

Astronautical Federation

3/2020 (October 2020)

IAF President's Welcome

Dear IAC Enthusiasts,

This is your favorite month of the year, we are days away from the most important space event of the year: the International Astronautical Congress 2020 to be held in a CyberSpace Edition from 12 to 14 October.

This is truly an exciting time for our space community. This is the first time the IAC will be entirely online and free of charge. Literally everybody all over the world will be able to attend, there won't be any economic nor travelling issues – as long as people will have an internet-connected device, they will be able to participate.



The IAC 2020 – The CyberSpace Edition will grant the IAF the possibility to including an even wider range of communities with diverse backgrounds, various geographies, all generations, more gender balance, new space actors and non-space actors. The interesting dialogues that the #CYBERSPACEIAC2020 will start, will make us humans stronger as we engage toward a common fight against the COVID-19 pandemic.

This Congress is going to feature a rich programme of plenaries, highlight lectures, special sessions, IAF global networking forum, video lectures, press conference, announcements, and as always, a dedicated event to the next generation.

I would like to express my sincere thanks in advance to all IAF volunteers, committees, and the IAF secretariat for what promises to be a successful congress, rich in diversity and international cooperation. I am very much looking forward to see you all on your computers and be united in the name of space.

Warmest Regards,

Pascale EHRENFREUND IAF President

Connecting @ll Space People

IN THIS ISSUE

IAF PRESIDENT'S WELCOME

IAF EVENTS & NEWS

- IAC 2020
- SPRING MEETINGS 2021
- GLEX 2021
- IAC 2021
- GLOC 2022
- IAC 2022
- IAC 2023

IAF MEMBERS' CORNER

OUR LATEST PUBLICATIONS

- IAF 2021 Calendar
- IAF Welcome Kit for New Members
- IAF Brochure
- IAC 2020 General Programme
- IAC 2021 Call for Papers
- GLEX 2021 Call for Papers
- IAC 2022 Flyer
- GLOC 2022 Flyer

INTERVIEW WITH: CHANG'E4 Mission Leaders

IMPORTANT DATES:

- Opening call for papers GLEX 2021: 26 October 2020
- Opening call for papers IAC 2021: 4 November 2020
- IAF Spring Meetings: 23 25 March 2021
- GLEX 2021: 14 18 June 2021
- IAC 2021: 25 29 October 2021
- GLOC 2022: **31 May 2 June 2022**
- IAC 2022: 18 22 September 2022
- IAC 2023: 25 29 September 2023



IAC 2020

It has been a challenging year and unfortunately many important space events had to be cancelled. However the IAF has transform this challenge into an opportunity therefore the IAC will still take place this year, even if only virtually. Because this is the legacy of the IAC: giving a platform for all humankind to meet, exchange and connect. Connecting @II Space People, this year's IAC theme, is more than ever of paramount importance as we need to be united in the name of space – even if only online, virtually. The IAF is pleased to present you the full programme for 12 – 14 October 2020. Following the good practice we had during the IAF Spring Meetings 2021, this programme has been conceived to allow people from all over the world with various time zones to be part of the conversation. The IAF would also like to thank all the volunteers, the IPC members, the IAF Bureau, and all IAF partners and supporters to come up with such interesting and timely contents. Most importantly, the IAF is offering the IAC 2020 free of charge, without registration fee and thus this will literally be the year where the IAF will reach EVERYBODY. Social media bets have already started claiming that the IAC 2020 – The CyberSpace Edition will reach more than 10.000 participants... BE PART OF IT!

CONGRESS AT A GLANCE





PE **PLENARY EVENTS**

Heads of Space Agencies Day: Monday 12 October • Time: 14:40-15:30 CEST

Small and Medium Sized Companies – Strategies for Survival and Recovery in the Age of COVID-19? Day: Tuesday 13 October • Time: 14:50 – 15:30 CEST

Early 2020s – Launch of Worldwide Missions to Mars Day: Wednesday 14 October • Time: 14:50 - 15:30 CEST

HIGHLIGHT LECTURES HLL

The Chang'e 4 Mission Day: Monday 12 October • Time: 17:30 - 18:00 CEST

MEV 1: The World's First Commercial On-Orbit Servicing Mission Day: Tuesday 13 October • Time: 17:50 - 18:20 CEST

IAF GNF SESSIONS



DLR Panel: Science for Future – Earth Observation Technologies in the Age of Climate Change Day: Monday 12 October • Time: 16:40-17:20 CEST

ISS Commercialization and Future Industry Innovation in Low Earth Orbit Day: Tuesday 13 October • Time: 14:00 – 14:40 CEST

The Artemis Mission Day: Tuesday 13 October • Time: 15:40 - 16:20 CEST

Orion, The Foundation for Crewed Exploration of Deep Space Day: Tuesday 13 October • Time: 16:20 - 17:00 CEST

IAF/ASE Astronauts Panel Day: Wednesday 14 October • Time: 15:40-16:20 CEST

Europe on and around the Moon and Mars: A discussion between ESA and NASA leaders with European young professionals on Europe's space exploration contributions and ambitions Day: Wednesday 14 October • Time: 16:30 - 17:10 CEST

IAF Events & News









IAC 2020 – The CyberSpace Edition will feature a Virtual Technical Programme based on a compilation of 10-minute video lectures. The presentations will be available throughout the entire duration of the congress, 12 to 14 October, in the form of a "Technical Presentations' Virtual Gallery". The Virtual Gallery will be grouped per Symposia, where all the video lectures and the full papers submitted to each Symposium will be be available to the Congress participants. With "more than 1600" lectures there will be a very rich and diverse Technical Programme presenting the latest research outcomes in space. These will be available 24/7 throughout the whole IAC.

SPECIAL SESSIONS

State and Response of the Global Space Sector during COVID-19 Day: Monday 12 October • Time: 16:00-16:40

Unleashing the potential of Artificial Intelligence (AI) & Machine Learning (ML) into Space Day: Wednesday 14 October • Time: 14:00 - 14:40

SYMPOSIUM KEYNOTES Keynotes

NASA's Jet Propulsion Laboratory (JPL) Response to the COVID Pandemic: Ventilators, Respirators and More. **Special Keynote**

A6.2 Identifying the 50 Statistically Most Concerning Derelict Objects in LEO Symposium: A6. 18th IAA SYMPOSIUM ON SPACE DEBRIS

B3.1 Innovative Partnerships in Human Space Exploration Symposium: B3. IAF HUMAN SPACEFLIGHT SYMPOSIUM • Session: 1 – Governmental Human Spaceflight Programmes (Overview)

B4.1 Survey on Nano-satellite Capacity Building Needs Around the World Symposium: B4. 27th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS • Session: 1 – 21st Workshop on Small Satellite **Programmes at the Service of Developing Countries**

B4.8 Consolidated Phase A Design of the LUMIO Spacecraft: a CubeSat for Observing and Characterizing **Micro-Meteoroid Impacts on the Lunar Far Side** Symposium: B4. 27th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS • Session: Small Spacecraft for Deep-Space Exploration

B4.9-GTS.5 Constellations : The Satellite Serial Production Challenge Symposium: B4. 27th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS • Session: Small Spacecraft for Deep-Space Exploration

C3.1 New Concepts and Markets for Space Solar Power Symposium: B4. 27th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS • Session: Small Spacecraft for Deep-Space Exploration

C4.1 Research and Development of 500 Ton-Thrust-Class LOX/Kerosene Rocket Engine Symposium: C4. IAF SPACE PROPULSION SYMPOSIUM • Session: 1 – Liquid Propulsion (1)

C4.5 Electric Propulsion Research and Development at NASA Symposium: C4. IAF SPACE PROPULSION SYMPOSIUM • Session: 5 - Electric Propulsion (1)

C4.7 The Synergetic Air-Breathing Rocket Engine (SABRE) – Development Status Update Symposium: C4. IAF SPACE PROPULSION SYMPOSIUM • Session: 7 – Hypersonic Air-breathing and Combined Cycle **Propulsion, and Hypersonic Vehicle**

E6.5 Business Strategy in the Emerging Commercial Space Industry Segments Symposium: E6. IAF Business Innovation Symposium

E7.1 A New Format for Space Law? Symposium: E7. IISL Colloquium on the la of outer space

E9.1-A6.8 Progressive Leadership in Space Safety Requires a New Approach to Setting Debris Mitigation **Standards**

Symposium: E9. SYMPOSIUM ON SPACE SECURITY • Session: 1-A6.8 – Policy, Legal, Institutional and Economic Aspects of Space Debris Detection, Mitigation and Removal Please lin kit to Read more...

E9.2-D5.4 Crises: Cybersecurity for Small-satellite Ecosystem – State-of-the-art and Open Challenge Symposium: E9. SYMPOSIUM ON SPACE SECURITY • Session: 2-D5.4 – Cyber-security threats to space missions and countermeasures to address them



The IAF is very happy to announce that a campaign to give special recognition to all IAC delegates will soon be launched!

We invite you to take a picture of you, your friends, your family, while you attend the IAC 2020 from your home, your office or wherever you connect from and share it with us through social media. Selected pictures will then be included in a collage that will be published on the IAC Highlights brochure, IAF website and related social media.

