets, entering new markets, it is always linked to positive and more painful decisions, affecting people who wants to be inspired and motivated to jump on the challenges of the future. Working with people within the company, within customer organization, or even institutions is an extraordinary experience in space where many people are highly enthusiastic and passionate for our missions. It is a pure pleasure to steer those groups within a very dynamic environment.

What is one of the accomplishments in your professional career you are most proud of?

I have been able several times in different positions to form a management team that leads the company into a leading position on national/European/global scale. With the creation of an operational team, with the definition of a clear strategy for the business of the company, we have

been able to convince customers and partners.



How is the space business different now from when you started your career?

Space business meanwhile is a “normal” industry which contributes to many aspects of our daily life. Space has partially lost the image of being “exotic” or “fancy” but has been recognized as a key enabler for many important innovations and developments worldwide. Thus, the business is much more comparable to other commercial or industrial activities in which economic viability and productivity needs to be considered, despite some rather exotic and fancy projects and missions the space community is still pursuing.

What is your advice to the young professionals and students to have a successful career in the space sector?

Young professionals should first develop a clear vision of their long term ambitions and aspirations, being it a specific technical domain, leadership or management positions. They should then try to develop, assisted by internal or external supporters, in those areas which are key to qualify for relevant positions. The IAF network can be a perfect instrument on this path. I have had and still have the opportunity to follow the career of some young professionals for whom I could/can act as a mentor. I am trying to support those colleagues in the same way and to provide additional experience to make it happen.



Please, tell us in three hashtags what you think will define space business in next decade

#(wo)menareonthemoon
#globalmarsmission
#spaceagainstclimatechange

Chiara Cocchiara

Chiara Cocchiara was awarded the IAF Young Space Leaders award in 2020, for her contribution to the IAF and the space sector. Forbes listed her as 30Under30 Leader in the category Industry. She was also awarded the MIT Innovator Under35 and the ESNC Prizes for a new drone technology that she designed to help saving human lives. She volunteer for SGAC since 2015 and she is currently part of the SpaceOps Committee meeting, as member of the Communication, Outreach and Publications Group (COPG) where she leads the SpaceOps Students and Young Professionals (SYP) program. Chiara Cocchiara is a System Operations Engineer working as Staff member at EUMETSAT, the European Organization for the Exploitation of Meteorological Satellites, where she contributes to the preparation of future space missions (EPS-Second Generation). Chiara was also the Crew Commander and Engineer of a Mars Analogue mission with focus on psychological exercises with the Mars Society and experiments from NASA. In 2019 she was also awarded as one of the Atlantic Dialogue Emerging Leaders by the Policy Center for the New South, and she is part of the Italian-German Young Leaders Forum. Aside from her job, Chiara initiated a cooperation between the pharmaceutical company Boots, and the European Space Agency to work on health products for astronauts for long-term space travels.



IAF WD/YPP COMMITTEE

MEMBER
OF THE
MONTH

SEPTEMBER 2020



Emirates Mars Mission 2020 Hope



Mission Highlights:

Name	Emirates Mars Mission
Probe Name	Hope Probe
Launch Window	July 15, 2020 - August 12, 2020
Launch Location	Tanegashima Space Centre, Japan
Cruising Distance	493.5 million kms
Mission Duration	One Martian Year (2 Earth Years)

The mission design, development, and operations are led by the Mohammed bin Rashid Space Centre (MBRSC). The spacecraft was developed by MBRSC and the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder, with support from Arizona State University (ASU) and the University of California, Berkeley. It was assembled at the University of Colorado. The space probe will study daily and seasonal weather cycles, weather events in the lower atmosphere such as dust storms, and how the weather varies in different regions of the planet. It will also attempt to find out why it is losing hydrogen and oxygen into space and other possible reasons behind its drastic climate changes. The mission is being carried out by a team of Emirati engineers in collaboration with foreign research institutions, and is a contribution towards a knowledge-based economy in the UAE. Hope is scheduled to reach Mars in February 2021. Hope was the first of three space missions sent toward Mars during the July 2020 Mars launch window.

Article Source: [UAESA/MBRSC/emiratesmarsmission.ae/wikipedia](https://uaesa.mbrsc/emiratesmarsmission.ae/wikipedia)

Mission Objectives:

Understanding climate dynamics, and the global weather map through characterizing the lower atmosphere of Mars.
How weather changes the escape of hydrogen and oxygen by correlating the lower atmosphere conditions with the upper.
Structure and variability of hydrogen and oxygen in upper atmosphere and their loss in space.

To achieve the scientific objectives of the mission, the Hope probe is equipped with three scientific instruments:

Emirates eXploration Imager (EXI) is a multi-band camera capable of taking high resolution images with a spatial resolution of better than 8 km. It uses a selector wheel mechanism consisting of six discrete bandpass filters to sample the optical spectral region: three UV bands and three visible (RGB) bands. EXI measures properties of water, ice, dust, aerosols and abundance of ozone in Mars's atmosphere.

Emirates Mars Infrared Spectrometer (EMIRS) is an interferometric thermal infrared spectrometer developed by ASU and MBRSC. It examines temperature profiles, ice, water vapour and dust in the atmosphere.

Emirates Mars Ultraviolet Spectrometer (EMUS) is a far-ultraviolet imaging spectrograph that measures emissions in the spectral range 100–170 nm to measure global characteristics and variability of the thermosphere, and hydrogen and oxygen coronae.

A FACTSHEET | SPACE DEBRIS: A GROWING THREAT

Space Debris

Growing Threat

Astroscale



There is no issue related to space more important for all of us to get right than that issue of space situational awareness and space traffic management. We need to preserve the space environment for generations to come. The only way we're going to be able to do that internationally is to collaborate.

— NASA Administrator Jim Bridenstine, 1 October, 2018



130 million

↔ smaller than 1cm

There are millions of pieces of debris in orbit that are too small to be tracked.



34,000

↔ greater than 10cm

Pieces of space debris over 10cm in diameter being tracked, currently.



28,100 kph

Orbiting up to vast speeds



8,950+

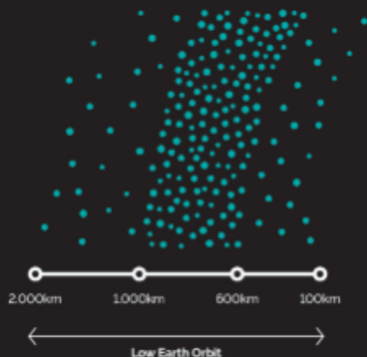
Satellites launched to-date



5,000+

Currently orbiting, only 1,950 operational

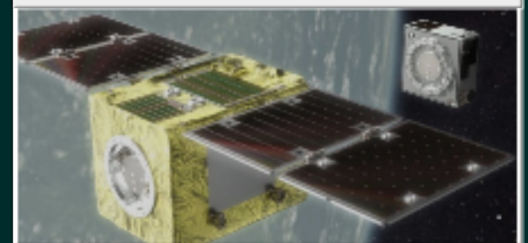
Astroscale



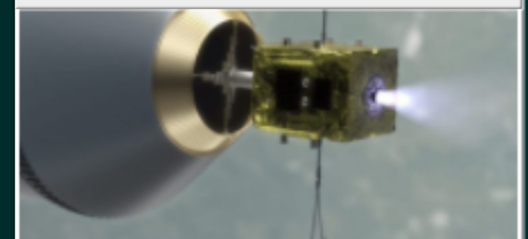
Most satellites operate in Low Earth Orbit (between 800-2,000km), the same area where the majority of space debris is found.