Please make sure to use the official #CYBERSPACEIAC2020

IAF EXCELLENCE IN INDUSTRY AWARD CEREMONY

Day: Tuesday 13 October Time: 13:40-14:00 CEST

KEYNOTE PRESENTATION:



Jean-Marc NASR

Head of Space Systems, Airbus Defence and Space SA, President. Airbus Defence and Space SAS, France

NEXT GENERATION NETWORKING SESSION - INSPIRATION AND INNOVATION: PUBLIC/PRIVATE PARTNERSHIPSAS A CATALYST FOR THE NEXT GENERATION

Day: Tuesday 13 October Time: 17:00-17:40 CEST

This year's IAC's NextGen Networking Session will bring together the best and brightest of students and young professionals dealing with Public/Private Partnerships (PPPs). Such partnerships are characterized by government organizations, private companies, and non-governmental organizations sharing cost, risk, and benefits of success. From cooperative research to inspiring ventures as NASA's Commercial Crew program, PPPs are vital to enable new endeavours and power an ever exciting space industry and economy - and this session is an opportunity for students and YPs that want to be a thriving part of it.

Are you considering the next step in your professional growth? Are you looking for mentorship? Do you want to meet and hear from like-minded people, kickstarting a dialogue in our sector? You'll network with the right space folks here!

This session will showcase how the next gen is working to ensure that space is both sustainable and attainable through effective PPPs. By interacting with other attendees, you'll give and get plenty of enriching bits and tips to help you position yourself as a bridge between governmental and private actors' needs and ambitions.

Come to share your ideas and mingle with space professionals. Leave with fresh perspectives, new contacts, and plenty of inspiration to shape the sector and make it flourish!

IAF EXCELLENCE IN "3G" DIVERSITY AWARD CEREMONY

Day: Wednesday 14 October Time: 13:40-14:00 CEST

KEYNOTE PRESENTATION:



Ersilia VAUDO SCARPETTA

Chief Diversity Officer, European Space Agency (ESA), France



AIRBUS



3/2020 | Page 6 | October 2020

IAF Events & News

More Space for Exploration

The world's space agencies are relying upon Arianespace to help boost humanity's knowledge of the universe. With a proud legacy of exploration missions—including five ATVs to the International Space Station, Herschel and Planck, and BepiColombo— Arianespace will use its existing and upcoming family of launch vehicles to launch NASA's James Webb Space Telescope to a Langrangian point, ESA's JUICE spacecraft that will visit Jupiter and its moons, and the ISRU lunar lander system.



FIRST LAUNCH OF A CUBESATELLITE LASER TERMINAL

TESAT is proud to announce that their newly developed CubeLCT is ready to launch and has a reserved launch slot later this year. The CubeLCT is a small, ultra-lightweight optical data transmitter, which is capable of transferring data with 100 Mbps from low Earth orbit satellites directly to ground.

Its development serves the demand for increasing bandwidth resulting of new sensor capabilities on small satellites, which is facing bottleneck issues with today commonly used radio frequency technology. In the future, small satellites will benefit of the ultra-lightweight laser terminal with a mass less than 400 gram and a volume of only about one third U (9,5 x 9,5 x 3,25 cm³), which is capable of data rates of up to 100 Mbps.

Furthermore, due to physical properties of a laser beam, the technology is unaffected by ITU regulations and independent of frequency bands while enabling enhanced security aspects: Optical links are interference-free, resilient to eavesdropping by technology and are the medium for guantum key distribution (QKD) technology.

The CubeLCT was developed in cooperation with the Institute of Communications and Navigation of the German Aerospace Center (DLR-IKN) and is based on a long-time industrial heritage.

GIGABIT ACTIVATION FOR THE ISS

As the Bartolomeo platform is successfully installed and already in use on the ISS, fundamentally simplifying its operational capability and scientific resilience, it is time to announce the next big thing and launching the ISS into the gigabit era:



TESAT's second smallest laser communication terminal called TOSIRIS will be attached to the outer shell of Bartolomeo in the beginning of 2021, enabling data transmission rates of up to 10 Gbps, while weighing just about 9 kilograms and being barely bigger than a customary shoe box.

The TOSIRIS, as well as the CubeLCT, was developed and built in cooperation with the DLR-IKN and comes along with the same benefits as its smaller brother.

Furthermore, the TOSIRIS features 1550nm IM DD technology, has an integrated terminal controller for autonomous terminal operation, integrated mass memory and delivers 10 minutes communication time per ground station pass.

🐇 LEONARDO

Leonardo to the space and beyond

Leonardo, a global high-technology company, is among the top ten world players in Aerospace, Defence and Security. Since the 1960s, Leonardo's technologies and services have played a leading role in the international space market.

Leonardo is involved in all major international missions for earth observation, space exploration, remote sensing for weather phenomena, communication and navigation.

Within the space sector, Leonardo covers the whole market's production chain: from satellite manufacturing and development of innovative payload and equipment, to in-orbit launch and satellite and geo-information services.

This is also possible thanks to Leonardo's joint ventures such as Telespazio (67% Leonardo, 33% Thales), responsible for developing and managing ground systems, satellite operations and services, and Thales Alenia Space (67% Thales, 33% Leonardo), with regard to satellite and orbital structures manufacturing. Telespazio and Thales Alenia Space together form the Space Alliance.

Leonardo also owns some shares of Avio (about 30%), leader in the space launcher and spacecraft propulsion sector and famous for its Vega launchers.

In the satellite service sector, Leonardo, through e-GEOS (an ASI and Telespazio company), offers superior data acquisition, analysis and reporting coming from some of the most important Earth Observation programs, such as Copernicus, headed by the European Space Agency (ESA) and the European Commission, and the Italian COSMO-SkyMed constellation (Italian Space Agency and Italian Ministry of Defence).

Within its Electronics Division, Leonardo designs and develops hi-tech electro-optical payloads, robotic drills and arms, solar arrays and power units, atomic clocks, attitude sensors and other equipment for all major international space missions.

Leonardo's drills are famous for having touched on a comet, with the Rosetta mission, and will soon fly to Mars with Europe's ExoMars2022 mission. The drill, for the first time in history, will dig down the Red Planet's surface, as far as 2 meters, searching for any trace of life. In addition, Leonardo is now developing PROSPECT, a drill and a mini-laboratory, that on-board of the ESA-Roscosmos Luna-27 mission will study the Moon subsoil.

The electro-optical payloads developed by Leonardo are being used for a wide range of purposes. PRISMA's hyperspectral camera can be described as a technological jewel: it can observe the chemical and physical analysis of the Earth from space. Another innovative instrument that can help to study and monitor our planet is SLSTR. Embarked on Copernicus Sentinel-3, SLSTR is able to measure the temperature of the Earth and its oceans at a range of 800 km with tenths of a degree accuracy.

Some of the most important meteorological missions such as Meteosat and Metop (ESA and Eumetsat) also include Leonardo's instruments. For instance, Lightning Imager, which is capable to "see" lightning during the day and night, and the **3MI** to study the quality of the air.

The electro-optical payloads realized by Leonardo are not only for Earth observation but also represent the heart of science missions to study the universe. Only in 2019, Leonardo provided the electro-optical system of CHEOPS's telescope (in search of extra-solar planets) and is now working on PLATO's 26 telescopes.

Another key space element is the atomic clock, useful for satellite navigation applications. Leonardo's hydrogen maser atomic clock is the most accurate clock ever made as it accumulates an error of just one second every three million years. Two atomic clocks are installed on each of the GNSS Galileo satellites and they are the key of the system. In fact, because space and time are linked in determining a geographical position, a better measurement of time equals to a more accurate location.

Since the 1990s, over 60 satellites and space probes have been operating thanks to Leonardo's photovoltaic technology. Leonardo's solar arrays and power distribution units will soon take Orion European Service Module to the Moon.

> Thanks its proven experience in the space sector, Leonardo's technologies take part in all the most important space programmes that are promoted by international agencies and institutions such as Artemis, ExoMars, Dart, BepiColomobo, Galileo, CHEOPS, JUNO, Copernicus, Venus Express, missions as well as the International Space Station.

The Cosmic Welcome Mat

by Jonathon Keats and Alice Gorman, PhD

This is a Cosmic Welcome Mat. The mat has been designed to welcome beings from anywhere in the universe – including members of our own species here on Earth – to visit your home during the 71st International Astronautical Congress. The design draws on a universal visual language derived from physics, chemistry and biology, as well as archaeological research into symbolic communication through deep time. Welcomeness is communicated in terms of receptiveness, conveying the potential of an 'alien' organic blob to fit into a standard domestic space. The graphic can be downloaded and printed out, ideally on carpet (though even ordinary paper will suffice), and oriented to fit in your doorway as shown in the photograph. To invite otherness and overcome xenophobia, the welcoming effort must be ongoing and should involve everyone. The Cosmic Welcome Mat is merely an entry point into a future world of tolerance.



IAC 2020 – Sponsors





3/2020 | Page 10 | October 2020





IAF SPRING MEETINGS 2021

s each year, the IAF is pleased to invite you to its Spring Meetings taking place As each year, the IAF is pleased to infine you to the provide the second 23 – 25 March 2021 in New CAP Conference Centre.



#GLEX2021

The IAF is following closely the COVID-19 situation and will keep you all updated if things change.



IAF GLEX 2021 – St. Petersburg, Russia

Welcome to GLEX 2021!

It is with great pleasure that the International Astronautical Federation invites you to the third Global Space Exploration Conference 2021 – GLEX 2021. After Washington, D.C. in 2012 and Beijing in 2017, St. Petersburg will now host the Global Space Exploration stakeholder community for a unique and timely global conference. GLEX 2021 is dedicated to building and maintaining the international relationships that will support human exploration of outer space.



A Global Space Exploration Conference appears timely considering current discussions

and efforts worldwide to define the next steps for international cooperation that seems to become increasingly relevant to the future of space exploration. This conference will cover a large spectrum of topics pertinent to space exploration. Where do we stand on robotic and human missions to the moon? Are there new business models for space exploration? What is the life support challenge for human space exploration? How can we improve international cooperation for Space Exploration?

The Global Space Exploration Conference will be an essential milestone in the world's leading and emerging Space nations' decision-making process. We welcome all members of the global space community to actively participate in this critical discussion on space exploration policy, science, and technology.

Welcome from IPC Co-Chairs

Dear fellow members of the global space exploration community,

We look forward to welcoming you to the Global Space Exploration Conference 2021 in St. Petersburg! GLEX 2021 is jointly organized by the International Astronautical Federation and ROSCOSMOS and follows the successful GLEX 2012 in Washington, D.C. and GLEX 2017 in Beijing.

Space Exploration has been a dream of many for a long time. Beginning in the middle of the last century humanity has started to turn this dream into reality. We remember with pride the first artificial satellite, Gagarin's spaceflight, the first woman in space, the first spacewalk, and the first steps by man on the Moon. International partnerships have become ever more important, and today the International Space Station, the biggest and largest human-made space object, serves as a unique science laboratory in Earth orbit. We stand today at a truly transformational time in space exploration. Humanity's gaze is now often focused ever further out - to the Moon, and Mars, and beyond. Robotic





Sergey Krikalev

Pascale Ehrenfreund

International Astronautical Federation (IAF)

President,

Austria

Past VP for International Relations and Outreach International Astronautical Federation (IAF), Executive Director for Piloted Spaceflights,

State Space Corporation ROSCOSMOS, **Russian Federation**

Christian Sallaberger

Chair.

IAF Space Exploration Committee, International Astronautical Federation (IAF), President, Canadensys, Canada

and human lunar missions are being planned and implemented by both governments and private industry around the world. Others are planning lunar bases and villages. Others are developing missions to explore Mars, or to mine asteroids. One of the remarkable aspects of the global space world today is how commercially funded space exploration activities are becoming an ever more common compliment to government-led space programmes.

Against this exciting backdrop, GLEX 2021 will bring together all the key space exploration players for a week in wonderful St. Petersburg this coming summer. Space agency leaders, captains of industry, academic researchers, policy experts, entrepreneurs, and other enthusiasts are invited to exchange ideas, report on results, share visions, and together make space exploration plans. Delegates will be able to inform themselves about programmes around the world and establish and advance international partnerships to turn exploration dreams into reality.

We encourage all who are active and interested in moving humanity beyond the boundaries of the known world to join us for GLEX 2021 on 14-18 June 2021 in St. Petersburg!

Conference Objectives

Following its mission to encourage cooperation, promote international development and share knowledge, the IAF as well as ROSCOSMOS are committed to supporting the international relationships that enable exploration of outer space. GLEX 2021 is designed to encouraging the sharing of programmatic, technical and policy information, as well as collaborative solutions, challenges, lessons learnt, and paths forward among all nations with the desire to explore space. During the 4 years since GLEX 2017 the international space exploration community has significantly moved forward with their respective exploration planning and programmes and it is therefore timely to take stock of the developments and undertake an outlook to the future of space exploration on a global scale.

The GLEX 2021 programme is designed to bring together leaders and decision-makers within the science and human exploration community engineers, scientists, entrepreneurs, educators, agency representatives and policy makers. It will provide a forum to discuss recent results, current challenges and innovative solutions and it will contain several opportunities to learn about how space exploration investments provide benefits as well as discuss how those benefits can be increased through thoughtful planning and cooperation.

Call For Papers

Abstracts should be written in English and submitted on the IAF restricted area at www.iafastro.net to one of the following tracks:

- 1. International Cooperation for Space Exploration
- 2. Lunar Exploration
- 3. Mars Exploration
- Δ. Exploration of Near-Earth Asteroids
- Exploration of Other Destinations 5.
- 6. Space Transportation

Submitted abstracts will be evaluated by the session chairs on the basis of technical quality and relevance to the session topics. Note: An abstract can be submitted to only one technical track

Important dates and deadline

- 26 October 2020 > > 31 January 2021 14 June 2021 > 14 - 18 June 2021 18 June 2021
 - **Call for Papers closes** > **Next Generation Seminar**
 - Conference

Call for Papers opens

≻ **Cultural Visits**



- 7. Key Technologies
- 8. Challenges of Life Support/Medical Support for Human Missions
- 9. Space Stations
- 10. Space Resources
- 11. Ground-Based Preparatory Activities
- 12. Transcending Societal Issues for Space Exploration



GLEX 2021 at a Glance



Programme Committee

Co-Chairs

Christian Sallaberger Chair, IAF Space Exploration Committee International Astronautical Federation (IAF), President, Canadensys, Canada

Members

Khaled Al Hashmi UAE Space Agency, UAE Salem Humaid Al Marri Aohammed Bin Rashid Space Centre, UAE Oleg Alifanov Moscow Aviation Institute, Russian Academy of Sciences, Russian Federation

Stephen Attenboroug Virgin Galactic, UK Alain Bories, OHB System SE, Germany

Pierre W. Bousquet Centre National d'Etudes Spatiales (CNES) France

Kammy Brun China Head Aerosapce Technology Group, China **Bruce Chesley**

The Boeing Company, USA Juan De Dalmau

International Space University (ISU), France J.R. Edwards

Lockheed Martin Corporation, USA Matteo Emanuell Space Generation Advisory Council (SGAC), Austria

Christian Feichtinger International Astronautical Federation (IAF), France

Bernard Foing European Space Agency (ESA), The Netherlands

Kevin Foley The Boeing Company, USA Nadeem Ghafoor

Canadensys, Canada Peter Graef German Aerospace Centre (DLR), Germany

Mariella Graziano GMV Aerospace & Defence SAU, Spain Bernhard Hufenbach

European Space Agency (ESA) and ISECG, The Netherlands

Sponsorship Opportunities

GLEX 2021 offers a wide range of visibility and promotion opportunities for your organization. For more information on sponsorship opportunities, please contact: Isabella Marchisio, Senior Projects Manager, International Astronautical Federation, isabella.marchisio@iafastro.org

Sergey Krikalev Past VP for International Relations and Outreach, International Astronautical Federation (IAF), Executive Director for Piloted Spaceflights, State Space Corporation ROSCOSMOS. Russian Federation

Maria Antonietta Perinc European Business Angels Network (EBAN), Belgium Human Space Flight Program Center, The Central Research Institute of Machine Building (TSNIImash), Russian Federation Federation Lavochkin Association, Russian Federation Cheryl Reed

United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), Canada Masaru Koga

Japan Aerospace Exploration Agency (JAXA), Japan Kathy Laurini Osare Space, USA

Gilles Leclerc Canadian Space Agency (CSA), Canada

Candace Johnson

Kharun Karchaev

David Kendall

Georgy Karabadzhał

Sandy Magnus AstroPlanetview, Inc., USA

Viktoria Mavorova Bauman Moscow State Technical University, Russian Federation

Fritz Merkle OHB System AG-Bremen, Germany Carlo Mirra

Airbus Defence and Space, Germany Clay Mowry

Blue Origin, USA Chiaki Mukai Japan Space Exploration Agency (JAXA), Japan

Valanathan Munsami South African National Space Agency (SANSA), South Africa Oleg Igorevich Orlov nstitute of Biomedical Problems of the Russian Academy of

Sciences, Russian Federation David Parker

European Space Agency (ESA), France

Thales Alenia Space Italia, Italy Anatoli Alekseevich Petrukovich Space Research Institute Of Russian Academy of Science corresponding member of Russian Academy of Sciences. Russian

The Johns Hopkins University Applied Physics Laboratory, USA Giuseppe Reibaldi,

Moon Village Assocation (MVA), Austria Gwynne Shotwell SpaceX, USA

Igor Sorokin 5. P. Korolev Rocket and Space Corporation Energia, Russian

Federation **Randy Sweet**

Lockheed Martin Corporation USA Nikolav Testovedov

ISS-Reshetnev Company, Doctor of Engeneering, Corresponding member of the Russian Academy of Sciences, Russian Federation Stephan Ulamec

erman Aerospace Center (DLR), Germany

Daniel Voigt German Aerospace Centre (DLR), Germany Dengyun Yu

China Aerospace Science and Technology Corporation (CASC), China

Lev Matveevich Zelenyi Snace Research Institute of Russian Academy of Sciences sian Federation

Hans Zeller Arianespace, France

Ivnn Zoenen space, Luxembourg



GLOC 2022

- ollowing its mission to promote international development and share knowledge, the International Astronautical Federation (IAF) and its member the Norwegian Space Agency (NOSA) are pleased to announce that the 2022 Global Space Conference on Climate Change (GLOC 2022) will be taking place in Oslo, Norway on 31 May – 2 June 2022. GLOC 2022 will contribute to the global efforts to better understand and battle climate change through the use of space-based services and applications. First conference of its kind, GLOC 2022 is designed to encouraging the sharing of programmatic, technical and policy information, as well as collaborative solutions, challenges, lessons learnt, and paths forward among all nations. GLOC 2022 will address various topics of interest in relation to space and climate change with a specific focus on:

- **Causes and Effects of Climate Change** •
- **Possible Solutions** •
- Space Remote Sensing / Satellite Monitoring / • Earth Observation
- Maritime Surveillance •
- Intergovernmental and Interagency Actions

57 0) P



IAF Events & News GLOC 2022 IAF GLOBAL SPACE CONFERENCE ON CLIMATE CHANGE



The International Programme Committee is pleased to invite you to submit an abstract for consideration for the 72nd International Astronautical Congress to be held in Dubai, United Arab Emirates from 25 to 29 October 2021. The Congress is organized by the International Astronautical Federation (IAF), hosted by the Mohammed Bin Rashid Space Centre (MBRSC), and will be supported by the International Academy of Astronautics (IAA), the International Institute of Space Law (IISL) and the Space Generation Advisory Council (SGAC) who contribute to the IAC through their particular events and symposia.