Astroscale

End of Life (EOL)

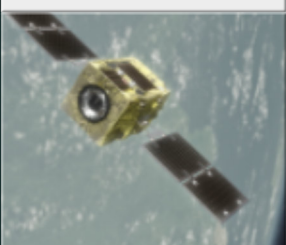


Active Debris Removal (ADR)

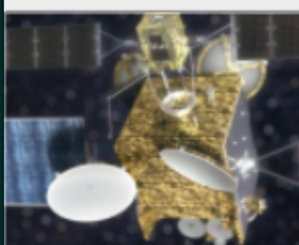


Astroscale

In situ SSA



Life Extension



Lunar Dream Capsule





Image: © IAF



Image: © Google



Image: © IAF



IPMC YP WORKSHOP 2020

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. Let us listen to the leaders of 2020 IPMC YP Workshop:



Image: © IAF



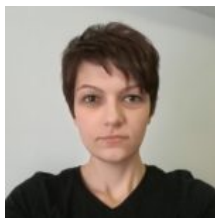
Ghanim ALOTAIBI, Topic 1

Our team's topic is "How do fragmented, remote, delocalized and virtual teams affect the way space projects are managed?". The topic is already challenging the team because we found it a bit difficult to find a suitable slot for everyone to conduct online meetings.



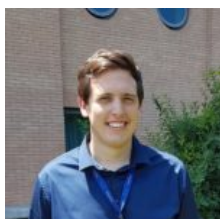
Antje STAMM, Topic 2

Our group's topic is "Which are the key leadership and planning aspects of PM in a time of crisis?" I chose this especially because of the theme's concern for key leadership and planning aspects of PM and the impact of the current crisis on future projects and PM, with which my personal interests are met.



Adriana ANDREEVA-MORI, Topic 3

My group will be discussing the relation between space and society, in particular by investigating the role of space programs and the space community at large in shaping the societal impacts of forced social isolation and economic lockdown. I believe that aeronautics and astronautics technologies and communities as a whole can provide connectivity and insight much needed in the current global crisis.



Clement GOUJON, Topic 4A

our topic addresses a key point in project management: how do we ensure that the knowledge collected and generated during the execution of a project will be available for the future projects, and how the crisis we are living can teach us how to handle the projects in general.



Takeshi SHOJI, Topic 4B

our group is currently tackling: "What is the impact of the current international crisis for the future of space projects, and how can project managers shape this impact into successful progress, ensuring acceptable risk and pioneering a new way toward?"

ORGANIZED AND HOSTED BY:



ASTRONAUTICA AD PACEM HOMINUMQUE PROGRESSUM

71st International Astronautical Congress

– The CyberSpace Edition

12-14 October 2020

IAF Connecting @II Space People



71st IAC 2020
The CyberSpace Edition

www.iac2020.org

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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 registration and congress related details, go to IAF News on Pages 26-28. Follow us on:



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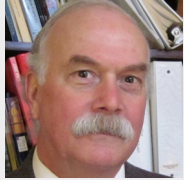
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FROM CAROL & SCOTT | CROSS CULTURAL COMMUNICATIONS & SKILL DEVELOPMENT

A Series on SCIENTIFIC WRITING



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)

Thank You!

Dear Participants of the Scientific Writing Series

We would like to express our sincere gratitude to each of you who have participated in the Scientific Writing Series coordinated by the IAF WD / YPP Committee.

Over 100 participants from various organisations and countries gave their time and resources to participate and contribute. You have made the Science Writing Series a success, and it was a great pleasure to see so many of you there!

Let's hope that you enjoyed writing paper and making presentations and that you took the opportunity to submit your material to the upcoming IAC 2020 – Cyberspace Edition. I'm sure that the collaboration with most of you will continue in the near future with more activities like this.

We would like to express our special thanks to the Speakers of the series, Scott Madry and Carol Carnett, respected members of the IAF WD/YPP Committee, for hosting us during the gathering, as well as to the successful teams that have done outstanding work in organising the series.

Presentations from the series can be downloaded from official page of the IAF WD/YPP Youtube channel.

<https://www.youtube.com/channel/UCDFhQ7uOvflarTrO53fxuNg>

Patrick Hambloch

Chair, IAF WD/YPP Committee



AMBITIOUS XPLORATIONS

SPACEX-Present and Future

There's lots to be excited about for ongoing activities at SpaceX. First founded in 2002, SpaceX has since revolutionized the space industry. Of its many achievements, some notable milestones include becoming first private company to successfully launch, orbit, and recover a spacecraft in 2010, being first private company to send a spacecraft to the International Space Station in 2012, being the first to successfully land an orbital rocket's first stage on land or on an ocean platform (2015 and 2016), and becoming the first private company to send a human-rated spacecraft to space. Most recently, SpaceX became the first private company to send humans into orbit and the International Space Station (2020). From the memorable Falcon Heavy maiden launch to the recent successful demonstration mission of the Crew Dragon, SpaceX has accomplished various commendable milestones and the company is effectively positioning itself to reach more in the coming years. Most recently, the world watched as SpaceX accomplished a final major test for the company's human spaceflight system to operate crew missions to / from the International Space Station. On Saturday May 30th, SpaceX's Falcon 9 launched Crew Dragon's second demonstration mission (known as Demo-2) from NASA's Kennedy Space Center. The following day, the Crew Dragon docked to the ISS with NASA astronauts Bob Behnken and Doug Hurley. Just over two months later, on August 2nd, the Crew Dragon returned the astronauts back to Earth where they splashed down in the Gulf of Mexico. This test flight marked a significant milestone, as it was the first-time that a commercial company brought astronauts to orbit and back, and it reflected the successful return of human spaceflight to the United States. Next, NASA astronauts Victor Glover, Mike Hopkins, Shannon Walker, and JAXA astronaut Soichi Noguchi are scheduled to fly on Dragon's first six-month operational mission (known as Crew-1), which is currently targeted for late September 2020. With this significant achievement accomplished, SpaceX continues to set forth on accomplishing new milestones in the future. This includes the ongoing testing of the SpaceX Starship vehicle. On August 4th, Starship flew to a height of 150 meters and returned to a nearby landing pad. This test flight is part of a much larger effort for SpaceX to successfully develop a reusable transportation system. When completed, the Starship system – consisting of the Starship spacecraft and the Super Heavy rocket – will become the most powerful launch vehicle ever developed. The system intends to transport cargo and crew to Earth's orbit as well as the Moon and Mars. Furthermore, the company intends to offer speedy Earth-to-Earth transportation services.

SPACEX

SpaceX, is an America based aerospace manufacturer and space transportation services company headquartered in Hawthorne, California. It was founded in 2002 by Elon Musk with the goal of reducing space transportation costs to enable the colonization of Mars.

www.spacex.com



Elon Reeve Musk FRS is an engineer, industrial designer, technology entrepreneur and philanthropist. He is the founder, CEO, CTO and chief designer of SpaceX; early investor, CEO and product architect of Tesla, Inc., founder of The Boring Company; co-founder of Neuralink; and co-founder and initial co-chairman of OpenAI.