Join the global space community at this exciting international gathering – and play an active role in the Technical Programme by presenting your recent work. Submitted abstracts can be considered for oral presentations (as 'Short Talks' in the Symposia) and for interactive presentations.

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

The "Call for Abstracts" is a precursor to a subsequent submission of a final paper, which may be presented at the 72nd IAC. Authors are invited to submit an abstract regarding an original, unpublished paper that has not been submitted in any other forum. Abstracts must fit into one of the following IAC categories: Science and Exploration; Applications and Operations; Technology; Infrastructure; Space and Society. Abstracts must be written in English and the length shall not exceed 400 words. Tables or drawings are not allowed in the abstract. Submit your abstract through the online IAF portal at www.iafastro.net no later than 11:59 PM CEST on 28 February 2021.

Submitted abstracts will be evaluated by the Session Chairs on the basis of technical quality and relevance to the session topics. Selected abstracts may be chosen for oral or interactive presentation. Any such choice is not an indication of quality of the submitted abstract. Their evaluation will be submitted to the International Programme Committee, which will make the final decision during the IAF Spring Meetings to be held in March 2021 in Paris, France. Please note that any relevance to the Congress main theme will be considered as an advantage. Accepted abstracts will be displayed on the Congress website and published in the IAC Congress Proceedings.

We look forward to receiving your abstracts for IAC 2021 and please check the IAF website regularly to get the latest updates on the Technical Programme!



S. SOMANATH Vice President, Technical Activities nternational Astronautical Federation (IAF)



#IAC2021



3/2020 | Page 16 | October 2020

IAF Events & News



IAC 2022 ORGANIZED BY





2022





CONGRES INTERNATIONAL D'ASTRONAUTIQUE

PARIS \$0 SEPTEMBRE 1950

What is the IAC?

The IAC is the one place and time of the year where all global space actors come together. The event attracts more than 4,000 participants each year.

Covering all space sectors and topics, it offers everyone the latest space information and developments in academia and industry, networking opportunities, contacts and potential partnerships.

Each year, the IAC changes country, theme and local organizer, enabling all to learn more about, and be a part of the world space scene.

What is the IAC 2022 about?

The International Astronautical Congress 2022 will be hosted in the beautiful city of Paris, France. Exceptionally, the IAC 2022 will be from Sunday till Thursday, 18 – 22 September. The Hosting Organization is the Centre National d'Études Spatiales (CNES), a member of IAF since 1981. Paris hosted the first IAC ever in 1950, then in 1963 and lastly in 1982 and now will be holding the record of the city with most IACs hosted.

The IAC 2022 theme will be **Space for @II** to reach beyond the space community and bringing together all communities. The IAC 2022 will offer great opportunities for networking and forging new contacts and potential partnerships.

For the latest information, visit www.iac2022.org or www.iafastro.org



www.iac2022.org



Baku is waiting for you!

Azerbaijan is a land of many extraordinary revelations. An Eastern country with a Western outlook, it has been at the crossroads of culture for millennia and boasts a history woven together by the fascinating tales of travellers passing through the Great Silk Road.

Combining the charms of both Europe and Asia, Azerbaijan's many contrasts are beautifully intertwined and evident throughout the country. From historic and traditional experiences to modern-day escapades, there are countless paths that each lead to untold tales and adventure. And no matter which path you take, expect architectural splendour, breath-taking landscapes, unparalleled hospitality, and exquisite food and wine.



Baku Old City



Azercosmos Satellite Fleet

Azerbaijan is still a mystery to many. Yet over the past decade, more and more travellers have been discovering the country. Before the unfortunate pandemic caused by the spread of the coronavirus disease (COVID-19), the country was on the cusp of a tourism boom as it welcomed a record number of inbound visitors. The country is easily accessible with over 40 direct flights across the Middle East, Europe, and the Americas, and its visa-on-arrival offering with a simplified e-visa procedure adds to the convenience of visiting.

Azerbaijan is one of the leading countries in its region. Having prioritized ICT sector, undoubtedly including space technologies, at heart of the socio-economic development, the country's economy is growing very fast. And Azercosmos, the first and still the only satellite operator in the South Caucasus region, aims at fostering innovation and further development of the space industry in Azerbaijan.

The prospects for Azercosmos to support the country's socio-economic development as well as the space industry advancements exceed meeting the domestic demand or making commercial profits through the export of satellite services. Azercosmos aims to turn Azerbaijan into a regional space technologies hub through cooperation with leading industry representatives in the field. Its objective is to boost product development and facilitate the establishment of regional offices, production facilities, and R&D centers in Azerbaijan. Azercosmos strives to create an industrial and technological environment to support and achieve the formation of an innovative ecosystem for the space industry in the country. This will attract both private NewSpace companies and startups, as well as established giants of the space industry from all over the world.

Azercosmos has already embarked on these plans. It negotiates with leading space agencies and businesses.

Furthermore, Azercosmos, as a proud host, has already begun large-scale preparations for the 74th IAC and carries out the respective tasks in this direction. Its team is working all-around to make this experience unforgettable for all the participants of the IAC in 2023.

We are waiting for you in Baku! Come and Enjoy our hospitality! www.iac2023baku.org



3/2020 | Page 18 | October 2020

IAF Events & News

#IAC2023



Baku Boulevard





NEWS!

UAEU The

👔 جامعة الإمارات العربية المتحد

NSSTC

NSSTC aiming to become one of the pioneered Space center. Currently NSSTC is nearing completion its 250kg Assembly, Integration, and Testing facility for satellites. The Center's other facilities include a ground station, mission control and GNSS. In the near future, In Space Resources Utilization and Propulsion laboratories will be built supported by additive manufacturing equipment aiming to conduct a leading-edge research activities to develop innovative advanced technological prototype and industrial products for aerospace applications.

NSSTC's first satellite, is a GNSSaS Nano-Satellite to demonstrate capabilities of RF Signaling technology, perform remote sensing using GNSS reflectometry; and monitor effect of the lonosphere on RF signals. The 813 hyperspectral satellite development program will carry a compact hyperspectral instrument (400-2500nm) with more than 200 spectral bands. The satellite will allow precise applications in forestry, crop management, mineralogy, and natural resource management. This first and substantial step towards making UAE and Gulf Cooperation Council (GCC) countries self-reliant in the field of hyperspectral Earth observation is a significant milestone and will usher a new era of regional remote sensing capacity building and applications.

One of the on-going projects at NSSTC is 'Developing land use land cover (LULC) maps using geo-spatial and artificial intelligence techniques', which allows to develop dynamic national level LULC classification maps using high resolution satellite images, making use of high-performance computing resources. NSSTC is developing research capabilities, to engage in the Emirates Mars Mission, on Mars' atmosphere, planetary climate modelling, data assimilation, the dust cycle, and other physical processes relevant to Mars' lower atmosphere and climate.



The Intersputnik International Organization of Space Communications, an institutional member of the International Astronautical Federation since 2015, has summed up the first results of its Program for the Development of Space Communications Business in the Intersputnik Member Countries. Approved in late 2018 by Intersputnik's governing bodies - the Board and the Operations Committee - the Program was launched last year. Under the Program there was set aside a dedicated investment fund totaling USD 4,500,000 to finance new satellite telecommunications projects planned by government and private companies operating under relevant national jurisdictions. Winners of tenders under the Program can be offered an interest-free loan of up to USD 750,000 to fund a project. The winner of the first tender was Isatcom from Mongolia with a project aimed at upgrading a hub station and expanding a ground network to 750 mobile terminals to be used in Mongolia's remote and hard-to-reach regions. Recently, Intersputnik has analyzed progress in the implementation of that project finding it satisfactory and up to the requirements of the investment program. The next tender is scheduled for late 2020. Tentatively, letters of intent have been received from two Asian companies and an African company willing to participate.

Shortly, the Intersputnik Board and the Operations Committee will review several amendments to the Program, which are meant to make it more attractive and draw more potential bidders. It is planned to increase the amount loaned to Intersputnik Signatories to USD 1,000,000 per project and keep the same amount for other bidders. Under certain conditions, loans may also be requested by companies from non-Intersputnik countries. There will be added a separate opportunity to finance startups.

Please visit www.intersputnik.com for more details concerning Intersputnik's Program.