Elon Reeve Musk FRS



With Starship and Super Heavy, SpaceX claims most international trips across long distances could feasibly be completed within approximately 30 minutes. For example, SpaceX suggests the 8,781-kilometre voyage from Los Angeles to London, that would typically take 10.5 hours on a commercial airline, could be completed in 32 minutes on the Starship system. When complete, the Starship will not only intend to be fully reusable, but will also be the largest rocket ever developed to date. Back in September of 2018, SpaceX announced that art curator and fashion innovator Yusaku Maezawa will be the company's first private passenger to fly around the Moon. This will be the first private lunar passenger flight and is currently scheduled for 2023. The week-long mission aims to help fund the development of the Starship system. The Starship system will replace the SpaceX Falcon Heavy rocket. The iconic first lift-off of the Falcon Heavy in February of 2018 remains a fresh and special memory for many. The maiden test flight featured a dummy payload of Elon Musk's personal Tesla Roadster from which spectacular images of the Earth were taken. The Falcon Heavy is currently the most powerful operational rocket, generating thrust at lift-off that is equivalent to roughly eighteen 747 aircraft. Including its first test flight, Falcon Heavy has flown three times – most recently in June of 2019. There are currently no plans to support human spaceflight on the Falcon Heavy, however various other flights are planned for the rocket in the coming years.



SpaceX also continues to deploy Starlink satellites. On recently, on August 7th, the tenth Starlink mission successfully launched and deployed 57 Starlink satellites from the Falcon 9 rocket. This satellite constellation system aims to provide reliable internet access to locations that have typically been remote, costly, or unreliable. Service coverage is intended to be offered globally by 2021. The system is also employing a variety of measures to address concerns of sustainability and satellite reflectivity. For example, the satellites – which each weigh approximately 260 kilograms – are each equipped with onboard propulsion systems to deorbit after they become inoperable. To mitigate concerns of satellite reflectivity that may inhibit astronomical observations from Earth, the satellites each host a deployable visor to mitigate sunlight away from the bright components of the satellites. On September 17, 2018, SpaceX announced fashion innovator and globally recognized art curator Yusaku Maezawa will be the company's first private passenger to fly around the



Moon in 2023. This first private lunar passenger flight, featuring a fly-by of the Moon as part of a week-long mission, will help fund development of SpaceX's Starship and Super Heavy, an important step in enabling access for everyday people who dream of flying to space. Watch the announcement [here](#).

Reflecting on these recent milestones and the path forward, there is much to be excited about with regards to the future of SpaceX and its lasting and prominent impact on the space industry.



- Information Source: SpaceX/Wikipedia



International Moon Village Activities by the Youth

The rush toward the moon is a notable aspect of today's space seen. Although going back to the moon is a dream for many, most of the world population are away from sharing a similar dream. The Moon Village – Participation of Emerging Space Countries project (MV-PESC) aims to identify opportunities for Emerging Space Countries and non-space faring countries in the moon village. The MV-PESC is an international activity by the youth to share the dream with everyone, and to make the moon a truly international effort. The project was adapted by the MVA in January 2020, but it started in summer 2018.

We are living in a time where we witness an international rush to the Moon. The advancement in technology since the Apollo era and the discovery of water in the lunar poles made the Moon the priority destination. In December 2017, the president of the United States signed a new policy that will direct the American space program toward the moon (NASA, 2017). NASA has responded with the creation of the National Space Exploration Campaign report which mentioned 5 strategic goals, 4 of them are focusing on the moon (NASA, 2018). NASA is not the only player with clear plans for the Moon. China, Russia, Japan, Europe and other countries are also planning for missions that will all contribute for sustained exploration of the Moon. The private sector from many countries sees commercial opportunities and trying to create innovative models to support space agencies.

Most of the world population are not yet part of the moon rush. This a grand challenge because shaping future partnerships for the moon will have a great impact on the shape of future settlements, resources accessibility and many more important topics. Although the National Space Exploration Campaign emphasized the importance of international partnerships, international parties should be involved to shape this partnership.

I believe going to the Moon should be for the mutual benefits of humanity. We go to the Moon because we want to live in a better world. Involving new players will distribute risks, funds and benefits. Everyone agrees that going



Ghanim Alotaibi is a senior mechanical engineer working in KuwaitSat-1 for Kuwait University. This made Ghanim the first person in Kuwait that works full time in a space project. Ghanim holds a master's degree in solar energy from Freiburg University and a BSc in mechanical engineering from Kuwait University. He also has a graduate certificate in astronomy from Swinburn University and a diploma from the International Space University (ISU). In addition to his duties in KuwaitSat-1, Ghanim is the Middle East Regional Coordinator for the Space Generation Advisory Council (SGAC) and the project manager for the Moon Village–Participation of Emerging Space Countries (MV-PESC) project. Ghanim was an analogue astronaut simulating two missions to Mars at the Mars Desert Research Station (MDRS), and he is an amateur astronomer.

to the Moon should be an international effort. But nobody knows what this partnership will look like. There are many legal, moral, and philosophical discussions that require the involvement of parties from emerging space countries and non-space faring countries. In other words, everyone should be involved to shape the future of human quest in the Moon, for a better world. Let's not export our problems on Earth to the Moon.

The Moon Village Association goal is "the creation of a permanent global informal forum for stakeholders like governments, industry, academia and the public interested in the development of the Moon Village" (MVA, 2016). As a space enthusiast from a non-space faring country, I saw the goal of the MVA inspiring. But the reality is different. How to involve emerging countries to the global forum for the development of the Moon Village? Slowly, the idea of the "Moon Village – Participation of Emerging Space Countries" PESC project started to take shape.

In summer 2018, I contacted the MVA to propose the idea of organizing a workshop in Kuwait for the Moon Village. The idea was to identify scientific, engineering and commercial opportunities for Kuwait in the Moon Village. This is done by inviting a mentor for a two-days workshop from the MVA to support a group of students and young professionals to brainstorm ideas about opportunities for Kuwait in the Moon Village. The Kuwait workshop was considered as a pilot project to be generalized later for emerging space countries around the world.

The workshop was held in April 2019 with mentors from the MVA supporting 13 participants in Kuwait. The PESC [Kuwait] workshop was an independent event sponsored by the Kuwait Foundation for the Advancement of Science (KFAS) and with the MVA as a partner. This workshop was the first discussion of its kind in Kuwait.

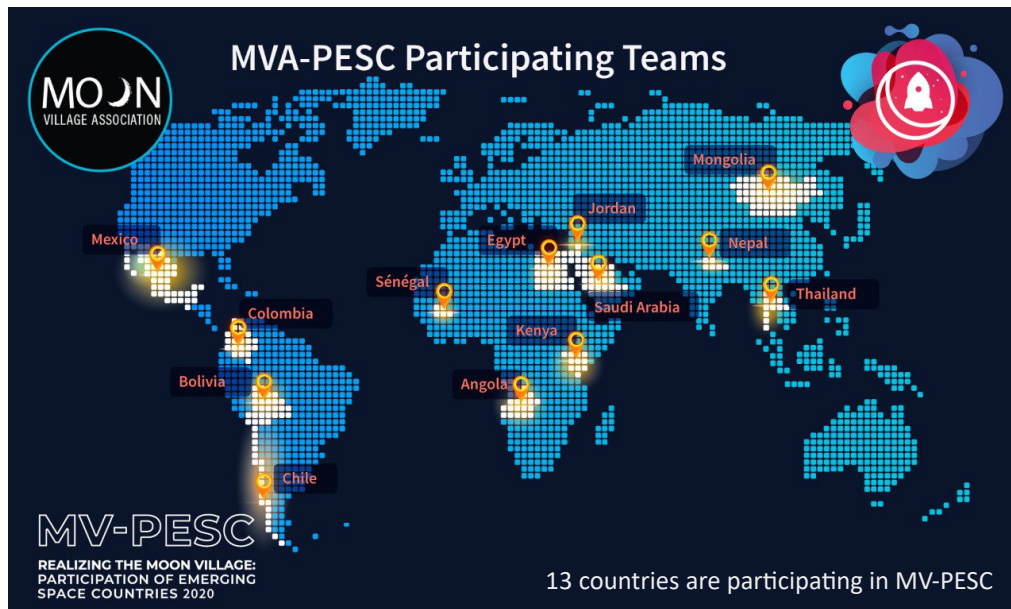
An important output was a list of 9 recommendations for Kuwait to participate in the Moon Village. The 9 recommendations were presented during the 62nd session of the UN COPUOS session that was held in June 2019. The Space Generation Advisory Council (SGAC) as a platform for the youth supported the initiative by providing a slot for Kuwaiti delegates to present the recommendations (UN, 2019). The first recommendation was about urging Kuwait to create a roadmap to participate in a Moon Village. The creation of a roadmap for a particular country will be later an important element for the PESC project in the soon future.



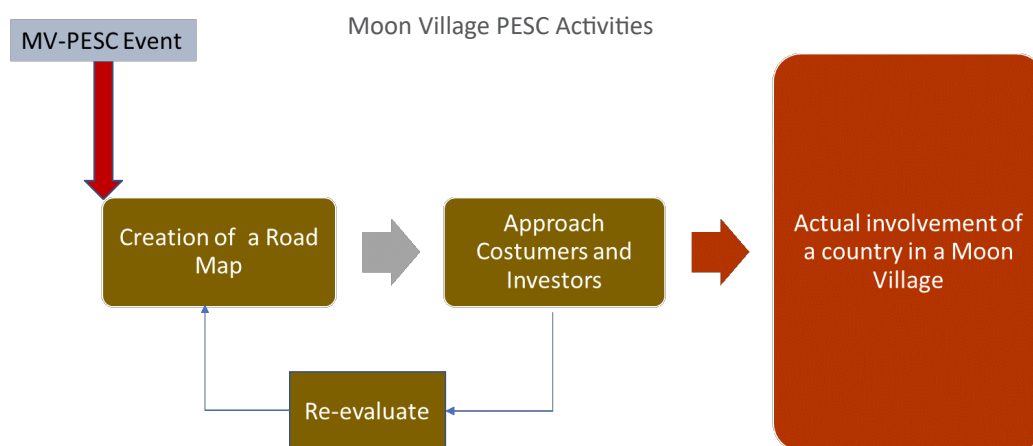
In November 2019, the MVA adapted the PESC project, and by March 2020, a dedicated team for the project was formed. However, COVID-19 crisis has changed the PESC project plan. Initially, PESC [Kuwait] was a physical workshop and was considered as a pilot project for future implementation in other countries around the world. However, it was decided to create a fully online program. The new PESC project program will consist of a series of webinars and a mentorship program for the participating teams. Experts members from the MVA from different fields will be supporting the participants to write their roadmaps (MVA, 2019).

In July 2020, 13 teams were accepted to participate in the PESC project.

The PESC project is the only program in the world that provides practical steps for the public/private sectors (with the focus on the youth) in non-space faring countries or emerging space countries to be part of the Moon rush. The aim of the project is to identify opportunities in the Moon Village by creating a roadmap and supporting the youth to implement the roadmap



This roadmap is a peer reviewed document that identifies opportunities for a country in a given time frame based on the shape of the Moon Village. Because the Moon Village is evolving, the PESC project is contributing on the future development of the Moon Village. The PESC project is practical in the sense that it provides mentorship and capacity building for the participants to come up with their roadmaps. In addition, it brings the youth from emerging countries into critical discussions that concern the future of the Moon Village. The process of writing the roadmap and communicating it locally and internationally, is one form for countries to be involved in the Moon Village, and the rush to the Moon. Other forms of involvement will be left for teams' creativities.



The Roadmap is just the start of the PESC project. As shown in the figure below, the PESC project contributes to the Moon Village activities by approaching potential stakeholders. This process is iterative as the roadmap can be modified to reflect the needs, requirement, and aspirations of the potential stakeholders. This process will be repeated. Many countries around the world will be performing the same process. This will expose potential stakeholders to the opportunities in the Moon Village, and thus a wider horizon for involvement in the moon rush.

In conclusion, the MV-PESC project treats an important challenge regrading the international rush to the moon. It aims to identify opportunities for emerging space countries in the Moon Village to make the moon rush a truly international effort. The PESC project started as an independent event in 2019, and today, there are teams from 13 countries working on their roadmaps.

REFERENCES

- MVA, M. V. A., 2016. [Online] , Available at: <https://moonvillageassociation.org/about/>, Accessed July 2020].
MVA, M. V. A., 2019. [Online] , Available at: <https://moonvillageassociation.org/projects/participation-of-emerging-space-countries-pesc/>, Accessed July 2020].
NASA, N. A. a. S. A., 2017. [Online] , Available at: <https://www.nasa.gov/press-release/new-space-policy-directive-calls-for-human-expansion-across-solar-system/>, Accessed July 2020].
NASA, N. A. a. S. A., 2018. National Space Exploration Campaign Report, s.l.: NASA.

SPACE TRIBOLOGY



Image: © Google

The tribology includes the friction, wear and lubrication of mechanical parts such as bearings and gears. Tribological practises are structured to ensure that such components work with high efficiency (low friction) and achieve long life. On spacecraft systems, the road to achieving these objectives poses its own specific challenges. The performance of spacecraft missions depends critically on the reliability of the mechanisms, and this, in turn, depends on the life and functionality of the components. The management of friction and wear processes in those parts which have a tribological aspect is the topic of space tribology. As a result, the stability of the spacecraft is seen to be critically dependent on the integrity of tribological components such as bearings, slip rings and gears — and the lubrication applied to them. 'Space Tribology' involves the design of each of these components and the management of friction, wear and lubricating processes within them to prevent misbehaviour, prevent failure and help ensure mission success ⁽⁵⁾.

The spacecraft mechanisms used are now divided into two categories: one that is expected to operate only once during a spacecraft mission and the other that operates continuously or intermittently ⁽⁵⁾.

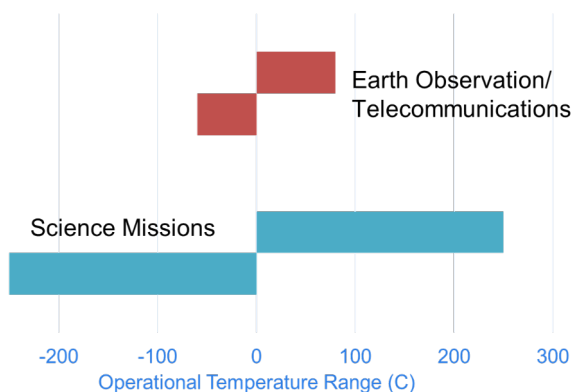


Image: © [4]

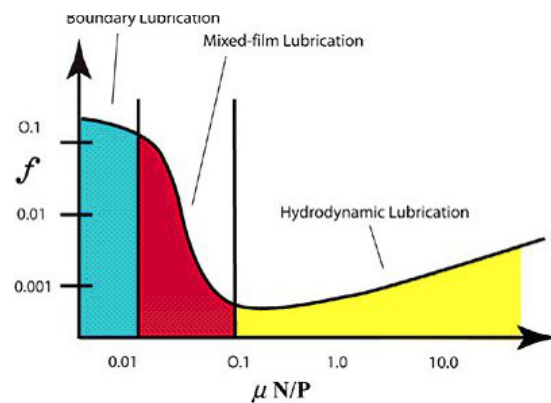


Image: © [6]