Established in 2011, the Vietnam National Space Center (VNSC) is governed by the Vietnam Academy of Science and Technology (VAST), which administers and advances research and development and technology applications. VAST is working with VNSC to increase Vietnam's space science and technology capabilities with additional investments in national training and infrastructure. VNSC also oversees the management and implementation of the Vietnam Space Center Project-one of Vietnam's largest science and technology investments. Having 2 satellites created by our engineers and launched in orbit: PicoDragon (2013) and MicroDragon (2019), VNSC plans to continue this successful path by launching NanoDragon in 2021 and LOTUSat-1 in 2023.

VNSC's primary focus is to facilitate international cooperation and has become an active member of several international organizations including the International Astronautical Federation - IAF (2012), Committee on Earth Observations -CEOS (2013) and Group on Earth Observations - GEO (2014). The VNSC was proud to successfully organize 10th GEOSS Asia-Pacific Symposium in 2018, served as Chair of CEOS in 2018-2019. In the next coming year of 2021, VNSC is excited to be your host of Asia-Pacific Regional Space Agency Forum (APRSAF-27) and 39th International Symposium on Remote sensing of Environment (ISRSE-39) in Hanoi, Vietnam. For more information about us, please visit https://vnsc.org.vn/en/





Infostellar is an innovative SME looking to revolutionise the ground segment, democratising and adding flexibility to the way that operators access their satellites, through our cloud-based platform StellarStation.

IAF Members' Corner

Fragmented ground services consume satellite businesses' time and resources, hindering expansion and increasing costs, and from our inception in 2016, this is something we have actively been trying to change.

A Tokyo based start-up, we have spent the last four years building our product and solidifying our base in Japan, whilst simultaneously ensuring that we are also addressing the needs of the industry in Europe, where we established our base in London in 2019, as well as the USA, both of which will continue to be areas of interest to us for the remainder of 2020 and bevond.



Our focus in 2020 has been to continue growing our StellarStation platform to reach a wider range of satellite customers as well as to grow the ground stations that are a part of our network, as well as the growth of Infostellar.

In Q2 of this year, we raised a total of \$3.5M in a round of CB funding with existing investors Airbus Ventures and Sony Innovation Fund, whilst also welcoming new investors Daiwa Energy & Infrastructure, Mitsubishi UFJ Capital and Mitsubishi UFJ Lease & Finance. This brought our cumulative total of funds raised to \$11.5M USD. We also increased the employees in our UK office, and hope to continue expanding globally in 2021.







In June 2020, SITAEL and its partners Thales Alenia Space Italia, Leonardo and Airbus Italia signed the long-term agreement for the commercialization and industrialization of PLATiNO, the Italian answer to the world interest in innovative high-tech small satellite platforms. Funded by the Italian Space Agency ASI, PLATINO is the all-electric multi-purpose small satellite platform, suitable for deployment in constellation and for a wide range of multi-mission applications.



Figure - PLATiNO Satellite Platform

After the launch of Solar Orbiter (February 2020) with SITAEL electronics on board of METIS Coronagraph and Solar Wind Analyzer, the two instruments have been successfully activated en-route to the Sun. Meanwhile the company is completing the HT100 Hall Effect Thurster ground qualification targeting a maiden flight in 2021. HT100 is one of the smallest HET, with a demonstrated operational time of over 2000 hours with Xenon and able to operate with Krypton.



Figure - Characteristic blue-indigo plume of HT100 operated with Krypton

A very exciting 2020 for SITAEL Australia started with the opening of the new company premises within the technological district Lot14 in Adelaide and continued with the signature of the two contracts for Bucaneer, a cubesat programme for Defence applications led by Inovor, and SpIRIT a scientific cubesat programme led by the University of Melbourne.



Figure - From left to right: Pierluigi Pirrelli – Managing Director of the SITAEL Space Division , Francesca Tardioli – Italian Ambassador in Australia, Mark Ramsey – General Manager of SITAEL Australia, Steven Marshall – Premier of South Australia

SITAEL is a proud sponsor of the 71st International Astronautical Congress, IAC 2020 Cyberspace Edition, and belongs to Angel Group, an Italian holding world leader in Railway, Aerospace and Aeronautics markets.

For further information visit <u>www.sitael.com</u>





Ukraine is a Reliable Partner in **Antares International Space Project**

The 13th launch of the American-Ukrainian Antares mediumclass launch vehicle is scheduled for September 29, 2020, from the Wallops Flight Facility in Virginia, United States, as part of the NG-14 mission to deliver cargo to the ISS under the NASA CRS-2 contract.

The Antares rocket is a two-stage vehicle carrying the Cygnus resupply spacecraft. The Antares Stage 1 Core Structure was developed in Ukraine by Yuzhnoye SDO and manufactured by PA Yuzhmash in cooperation with Hartron-ARKOS, Kievpribor, Hartron-UCOM, CHEZARA, RAPID and other Ukrainian companies. Northrop Grumman Corp. of the United States is the prime integrator for the Antares launch vehicle.

On September 16 – 18, 2020, Northrop Grumman accepted the next Stage 1 Core Structure for the NG-16 mission. The stage was found ready for future integration into the Antares LV.

Acceptance of another Stage 1 Core Structure is planned for the end of October 2020.

Both Stage 1 Core Structures will be delivered to the Mid-Atlantic Regional Spaceport (MARS) on Wallops Island, VA. in early December 2020.

The production of two more Stage 1 Core Structures for the Antares booster is underway at PA Yuzhmash. The expected completion date is September 2021.



IAF Members' Corner



During the last months INTA maintains its activities in both flight and ground segment. It participates in Mars exploration developing payloads for Mars2020 and ExoMars. In the NASA mission has contributed with MEDA (Mars Environmental Dynamic Analyzer) instrument and for ESA has several contributions: RLS, the first Raman spectrometer which is going to fly in an exploration mission for the rover payload and with AMR (vectorial magnetometer) and RDM (radiation and dust sensor) instruments for the lander.



In the astrophysics field, it is involved in two instruments (IMAX and SOPHI) of the ESA Solar Orbiter mission in which has been implemented several components based on liquid crystals. For the ESA mission PLATO is working in the developing of the focal planes and for ESA large mission ATHENA is part of the XIFU team and it has been working in a cryostat breadboard. It also part of the SAFARI proposal team, involved in optics and mechanical aspects.

INTA is making a big effort for developing new technologies for smallsat. In particular, has a project for formation flight demonstration. The project tries to confirm the possibilities of this type of technology with cubesat for scientific missions. The systems will fly under an ESA project next year.

El Arenosillo Experimentation Center is resuming its activity as a European Space Port, working on planning launches with suborbital platforms (up to 150Km apogee), both for public and private entities. The next launch is scheduled for the second half of 2021.







Ukraine Now Has Its National Space Museum

The S.Korolev Space Museum received the highest recognition for museums and became a national. The President of Ukraine Volodymyr Zelenskyy signed a relevant decree on September 8, 2020. On the same day, the Head of State visited the museum, where he got acquainted with the history of space exploration and unique museum's exhibits, made a virtual flight on a space flight simulator.

The President also congratulated the museum staff on the national status granted to the institution. "Political leaders change, but real values remain. That's why I decided to confer the national status, so that all this would be preserved, and the state would support your museum, all of you, everyone," he said.











In the spring of 2020, the University of Southern California Liquid Propulsion Laboratory (LPL), like many other labs worldwide had to transition online, due to COVID-19. The students focused on the design of a cryogenic test stand, particularly a complex feed system. The new working environment allowed LPL to strengthen communications among student teams and called for adjustment of project planning and systems engineering strategies. One notable development is introduction of project tracking programs, Jira and Confluence, to assign tasks and help projects stay on schedule.

As USC gradually reopens research labs across campus, LPL has begun operating at limited capacity while following strict safety guidelines. Among its exciting next projects: creating a USC Space Program in partnership with USC's Rocket Propulsion Laboratory.



Photo caption: A member of the USC Liquid Propulsion Laboratory visits the lab, following several months of shutdown. New safety measures, including use of masks and gloves, are strictly adhered to for all visitors.

3/2020 | Page 24 | October 2020

IAF Members' Corner



Firefly Aerospace recently completed a successful static fire of the Firefly Alpha Flight 1 Stage 1. This 35 second test verified the four Reaver engines generated the thrust required for an orbital launch and exercised full thrust vector control maneuvers. The Flight 1 Stage 2 is undergoing preparation for similar testing. Concurrently, Firefly's launch site at Vandenberg Air Force Base Space Launch Complex 2-West is nearing completion and activation in advance of the first Alpha launch in the fourth quarter of 2020.











Space Flight Laboratory (SFL) Continues to Lead the Way in Microspace Technology

In September 2020, Space Flight Laboratory (SFL) continued its long line of successful projects with the launch and deployment of the GHGSat-C1 greenhouse gas monitoring microsatellite and the Slovenian NEMO-HD Earth observation microsatellite.

SFL, a developer of 52 distinct microspace missions, is recognized for generating bigger returns from smaller, lower cost satellites. Established at the University of Toronto Institute for Aerospace Studies (UTIAS) in 1998, SFL has developed CubeSats, nanosatellites, and microsatellites that have achieved more than 126 cumulative years of operation in orbit.

GHGSat Inc. awarded SFL the development contract for GHGSat-C1 ("Iris") after building the pathfinding GHGSat-D ("Claire") microsatellite launched in 2016. Using high-precision target tracking capabilities developed by SFL, Claire successfully demonstrated that sources of methane and other gas emissions could be detected and measured from space.