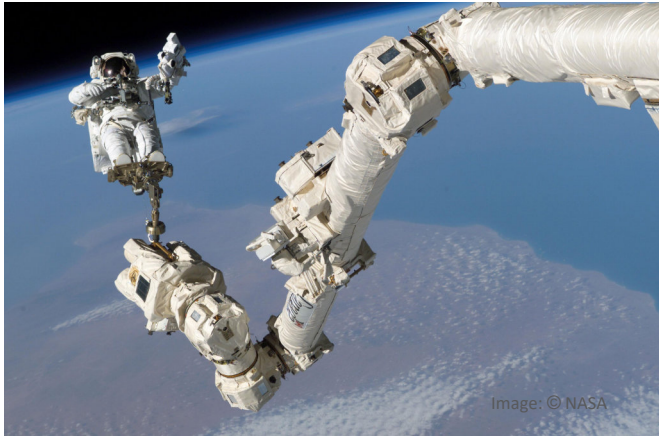


Image: © NASA

Fluid Lubrication: Multiply-Alkylated Cyclopentanes (MACs) or PerFluoroPolyEther (PFPE). They are synthetic, long chain, chemically stable and inert oils, e.g. MACs and PFPEs (and the associated greases, also thickened by PTFE). They have very low volatility, a long vacuum life with shear stability and intense pressure. The temperature range for these lubricants varies from -60°C to +100°C. They have a problem with rising viscosity when high temperatures are limited by cold and evaporation. Fluid lubricants have high thermal conductivity and super smooth activity. Anti-creep barriers with fluid lubricants are required. ⁽⁴⁾

Solid Lubrication: These lubricants include low shear strength metals such as lead, silver, lamellar solids such as MoS_2 and WS_2 or low shear strength polymers such as PTFE, polyimide. They have negligible volatility and may be insensitive to temperature. They may be resistant to temperature. They are stable, but usually shorter in life and more "noisy" than fluids. The temperature range for these lubricants varies from -270°C to +300°C. Adhesion, thickness, life and replenishing can be a matter of concern. Their activity in the air can be prohibited or heavily limited. Solid lubricants comes with some benefits like their accelerated testing is feasible and some of them are electrically conducting. ⁽⁴⁾

Often there are issues like which of them can be better, solid or fluid. There are such circumstances where only one of them is appropriate over the other. For example, when only dry (solid) lubricants are used where the temperature is extreme (high or low) and there is a risk of contamination of other parts of the spacecraft (evaporation or creeping).



Conditions where only fluid lubricants are to be used are as long life as needed and sufficient air flow (ground testing) is needed. ⁽⁴⁾

Image: © spacetriboology.com

However, certain practical lubricant problems such as solution have to be used in vacuum and at high temperatures, it's got to work in space and on the ground, if possible. It is important to consider lubrication in the early stages of design. (Impact on size of motors; etc.) Restricted selection of lubricants available (two base oils, only a few solids). Normally, re-lubrication in space is not an option. Qualifying or accepting new lubricant solutions or other new surface treatments is a long process. ⁽⁴⁾

What flies may often be a compromise - the perfect "one fit all" lubricant for space does not exist. Extensive testing and expertise is therefore needed for the selection and optimisation of lubricants for each new application. ⁽⁴⁾

Testing: Testing in the case of tribology and its applications in space is very significant. Because each component or mechanism associated with a spacecraft has a specific life span, its longevity is an essential issue. But tribology plays an significant role in making this possible. As discussed earlier, as there is no standardised lubricant available and it is different for various systems, it needs to be investigated at a higher level divided into the following:

Tribometer Level : basic friction & wear for materials and coatings, thin film durability, relative performance of candidate lubricants in idealised but controlled conditions (Mainly Pin-on-Disc and spiral Orbit tribometer).

Component Level : e.g. Ball bearing, gears, etc. Assessment & validation of torque, life, efficiency, adhesion etc. of individual components. Gives increased confidence but may be difficult to "condition" test item in isolation – so how representative is the test?

Mechanism Level : only valid way of qualifying/accepting a mechanism lubrication solution, but little information on individual component performance. ⁽⁴⁾



Image: © ESTL

In space tribology, we usually opt for ultra-high-vacuum tribometers for testing purposes to simulate exactly the same environment as hostile space. It is very interesting to look at how well the mechanism reacts to friction and wear life in case it is poorly lubricated.

Future: As far as future of tribology is concerned, research is going on solid coating improvement (MoS₂ process). We look at longer life, fewer operational constraints. Research is going on New European Self-lubricating cage materials with lower cost, long life, new European MAC type of Oil. Studies are underway on ionic Fluids (a new class of fluid lubricants?) with lower volatility and greater resistance to degradation than PFPEs. Very important is the REACH (Registration, Evaluation and Authorisation of Chemicals) which Replacement of established lubricants (Lead), solvents and other materials.⁽⁴⁾

As far as foreseen developments are concerned, we look into long-term storage meaning understanding of issues for spacecraft batch assembly, or “in orbit storage” for demisable spacecraft.

Scientists are also interested in the European anti-creep barrier, reusable turbomachinery and its tribological implications. There is also a search for magic lubricant or no lubricant (magnetic bearings and magnetic gears, etc.)⁽⁴⁾

Efficient implementation of tribology is key to successful space missions. Tribological structures are dynamic and diverse. It is difficult to predict "model" tribology; testing is highly recommended! And there's still a lot to be done!!!
(4)

References:

1. <https://www.spacetribo.com>.
2. <https://www.esa.int>.
3. <https://www.jaxa.jp>.
4. Lionel Gaillard, "Challenges of tribology in space mechanisms", Head of Mechanisms Sections, ESA/ESTEC.
5. EW Roberts, "Space tribology: its role in spacecraft mechanisms", J. Phys. D: Appl. Phys. 45 (2012) 503001 (17pp)
6. Bagi, Sujay. (2012). Effect of additive morphology & chemistry on wear & friction of greases under spectrum loading.

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 Committee
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;

JEANETTE EPPS GETS ANOTHER ASSIGNMENT TO ISS AFTER CANCELED TRIP

Two years after being unexpectedly pulled from a flight to the International Space Station, NASA astronaut Jeanette Epps is now assigned to a new mission to the ISS. Rather than flying on the Russian Soyuz rocket as first planned, Epps will join the first operational crew of Boeing's CST-100 Starliner, a new private capsule developed to ferry NASA astronauts to and from the station. Epps was originally supposed to fly on the Soyuz back in June 2018, as one of three crew members headed to the ISS for a six-month-long stay. That would have made her the first Black crew member of the ISS to live on the station long term. She'll join fellow NASA astronauts Sunita Williams and Josh Cassada, who are already assigned to fly on the Starliner. This will be the first trip to space for both Epps and Cassada, while Williams will be making her third trip.

Full story of Jeanette Epps can be accessed here:
<https://www.theverge.com/2020/8/25/21401076/nasa-astronaut-jeanette-epps-boeing-cst-100-starliner-assignment>

- Source: theverge.com



Image: © NASA

Luis Ferreira

Strategist at Airbus Defence and Space
IAF 2020 Young Space Leader Awardee

I am a Strategist at Airbus driving the development of strategic plans for the decade ahead in the Space and Defence sectors. I started my space career 10 years ago at the European Space Agency - it feels like yesterday! I have a Physics and space technology academic background and I was lucky enough to have worked in a handful of space missions and projects in different fields, such as: Earth science and climate monitoring missions, asteroid exploration probes, security and safety instrument concepts, and last, but not least, lunar exploration. I remember fondly testing in the Lab the camera onboard the European MASCOT lander that landed in 2018 on asteroid Ryugu after being released from its Japanese mothership, the Hayabusa-2 spacecraft. I am an alumnus of the International Space University, a member of the IAF Earth Observation Committee and an engaged Space Generation Advisory Council member having held several roles in the organisation in the past. I enjoy promoting and triggering interest for space activities among the wider public, especially early career individuals and students. I describe myself as a curious and energetic individual with an immense drive to harness all the possibilities that space has to offer to humankind, seeking purpose in all I do. I enjoy reading and learning from the intersection of technology, arts, politics and business strategy. As a final note, I believe it is the job of our generation to open the frontier of space!

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

I first got exposed to IAF and its activities in 2012, during the Space Generation Congress. I remember I made the terrible mistake to not stay for the IAC conference afterwards. Since then, however, I have never missed a single IAC! At the IAC 2013, I was blown away by the content provided, the range of activities and events featured, and the energy and contacts I left with after the intense space week in Beijing. From that time on I knew that was the place to go and to be every year! In 2016 I finally got more involved with the IAF by entering the Earth Observation Committee. I have been actively contributing to it and its IAC activities since then.

I want to say that, today, the IAF is for me more than just a professional organisation. It means a unique opportunity to see and talk to close friends, some almost family, and exchange face-to-face on pressing topics with the brightest minds. I quite like the stimulus and ideas I get after each IAC. As I move past my Young Professional time soon, I look forward to increasing my involvement with the IAF in new ways!

What do you think has been the value added of the IAF to your career in the industry?

I have grown and learned so much with the IAF! My career in industry would have certainly been quite different without the IAF influence – I consider it to be a strong pillar of my 10year career.

I guess the two main aspects which have brought value to my career were, first, the multi-disciplinary nature of the IAF activities and respective content and, second, the exposure to so many people and business contacts from all different backgrounds. For an optical engineer as I was, it would have been harder to move to a business, sales or strategy position without the IAF diverse learning and connections. I am sure about that.

The IAF has given me perspectives and opportunities that I couldn't otherwise imagine they would be possible. I think, initially, in the first years, the benefits were somehow more on the personal level; however, after a few years, I think my organisation also started valuing more what I could bring in given the IAF involvement and exposure.

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

I think the younger generation has been doing pretty well in becoming more vocal and active in shaping the future of the space sector in the past decade. Nevertheless, I still think that even more engagement from the younger community can be achieved with an increase on the quality of the content we produce.

For example, the younger generation should be more active in putting forward sound policy and positioning white papers to be extensively debated and taken further by the space community at large. In my view, this does not happen as frequently as it should. Organisations like the IAF, SGAC, ISU, SEDS, among others, have the human capital, the weight, and the network to facilitate that. Perhaps a competition or Open Call for White Papers where the winner gets the topic to be discussed during the next IAC? The winner would be selected by the community via democratic voting.

As a final thought, I also think that we must find our own "Greta Thunberg" of space; a person that can passionately voice the key concerns and challenges our generation faces. I think we need a more serious and in depth debate on topics like Space Traffic Management or Militarisation of Space.

As an IAF Young Space Leader from this year, how do you plan to give back to/support the young generation in the space sector?

The IAF YSL Award has given even more motivation to pursue my passion and engage further with the space community, the younger one especially.

Until the end of this year, and if we have no more big surprises in 2020, I will focus on implementing or sustaining local initiatives which I am involved in. One of them is in the city where I live, Munich, where a group of young space professionals has created the *Space Brewery*, a Space Café type of initiative with beer instead (what else in Munich!).

With the *Space Brewery* we aim to bring together under a relaxed setting the NewSpace community, which is growing considerably in the region.



Also, at Airbus, I am involved in growing a community to represent the voice of the younger generation inside the company, while nurturing strong links with relevant organisations outside. I think in the short-term this will keep me busy, but I am sure soon enough there will have new ideas to pursue. If you have one and I can help, please call me or drop me a line!

What advice can you provide to our audience to navigate their career in space?

This is a hard one, as there are no magic formulas and each individual and its surrounding context is different. I can share a few aspects based on my own experience and humble view:

Passion: you must work where your heart is! That is unbeatable. Follow it.

Be curious, be a lifelong learner: be curious, ask questions, simply dare to ask, learn! One of my mottos for many years is: "If I don't know it, I will learn it!". That has led me to great places while bringing you joy along the process.

Emotional intelligence: this is a skill not taught at school, but it is so, so important to successfully

navigate your career! Start reading and begin practicing and applying emotional intelligence to improve both your personal and professional interactions. Remember to start with yourself and work on a deep self-reflection on your values and beliefs, and how are they externalised through emotions and behaviours.

Mentorship: do not underestimate the value of mentorship. Finding someone in the same career field you would like to pursue in the future will bring you unique insight and information that will help you forever. Identify a couple of potential mentors and go ask now!

Plan: make a rough plan of where you want to be in five-year time. It does not need to be comprehensive or definite but knowing where you would like to be in 5 years will allow you to focus and take the right decisions today. Always have a longer-term perspective or aspiration.

Think less and do more: we tend to think that thought comes before action. But the process doesn't work that way most of the times. Action precedes thought. So, get to work, start today trying out, show up, make a contribution. Not in the future when the ideal conditions are met, no. Do it right now.



NEWSLETTER

CALL FOR ARTICLES



Interested writers are requested to submit their original articles for IAF YP Newsletter



Next Issue: December 2020

Send your articles to
iaf.wdypp@gmail.com

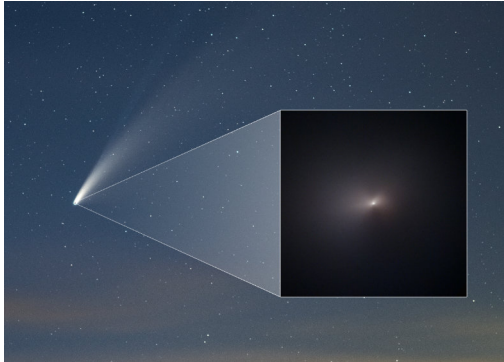


SPACE NEWS

August 2020

Part of YP Newsletter

Volume 2, Issue 2



August 21, 2020

HUBBLE SNAPS GLORIOUS CLOSE-UP OF NEOWISE

Comet Neowise may be out of sight of those of us on Earth, but it didn't escape the far-seeing eyes of the Hubble Space Telescope. NASA and ESA's telescope snapped a lovely portrait of the comet on Aug. 8. "This is the first time Hubble has photographed a comet of this brightness at such resolution after this close of a pass by the sun," said NASA in a release. Hubble's view highlights the gas and dust around the center of Neowise that formed into twin jets. The color of the dust can give scientists clues to the comet's interactions with solar heat. Neowise made quite a splash for the days it was visible from Earth. It starred in some epic images and drew people outside to skywatch in hopes of catching a glimpse of the visitor.

- Source: cnet.com



September 13, 2020

SPACE X GEARING UP FOR 12-MILE HIGH TEST

The next big leap for SpaceX's Mars-colonizing Starship spacecraft appears to be right around the corner. Two full-size Starship prototypes, known as SN5 and SN6, recently performed 500-foot-high (150 meters) test hops at SpaceX's South Texas facilities, near the village of Boca Chica. And the next vehicle in line is nearly ready to soar much higher, company founder and CEO Elon Musk said.