Precise pointing made possible by a stable platform at a relatively low cost was also a factor in Slovenia's selection of SFL to build the NEMO-HD microsatellite. It will capture 2.8-meter resolution high-definition multispectral imagery and video for use in a variety of applications. The microsatellite itself is only 60x60x30 centimeters.

Small satellites built by SFL include advanced power systems, stringent attitude control and high-volume data capacity that are striking relative to the budget. SFL arranges launches globally and maintains a mission control center accessing ground stations worldwide. Upcoming SFL launches include a 6U-XL nanosatellite for Kepler Communications, and five microsatellites – Norway's NorSat-3, Dubai's DMSat-1, and HawkEye 360's Cluster 2.







Space Center Houston Unites People Through Space Exploration

Space Center Houston, the Official Visitor of NASA Johnson Space Center, is engaging people around the globe with authentic science learning experiences, new exhibits and expanded digital resources.

Offering a unique perspective on what's happening now in space exploration, Space Center Houston's new exhibits include a flown SpaceX Falcon 9 rocket, the only place in the world outside of SpaceX's headquarters where you can walk underneath an actual first-stage booster, and an all-new exhibit, Mission: Control the Spread, showcasing NASA innovations supporting the COVID-19 pandemic. The center took the initiative to curate the Mission: Control the Spread exhibit to inform people what we can do to slow the spread of the coronavirus and what NASA does to keep astronauts safe. On display through Dec. 31, 2020, the exhibit features NASA innovations including the PULSE pendent, which alerts people to not touch their face, an oxygen helmet and more. The center has also made the exhibit's digital signage and content accessible to museums around the world.

Taking another step to unite people through space exploration, the nonprofit launched its Human Performance Accelerator Lab, a new leadership training and development program. In workshops led by astronauts, psychologists and business experts, the program will give insight on how be a more effective leader. Join Stanford School of Business lecturer and author Leah Weiss and former NASA astronaut Cady Coleman for the first virtual workshop, Compassionate Leadership: Leading with Heart, Oct. 8 at 2-3:15 p.m. CT.

To learn more Space Center Houston, www.spacecenter.org.



Space Center Houston launches a new leadership training and development program designed to empower people with leadership practices proven to achieve extraordinary feats. Space Center Houston's new Human Performance Accelerator Lab offers training workshops led by astronauts, psychologists and business experts to help you be a more effective leader. The first virtual workshop, Compassionate Leadership: Leading with Heart, is Oct. 8 at 2-3:15 p.m. CT. Registration is \$24.95. Stanford School of Business lecturer and author Leah Weiss will join former NASA astronaut Cady Coleman to discuss compassion and how having empathy for another can create a more inclusive, productive and results-driven work environment. Credit: Space Center Houston



The PULSE pendant is one of the NASA innovations on display at Space Center Houston's new Mission: Control the Spread exhibit. When the wearer's hand approaches their face, the movement is detected and the vibrating motor is activated. As the hand gets close, the response becomes stronger.

PULSE is a 3D-printed wearable device that pulses, or vibrates, when a person's hand is nearing their face. The haptic feedback from a vibration motor simulates a nudge, reminding the wearer to avoid touching these entryways in order to reduce potential infection. As health officials advised the world to continue washing our hands, social distancing, and wearing a face mask when going outside, a team of three at NASA's Jet Propulsion Lab (JPL) developed PULSE, to stand side-by-side with these efforts to keep us as healthy as possible.

3/2020 | Page 26 | October 2020

IAF Members' Corner

PULSE is a simple and affordable technology that can easily be reproduced by anyone regardless of their level of expertise. A list of parts, STL files, and assembly instructions are all available as Open Source. Image credit: Lisa Harbottle



A new exhibit at Space Center Houston highlights how NASA continues to innovate to overcome obstacles to benefit humanity. Space Center Houston's new Mission: Control the Spread exhibit tells the story behind NASA innovations supporting the pandemic, what people can do to slow the spread of the coronavirus and what NASA does to keep astronauts safe. Credit: Space Center Houston



NASA's Armstrong Flight Research Center teamed up with Antelope Valley Hospital, the city of Lancaster, Virgin Galactic, The Spaceship Company, and Antelope Valley College to develop an oxygen helmet to support COVID-19 patient.

The Aerospace Valley Positive Pressure Helmet is an oxygen hood prototype developed by NASA engineer Mike Buttigieg. It functions like a continuous positive airway pressure (CPAP) machine and can be used on patients exhibiting mild cases of the virus. See the helmet donated by NASA Armstrong Flight Research Center.

Credit: Space Center Houston







See the PULSE pendant developed by engineers at NASA's Jet Propulsion Lab, which vibrates to alert us to not touch our face. The PULSE pendant is one of the NASA innovations on display at Space Center Houston's new Mission: Control the Spread exhibit. When the wearer's hand approaches their face, the movement is detected and the vibrating motor is activated. As the hand gets close, the response becomes stronger. Credit: Space Center Houston



Walk underneath a flown SpaceX Falcon 9 rocket at Space Center Houston. It's the only place in the world, outside to SpaceX headquarters, where guests can see up-close a reusable rocket used for a NASA mission.

Credit: Space Center Houston



Space Center Houston's Independence Plaza exhibit complex is the only place in the world you can enter a shuttle replica mounted on top of the original shuttle carrier aircraft, NASA 905. It's one of the more than 400 things to see and do at the center. To learn more, visit spacecenter.org. Credit: Space Center Houston



Space Center Houston is open and welcoming guests with enhanced health and safety protocols in place to keep guests and staff safe. Visit Space Center Houston in-person or take a virtual tour through it's free mobile app. To learn more, visit spacecenter.org.

###

The Manned Space Flight Education Foundation is a 501(c)(3) nonprofit science and space exploration learning center with extensive educational programs. Space Center Houston is the cornerstone of its mission to inspire all generations through the wonders of space exploration. The center draws more than 1.25 million visitors annually, was named "Best Museum in Texas" by USA Today and generates a \$118.7 million annual economic impact in the greater Houston area. Space Center Houston is a Smithsonian Affiliate, the Official Visitor Center of NASA

Johnson Space Center and a Certified Autism Center. More than 250,000 teachers and students from around the world visit the center annually to experience the educational space museum with more than 400 things to see and do. For more information, go to www.spacecenter.org.

SOURCE: Manned Space Flight Education Foundation



Azercosmos' R&D Director's Article was Published in Springer

The article by Tarlan Mammadzada, Director of Azercosmos' Research and Development Center, entitled "Space and Security Activities in Azerbaijan" was published in Springer, a worldrenowned international publisher, which gathers the global scientific elite.

The article, which was written based on various comparative analyses and the application of different methods on geographic information systems, shows the results of the monitoring of illegal activities carried out in the occupied territories of the Republic of Azerbaijan by Armenia, particularly, new illegal settlements and infrastructure facilities, as well as proving illegal agricultural activities, looting of natural resources, damage to the environment and natural reserves, through the obtained satellite imagery.

Please follow the link to read the article on "Space and Security Activities in Azerbaijan" published in Springer: https://link.springer.com/referenceworkentry/10.1007% 2F978-3-030-22786-9 139-1



IAC 2023 Project Manager

IAF Members' Corner

Received PMP® Certificate

Abbas Mammadov, the Project Manager of the 74th International Astronautical Congress to be held in Baku in 2023, has received a PMP[®] certificate of the Project Management Institute.

The PMP certificate is an international guality mark for Project Managers that indicate their practical experience and thorough knowledge of the theory, tools, and principles of project management. Having a globally recognized and soughtafter PMP[®] certificate indicates that Abbas has the up-to-date knowledge, skills, and experience necessary to build effective IAC 2023 management systems and lead this project to successful completion.





GALAXI Lab: Strategic flight to boost up space economy in Thailand and Southeast Asia

Nowadays, the global space economy is broadening, extensively. The space and related industries in Thailand grew 10 percent per year, worth 35,559 million baht (in 2018). To gain some portions on this growth and to support the global trends, GISTDA, Thailand has established GALAXI (Gistda's Aerospace LAaboratory of eXcellence and Innovation) as a core infrastructure to conduct research and development, capacity building on space manufacturing technology, as well as, to provide international standard testing services for aerospace industry.





Since first operated in 2017, GALAXI has been providing services on aerospace manufacturing, material and structural testing, for example, composite materials and metallics. At present, GALAXI is accredited various international aerospace quality standards such as AS9100D, ISO/IEC17025:2005, and NADCAP AC7122, which is the only approved independent non-metallic material testing laboratory for aerospace in Southeast Asia.

GALAXI also plays key role to uplift the development of satellite component manufacturing in Thailand through THEOS-2 project. Satellite parts, both mechanical and electrical, are designed by GISTDA at Surrey Satellite Technology Ltd. in UK. Selected parts are placed order to Thai entrepreneurs. This can be potential mechanism to develop fundamental spacecraft manufacturing beside space applications and satellite services.





In the future, we will broaden our services and provide our full expertise to cover spacecraft manufacturing area. GALAXI is more than ready to bring Thailand as the hub of Southeast Asia region to contribute more on the global space community.