"SN8 Starship with flaps & nosecone should be done in about a week. Then static fire, checkouts, static fire, fly to 60,000 ft [18,300 m] & back," Musk said via Twitter on September 12.

SpaceX is iterating toward a final version of Starship that will feature six Raptors and, Musk has said, be capable of carrying up to 100 people to the moon, Mars and other distant destinations.

Source: Space.com



September 10, 2020

ISS SCHEDULED ORBIT CORRECTION CONDUCTED

On September 10, 2020, an orbit correction of the International Space Station was conducted using the Progress MS-14 cargo spacecraft engines. The engines were switched on at 20:32 UTC for 225 seconds giving the station velocity increment of 0.45 meters per second. As a result, the ISS mean orbit altitude increased by 0.8 km. According to TsNIIMash Mission Control Center (part of Roscosmos) data, the station orbit parameters after the correction are as follows: Rotation period — 92.90 min; Orbit inclination — 51.66 deg. Minimal altitude over the Earth's surface — 419.6 km; Maximum altitude over the Earth's surface — 437.9 km; The adjustment was conducted to form ballistic conditions prior to the Soyuz MS-17 crewed spacecraft launch and docking scheduled for October 14, 2020.

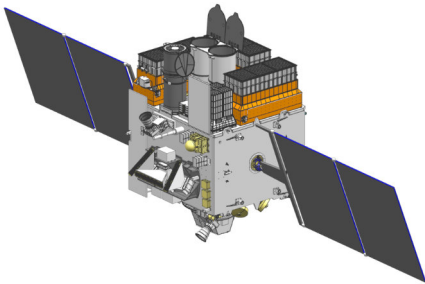
- Source: Roscosmos

SPACE NEWS

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August 27, 2020

ASTROSAT DISCOVERED EARLIEST GALAXIES

Dr. Kanak Saha and his team observed the galaxy which is located in the Hubble Extreme Deep field, through AstroSat. Since UV radiation is absorbed by Earth's atmosphere, it can only be observed from Space. Astronomers have been looking for sources that reionized the early universe. The usual suspects have been the first astronomical objects, especially the newborn small galaxies. But observing ionizing radiation from these sources is next to impossible. The probability that a fraction of extreme-UV photons escape the host galaxy and caught by a telescope on Earth is practically zero, because these photons will be absorbed by the gas in the galaxy or the gas surrounding the galaxy or the matter between the galaxy and us.

-Source: ISRO



September 14, 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



September 8, 2020

NASA ENLISTS COMMERCIAL PARTNERS TO FLY PAYLOADS TO MOON

NASA has issued another request to its 14 Commercial Lunar Payload Services (CLPS) partners to bid on flying a suite of payloads to the Moon. The request asks partners to fly 10 NASA science investigations and technology demonstrations to a non-polar region of the Moon in 2023. Through the CLPS initiative, NASA taps its commercial partners to quickly land scientific instruments and technology demonstrations on the Moon. The initiative is a key part of NASA's Artemis program. The science and technology payloads will help lay the foundation for human missions to the lunar surface. A provider will be selected by the end of the year, making it the sixth surface task award.

- Source: NASA/SciTech Daily

SPACE NEWS

August 2020

Part of YP Newsletter

Volume 2, Issue 2



August 21, 2020

CHINA'S "GAOFEN-7" PUT INTO SERVICE

The China National Space Administration announced that the Gaofen-7 Earth observation satellite has been put into service, representing significant progress for the country's surveying and mapping capabilities. Launched on Nov. 3, 2019, Gaofen-7 is China's first civil-use optical transmission 3D surveying and mapping satellite that reaches the sub-meter level. Equipped with two line-scan cameras and a laser altimeter, the satellite can provide 1:10,000 scale satellite 3D mapping for users in China and countries participating in the Belt and Road Initiative. Gaofen-7 will further meet the needs of users in basic mapping, global geographic information, monitoring, and evaluation in urban and rural construction, etc.

- Source: CNSA/Xinhua



September 4, 2020

ESA SELECTS THE NEXT AI MISSION

Following successful launch of ϕ -sat-1 – Europe's first artificial intelligence Earth observation mission – plans are already underway for the next innovative state-of-the-art technology, ϕ -sat-2. ϕ -sat-1, an enhancement of the Federated Satellite Systems mission, was launched onboard a Vega rocket from Europe's spaceport in Kourou, French Guiana, on 3 September at 02:51 BST/03:51 CEST (22:51 on 2 September, Kourou local time). ϕ -sat-1, pronounced PhiSat-1, will demonstrate how satellite data, coupled with advanced onboard digital technologies, can bring benefits to business, industry and science.

The next step, the ϕ -sat-2 mission, will further demonstrate the capabilities of artificial intelligence (AI) technology for Earth observation. The use of these technologies will lead to new ways of collecting, distributing and analysing data about our planet.

-Source: ESA



September 9, 2020

CYGNUS ISS CARGO MISSION NAMED AFTER KC

Northrop Grumman has named its next cargo and supply mission to the International Space Station (ISS), the NG-14 Cygnus spacecraft, after Space Shuttle astronaut Kalpana Chawla. Kalpana Chawla and six other colleagues died on board of Columbia in February 2003 when the Space Shuttle disintegrated reentering the atmosphere 16 minutes prior to its scheduled landing. Cygnus NG-14 is scheduled for launch end of September from Wallops Island, Virginia.

"It is the company's tradition to name each Cygnus after an individual who has played a pivotal role in human spaceflight," Northrop Grumman said. "Chawla was selected in honor of her prominent place in history as the first woman of Indian descent to go to space."

- Source: spacewatch.global

SPACE NEWS

August 2020

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September 15, 2020

VIRGIN GALACTIC FIRST SUB-ORBITAL FLIGHT IN OCTOBER

Virgin Galactic will fly to space again next month, if all goes according to plan. The space tourism company's latest SpaceShipTwo vehicle, known as VSS Unity, has made two crewed test flights to suborbital space, first in December 2018 and then again in February 2019. Virgin Galactic is now preparing for its next suborbital test flight, which could launch as soon as Oct. 22, CNBC reported, citing documents filed last week with the U.S. Federal Communications Commission. "Virgin Galactic said last month that the second test spaceflight will then have four 'mission specialists' inside the cabin," Sheetz added. "If both test flights succeed, Virgin Galactic expects to fly founder Sir Richard Branson in the first quarter of 2021."

- Source: space.com



July 28, 2020

THOMAS PESQUET TO RIDE DRAGON TO ISS

ESA astronaut Thomas Pesquet has officially been assigned to the second operational flight of SpaceX's Crew Dragon spacecraft, launching in spring 2021 from Cape Canaveral, USA, to the International Space Station. "With Thomas being the first European astronaut to fly to the International Space Station on a Crew Dragon vehicle, this shows that even when using a commercial spacecraft built in the US, the international character of human spaceflight is still given. The close collaboration among the Space Station partners NASA, JAXA, CSA, Roscosmos and ESA was strong in the past and remains very strong today and will do so in the future," says ESA Director General Jan Wörner. "I am very much looking forward to see European astronauts in an environment again where no borders exist - the International Space Station." "I am thrilled to be the first European to fly on the new generation of US crewed spacecraft," says Thomas. "It will be extra interesting for me to compare with my first flight as a Soyuz pilot, and to bring this experience to the team."

- Source: ESA/SpaceWatch.global



July 10, 2020

JAXA AND ASA SIGNS MEMORANDUM OF COOPERATION

The signing ceremony was organized online between Tokyo and Canberra. The conclusion of the MOC between JAXA and ASA was welcomed by the Prime Ministers of Japan and Australia during the Summit Meeting held on July 9, 2020. Based on this MOC, JAXA and ASA will consider cooperation in areas such as (1) space applications, (2) space technologies, (3) space environment utilization, (4) space science and space exploration and (5) space education and outreach. Through further cooperation in the space field between Japan and Australia, JAXA and ASA, as significant partners, will contribute to invigorating space-related activities in the Asia-Pacific region.

- Source: JAXA



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[2020 IPMC YP WORKSHOP](#)

MEETING SCHEDULE

Tuesday 6 October, 2020

12.00 - 13.00	IPC Steering Group
12:15 - 13:45	IAF Space Transportation Committee
14:00 - 15:30	IAF Technical Activities Committee (TAC)
14:00 - 15:30	Committee for Liaison with International Organisations and Developing Nations (CLIODN)
15:00 - 16:30	IAF Space Museums and Science Centres Committee
15:30 - 17:00	IAF Space Education and Outreach Committee (SEOC)
15:45 - 16:45	IAF Space Economy Committee
15:45 - 17:15	IAF Space Astronomy Technical Committee (SATC)
16:30 - 18:00	IAF Space Societies Committee (SSC)

Wednesday 7 October, 2020

12:00 - 13:30	IAF Space Habitats Committee
13:15 - 14:45	IAF Space Communications and Navigation Committee (SCAN)
13:30 - 15:00	Knowledge Management for Space Organisations (KMTC)
13:45 - 15:30	IAF Space Propulsion Technical Committee
14:00 - 16:00	IAF Committee on Developing Countries and Emerging Communities (ACDCEC)
15:00 - 16:30	IAF Earth Observations Committee
15:00 - 16:45	IAF Human Spaceflight Committee
16:00 - 17:30	IAF Industry Relations Committee (IRC)
16:00 - 17:30	IAF Workforce Development- Young Professionals Programme Committee
16:30 - 18:00	IAF Entrepreneurship and Investment Committee (EIC)
16:30 - 18:00	IAF Subcommittee on the Global Earth Observation System of Systems (GEOSS)
17:00 - 18:00	Committee on Integrated Applications

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2020 IPMC YP WORKSHOP

MEETING SCHEDULE

Thursday 8 October, 2020

12:15 – 13:45	IAF Committee on Space Security
13:30 – 15:00	IAF Space Universities Administrative Committee (SUAC)
14:00 – 15:30	GLEX IPC Meeting
15:30 – 16:30	IAF Committee on Space Security
15:30 – 17:00	IAF Enterprise Risk Management Committee (ERMC)
15:30 – 17:00	IAF Next Generation Coordination Committee (NGCC)
16:00 – 17:00	IAF Committee for the Cultural Utilisation of Space (ITACCUS)
16:00 – 18:00	IAF Finance Committee
16:30 – 18:00	IAF Committee on Near Earth Objects (NEO)

Friday 9 October, 2020

12:00 – 16:00	IAF Bureau
14:00 – 15:30	IAA Space Debris Committee
15:00 – 16:30	IAF Space Systems Committee
15:30 – 17:00	IAF Technical Committee on Space Traffic Management
17:00 – 18:00	IAF/IAA/IISL Advisory Committee on History Activities (ACHA)

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71st IAC2020

The CyberSpace Edition

71st International Astronautical Congress - The CyberSpace Edition

Sydney Time	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00
Beijing Time	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00
Paris Time	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00
Washington Time	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00
Los Angeles Time	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00

Tuesday 6 Oct	IPC Steering Group	TAC Meeting	IAF Committees (3 parallel streams max)
Wednesday 7 Oct	IAF Administrative Committees	IAF Committees (3 parallel streams max)	IAF Administrative Committees
Thursday 8 Oct	IAF Administrative Committees	Honours and Awards Cmt.	IAF AC
Friday 9 Oct	IAF Administrative Committees	IAF Finance Committee	IAF Committees (2 parallel streams max)
Saturday 10 Oct	IAF Administrative Committees	IAF Bureau	IAF Committees (2 parallel streams max)
Sunday 11 Oct	Live Session	IPMC Young Professionals Workshop	IPMC Workshop Online Technical Gallery (accessible 24 hours)
Monday 12 Oct OPENING/ AGENCY DAY	Introduction Opening Ceremony	PE (HoA)	Special Session - Response of the Space Community to the COVID-19 pandemic
Tuesday 13 Oct INDUSTRY DAY	IAF Excellence in Industry Award	IAF GNF - ISS Commercialization and Future Industry Innovation in Low Earth	IAF GNF - The Artemis Program
Wednesday 14 Oct DIVERSITY/ OUTREACH DAY	IAF 50 Diversity Award	Special Session - Launch of Worldwide Missions to Mars	IAF GNF - Astronauts Panel
Thursday 15 October	IAF General Assembly		

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2020 IPMC YP WORKSHOP

Plenary Programme

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**Victoria
Carter-Cortez**

**SpaceGen United
Deputy Manager**



SPACE GENERATION
ADVISORY COUNCIL

Just four weeks ago to the date, SGAC kicked-off its first-ever online Congress, SpaceGen United (SGU), and what a journey it's been!

SpaceGen United saw 143 delegates from 53 different countries join together for a dynamic and engaging, nine-day programme which hosted 14 hours of keynote speeches (now available on SGAC's youtube channel!) as well as panels which featured everything from discussions on the space economy and the state of the European space industry, to a conversation with astronauts Mike Finke and Chris Ferguson as they prepare for their upcoming flight on Boeing's Starliner.



7 Workshops took place during the week of SpaceGen United, including a virtual Hackathon sponsored by the European Space Agency as well as a UN COPUOS simulation, led by the Secure World Foundation, amongst others. These workshops provided an opportunity for delegates to deep dive into a variety of topics with the support and input of 50 subject matter experts from right across government, industry and academia. The outcomes and recommendations of each of these workshops were impressive and reflective of the high level of participation and involvement of the delegates throughout the event. These were delivered as a series of short videos at the closing of SpaceGen United which were broadcasted to the SGAC network (you can check them out online!).

In addition, SGU held a variety of fun activities, many through partnerships, to foster engagement. In collaboration with the 'Our Giant Leap' initiative, an artwork showcase took place on the theme of women in aerospace, Planet hosted a trivia night for the delegates, we maintained the yearly tradition of a joint ISU-SGAC social and held a vertical development workshop delivered by Julie Chesley, PhD from SYNCUP. In addition, we celebrated culture and diversity through our own SGU culture challenge on Instagram and aimed to collectively run, cycle and swim the distance from Earth to MEO.

We are very grateful for the feedback received from the delegates, sharing with us that their SpaceGen United experience was awesome, inspiring and engaging. For some delegates, international travel requirements or the costs associated with them can be a challenge to attending physical events, so it was wonderful to see such limitations lifted as a result of the new online format.

All this. The hours of programming, the technical details of hosting sessions online, the creative thinking necessary to transition from what was originally a physical event to a virtual one, could not have been possible without the SpaceGen United Organising team and the SGU Workshop Moderators. These 35 dedicated and outstanding volunteers weathered a global pandemic, balancing their studies and work commitments, and in short of 3 months delivered a terrific online congress! A huge thank-you to each and every one of them for their hard work and commitment - congratulations on making SGAC history!

Best Regards

Victoria Carter-Cortez

Deputy Manager, SpaceGen United 2020



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