A SPACETY Spacety is one of the first private commercial space companies

in China. Its goal is to enable wide commercial applications of satellite EO data with innovative low-cost small satellites and constellations. Since it was founded in 2016, Spacety has launched and operated 18 satellites, including XIAOXIANG-1, the first Chinese satellite designed, built, and operated by a private company in China. These satellites have provided space missions to universities, research insti-tutes, and companies, such as Chinese Academy of Sciences, China Aerospace Science and Technology Corporation, Tsinghua University, and ThrustMe, for space science research or technology demonstration. Spacety is one of the world leaders in providing fast and low-cost total solutions for small satellites and constellations.

Spacety has become a pioneer in small SAR satellites in China. It is developing its first genera-tion smallsat SAR, TY-MINISAR-SAT. Based on the satellite, a SAR constellation will be developed and deployed. The SAR constellation will be of low cost, fast deployment, and flexible con-figuration, and meet the requirements of high spatial resolution, short revisit time, wide cover-age, continuous monitoring, and real-time image processing. The first SAR satellite is scheduled to be launched before the end of 2020 and will become the first Chinese smallsat SAR of 200 kg class with 1 meter resolution. The SAR constellation will start to be deployed in 2021, which is composed of more than 300 satellites of C-band and X-band SAR, with a revisit time shorter than 20 minutes. It will provide SAR images to the whole world with high quality and low-cost.



eesa

Solar Orbiter reaches for our star

On 16th July 2020, the European Space Agency (ESA) shared the first images of the Sun taken by Solar Orbiter. Showing 'campfires', miniature solar flares near the surface of the Sun never observed before in this level of detail, the photos revealed the enormous potential of the spacecraft that had only just completed its in-orbit commissioning.

On 10th February, Solar Orbiter set out on a 7-year mission. After successfully making its first close pass of the Sun on 15 June at 77 million kilometres, the spacecraft's next major step is a Venus fly by on 27th December this year.

With Solar Orbiter, Airbus engineers have tackled huge challenges. At its closest approach to the Sun, Solar Orbiter will face temperatures exceeding 500°C at the front of the craft, while the back will be exposed to temperatures as low as -180°C.

A heat shield covered in a special heat-emitting coating called SolarBlack was built to protect the craft and its sensitive payload. To make sure the instruments could look at the Sun without being destroyed by the heat, the team found another way to keep them at low temperatures combining three ingenious materials, specially developed for this mission, that can divert heat straight through the spacecraft and back out again keeping the instruments cool enough to stare at the Sun.

3/2020 | Page 30 | October 2020

IAF Members' Corner

By balancing the needs of these ten different instruments, Solar Orbiter will be able to utilise their combined results to create a unique cause-and-effect picture of how the Sun works as a system.





The American Astronautical Society (AAS) is the premier network of current and future space professionals dedicated to advancing all space activities. Part of our mission is bringing professionals together to discuss all things space. As such we host many events every year. Highlighted events include:

Glenn Symposium:

AAS held the second annual John Glenn Memorial Symposium from July 15-17 online, which turned out to be a great success. (Due to COVID-19, our society was not able to host an in-person event.) The program included noted speakers such as Jim Bridenstine, NASA Administrator; Janet Karika, Principal Advisor for Space Transportation at NASA; Kathy Lueders, HEO Mission Directorate at NASA; and many more. We look forward to our third annual Glenn Symposium next summer.

Check out this year's symposium here: <u>https://bit.ly/2EBavbu</u>.









ISSR&D Conference:

AAS partnered with the ISS National Labs to host the 2020 ISSR&D Conference, leading the Technical and Poster sessions component. This year looked a little different as everything was online, but it turned out to be a great success with over 100 technical presenters and over 25 poster presenters who had the opportunity to answer live audience Q&A. Make sure to check out the 2021 Technical and Poster sessions on YouTube at https://bit.ly/2RXbB4v.



von Braun Symposium:

The 2020 von Braun Memorial Symposium will take place online October 26-28. This conference will include discussions on

the Artemis program, Human Landing Systems, human space exploration, workforce and education, policy, international collaboration, and more. Featured speakers include Jim Bridenstine, Carissa Christensen, Kara Cunzman, Mary Lynne Dittmar, Mike Griffin, Kathy Lueders, Wayne Monteith, Leland Melvin, Scott Pace, Jim Reuter, Jody Singer, and more! Don't miss out on this opportunity to get up to date on current space science and technology and register today at astronautical.org/ vonbraun.

Find more information about these and other AAS events please visit astronautical.org/events.



- the first national competition

CanSats are miniature structures that operate almost like real satellites, except that they do not reach Earth orbit - and they are much less expensive. Instead, they fly high in the atmosphere, after being launched by a rocket. The complete payload should fit inside a box similar to a soda can – hence the name CanSat. The small CanSats are excellent tools for teaching satellite technology for high-school students. There are several CanSat competitions organised worldwide. In the last couple of years, individual Hungarian teams performed extremely well in Europen competitions. However, 2020 was the first year when a national CanSat competition took place in Hungary. Despite the difficulties with preparations and traveling due to the pandemic, there were 3 student teams participating in the event at a military airfield on 15 August. The teams successfully designed, built, and launched their own CanSats, made the required measurements during the flight, recovered the payload after its landing by parachute, analysed the data, and finally presented the results. The overall winner was GRLsat, a team from a high school in Gödöllő.



The first-ever national CanSat competition was enthusiastically organised by the BME Cosmos Society, a student club at the Budapest University of Technology and Economics, with the assistance of the Hungarian Astronautical Society (MANT), and supported by the Ministry of Foreign Affairs and Trade, the governmental body responsible for space activities in Hungary.





TESAT announces that it recently has signed a new contract for the delivery of laser communication subassemblies for airborne connectivity. With this development, TESAT answers the customers' call based on its long-term heritage and the success of its already-in-orbit laser communication products. Once the new laser communication subassemblies for airborne connectivity are in orbit, they can use the resilient, optical, high data rate links via satellites to be connected for their mission needs.

With this latest achievement, TESAT is chasing a new milestone in terms of high data rate laser communications. After being the first manufacturer worldwide that has performed stable and ultra-fast optical data links in space, and by now having reached the mark of over 40,000 established laser links in orbit, TESAT's next big thing will be the launch of the world's smallest laser communication terminal at the end of 2020: the CubeLCT on the PIXL mission. This milestone will thereon be followed by the commissioning of the TOSIRIS on the ISS at the beginning of 2021, connecting the International Space Station to Earth via gigabit laser. Both, the CubeLCT and the TOSIRIS, were developed in cooperation with the Institute of Communications and Navigation of the German Aerospace Center (DLR-IKN).

IAF Members' Corner

So you can say, TESAT is rounding up its laser portfolio with this latest acquisition making it a true full portfolio one-stopshop for all laser communication products, from ground over airborne to orbit.





Bundesverband der Deutschen Luft- und Raumfahrtindustrie e.V.

BDLI: German space industry excited about virtual IAC

The COVID-19 pandemic clearly demonstrates the importance of space, especially as space creates virtual connectivity when mobility is reduced. After all, it is space that makes the virtual IAC possible.

The BDLI (German Aerospace Industries Association) appreciates the "71st International Astronautical Congress - The Cyberspace Edition". With our 246 members, the BDLI is the German representation of the aerospace industry. All relevant German space companies are BDLI-members, including the entire variety from SME to LSI, such as Airbus DS, OHB, ArianeGroup, Astro-Feinwerktechnik Adlershof, Jena Optronik, Tesat SpaceCom, Hensoldt, MT Aerospace, Thales, CGI, IABG, Telespazio-Vega, Rockwell Collins, von Hoerner & Sulger, Planet Labs and others.

The German space industry achieved great successes in 2019: With 10,000 employees, a turnover of 2.7 billion Euro was generated. The ESA budget has increased to a record level with Germany as the strongest contributor.

AIRBUS	ananecroup	A	CGI	C Collies Aerospace
HENSOLO	IABG	C jenaoptronik		ОНВ
(; TELESPRZIO	© TESAT	ThalesAlenia	THALES	vH&S





At the virtual IAC 2020, the German space industry will be presented with digital contributions. Having Airbus, ArianeGroup, Thales, Tesat, and OHB as key players of German space at IAC 2020, they will offer you exciting insights into their work.

On the past IAC, German space was represented with a joint stand where a great reception was held. Now, looking forward to the virtual IAC, the BDLI is excited about the fair and the various digital contributions and hopes to meet you again in person at the IAC next year at the latest!



Unlocking India's potential in space sector

The Indian Space programme is characterized by a vision to use space technology for national development. Over the last five decades, Indian Space Research Organisation (ISRO) under the Department of Space has been successful in the development of indigenous end-to-end capability in space technology and space activities. This has also led to the growth in Indian industries, with more than 500 MSMEs, PSUs and large private industries contributing significantly to the Indian space programme.

In order to further enhance the diffusion of space technology and boost space economy within the country, Government of India has recently announced that the Indian private sector will be made a co-traveller in India's space sector journey. Department of Space will enable private players to carry out their end-to-end space activities through promotion and handholding, sharing of ISRO facilities, expertise and technology and also by authorizing and monitoring private sector's space activities as per regulatory provisions. A national level autonomous nodal agency called Indian National Space Promotion and Authorization Center (IN-SPACe) is created for handholding, promoting, authorizing and regulating private space activities. A level playing field for the private sector in space will be created through these reforms and new policies in space domain will be brought in. A national legislation for space activities will be enacted to address the necessary legal framework. New Space India Limited (NSIL) will act as the aggregator of user requirements and obtain commitments and also operate commercial launches, satellites and services, while ISRO will carry out capacity building in Space domain through development of new technologies and capabilities.



Responding to the COVID-19 pandemic, the SpaceLand Center's design presented at United Nations and IAF events is being upgraded to completely rethink human life standards for towns, thanks to brand new space-tech-based urbanistics: thanks to international investors, the group will develop whole SpaceLand Cities to provide more freedom, flexibility, spirituality, nature and environmental awareness into the everyday's life of XXI century's citizens.



Artist's view of the SpaceLand City

Such game-changing, pollution-free, future-facing new-towns will enable most inhabitants to carry out respective activities without needing external offices, through beautiful "urban eco-systems" for interconnected business & life-style in unprecedented NZEB (Near-Zero-Energy-Buildings) mixed-use districts. Aiming at a real "holistic renaissance", the City's renewable-energy buildings will be developed with dry-wall technologies, low-maintenance environmental control systems and large windowed panels within vertical green facades, further increasing both natural look and passive-house energy efficiency.

At walking distance, totemic Moon & Mars analogs (SpaceLand Centers) will be built by 3D-printers using local bio-materials for ISRU (In-Situ-Resources-Utilization) to showcase groundbreaking techno-solutions for both extraterrestrial constructions and to restore the magnificence of thousands Middle-Age villages which can be made habitable again.

Such SpaceLand Center habitats will also embed ad-hoc microgravity edutainment systems and R&D labs for opendoor research, education and smart tourism to study, develop, test and demonstrate tools, bio-materials, services and operational scenarios for planetary exploration and for that myriad benefits stemming from low-gravity STEAM (Science, Technology, Engineering, Arts, Medicine) transferreable into everyday's life, benefitting everybody: from satellite-based robotized bio-agriculture and development of new materials to lifetime-extending bio-engineering, nutritional sciences, nanotechnologies and pharma research, by means of weightless 3D R&D programs which are impossible on ground, be them on systems and devices or on macro-molecular mixtures and compounds, targetting new alloys for lighter ground and aerospace vehicles or new proteins for medical drugs and vaccines.

SpaceLand Cities will not only generate a new urban life-style and contribute to the first steps on Mars, but will also be pathfinders for inexpensive, saluber habitations on our planet, proving that more decent, cheaper and healthier homes can be built for the poors of our troubled Earth, while striving to turn human existance into a "dolce vita" on a greener and healthier planet.

info: www.SpaceLand.it



Chinese private space launch company Beijing Interstellar Glory Space Technology Co., Ltd. (referred to as 'i-Space') had completed a series B round financing nearly 1.2 billion yuan(\$172 million) on September 15, setting a new record for a single round of funding in China's commercial space field. This round was led by Beijing Financial Street Capital Operation Center, with funding also coming from CICC Alpha, Taizhonghe Capital, Sequoia Capital China and others, including existing shareholders.

i-Space was the first Chinese private space launch company which sent satellites into orbit successfully on July 25,2019 by using its small solid launch vehicle Hyperbola-1(Y1). Hyperbola-1 is a small solid rocket developed independently by i-Space, whose capability to SSO at 500km is 300kg.

The \$173 million funding will be used for development of the 'Hyperbola' series of launch vehicles, reusable liquid oxygen methane engines.

i-Space is currently developing a reusable launch vehicle Hyperbola-2, whose capability to SSO at 500km is 1.2t (the first stage of the rocket is not recycled)/0.7t (recycle the first stage of the rocket).

JD-1 is a 15-ton thrust reusable liquid oxygen-methane engine independently developed by i-Space. Up to July 2020, the accumulated firing-test duration of JD-1 engine is 2320s. Long-duration firing test, multiple-start firing test and throttling test have been carried. It will empower the launch of Hyperbola-2. The 100-ton thrust reusable JD-2 engine is also in development.

IAF Members' Corner















2020 China Space Conference



September 18-21, China Space Conference was successfully held in Fuzhou, Fujian Province. The Conference was directed by China National Space Administration, China Association for Science and Technology and People's Government of Fujian Province, supported by China Aerospace Science and Technology Corporation, China Aerospace Science & Industry Corporation, International Astronautical Federation, International Institute of Space Law, and Asia-Pacific Space Cooperation Organization, and hosted by Chinese Society of Astronautics, and China Space Foundation.

The theme of the Conference is Foster Space Spirit, Explore the Starry Universe. Over 800 Chinese delegate attended the Conference.



At opening ceremony, Mr. YU Weiguo, the party secretary of Fujian Province Government, Mr. ZHANG Kejian, the administrator of China National Space Administration, Mr. WU Yansheng, the chairman of China Aerospace Science and Technology Corporation, Mr. Christian Fechtinger, the executive director of International Astronautical Federation, Mr. Kai Uwe Schrogl, the president of International Institute of Space Law, gave greeting remarks to all delegates.









The Plenary includes topics of BeiDou Navigation System, China's Mars Exploration Program, China's Manned Lunar Exploration Plan and development, China's Space Gravitational Wave Detection Taiji Project, HighResolution Earth Observation System, Chang'e Lunar Exploration Program, Space Technology Promotes the Construction of Maritime Silk Road, Space Nuclear Power, and Space Debris Legal Considerations.



IAF Members' Corner













The symposium and forums include Artificial Intelligence Empowers Space Control Development Forum, The Sino-U.S. Space Commercialization Perspectives Key Views for Areas of Interest and Understanding, Symposium on Maintaining the Rule of Law in Outer Space in an Age of Rapid Innovation, Satellite Application Forum, Small Satellites and Electromagnetic Information Technology Application Forum, Space Advanced Materials and Manufacturing Technology Forum, Space Energy Technology Innovation and Development Forum, and Space Standardization Forum.

Total 16 events were organized during 2020 China Space Conference, which includes 1 plenary, 2 international academic symposiums, 7 domestic academic forums, 1 space spirit forum, 3 space education activities, 1young professional activity and 1 space exhibition. These events and activities fall into four categories of academic exchange, industrialization, space education and space culture.





China Space Conference is now the most influential space event in China. It is a high-end platform for demonstrating frontier space technology and promoting international cooperation.



Israel Aerospace Industries Ltd (IAI) is Israel's largest Defense and Aerospace company. It provides Cutting-edge technologies and solutions for Space, Air, Land, Sea and Cyber. The company is active in both defense and commercial markets, for the IDF and foreign customers worldwide.

In space - IAI is the Israeli Space House, offering a One-Stop-Shop for satellites, ground systems, mission centers and launchers.

IAI satellites portfolio includes:

- Observation satellites (optical OPTSAT, EROS, OFEQ series as well as Synthetic Aperture Radar - TECSAR series);
- Scientific/research satellites and Lunar landers (such as Venus, Shalom, BGUSAT, Beresheet, Ultrasat);
- Communication satellites (AMOS series and DROR new generation):
- A full range of space sub-systems

All, in diverse sizes and capabilities, deliver excellent performance and significant contribution for their Users.

During 2019 IAI's space capabilities gained worldwide focus as part of the historical Beresheet mission to the moon. Beresheet, a co-development lunar lander of IAI and SpaceIL, was the 1st commercial lunar mission, situated Israel as the 4th country to attempt landing on the moon.

IAI's achievements continues with the successful launch of the Ofeq 16 satellite into space (aboard IAI's Shavit launcher) and receiving very high-quality images one week following the launch.

For additional information: www.iai.co.il and at our booth





Join us on the Artemis Program

NASA is continuing to push the boundaries of space exploration, science, and technology by exploring more of the Moon than ever before. This new era of lunar exploration is called Artemis. Named after the twin sister of Apollo, she is the Goddess of the Moon, and we are the Artemis Generation. NASA is building a coalition of partnerships with industry, nations, and academia that will help us get to the Moon quickly and sustainably, together.

Under the Artemis program, humanity will explore regions of the Moon never visited before, uniting people around the unknown, the never seen, and the once impossible. We will return to the Moon robotically beginning next year, send astronauts to the surface within four years, and build a sustainable presence on the Moon by the end of the decade.

At the Moon, we will:

- Find and use water and other critical resources needed for safe and sustainable exploration and development
- Investigate the Moon's mysteries and learn more about our home planet and the universe
- Learn how to live and operate on the surface of another celestial body
- Gain the experience necessary to launch a historic first • human mission to Mars

As we assemble from all corners of the world for this first virtual IAC later this month, I am excited to invite you to join us on this journey.



Ad astra,

Jim Bridenstine, NASA Administrator

IAF Members' Corner



Global Consortium of Geospatial Imagery

More than ever before, leaders across industries need up-todate information to build resilient organizations. We are proud to leverage our growing constellation, getting imagery into the hands of decision makers quickly, effectively, and at the right price point through an exclusive network of partners, so that governments, as well as enterprises of all sizes, can remain competitive and informed.

The Global Consortium of Geospatial Imagery allows fellow affiliates to leverage our Earth Observation satellite constellation and provide end customers with high resolution, high frequency, affordable geospatial data. Each of Satellogic spacecraft currently in orbit carries both a sub-meter multispectral camera and a 29-band hyperspectral sensor. Worldwide partners will have access to both multispectral and hyperspectral images, as well as Satellogic's tasking, downloading, and processing capabilities. Satellogic's constellation can currently provide affiliates with up to three daily revisits.



European Space Imaging, the leading supplier of global imagery in Europe and North Africa, joins as a founding member of the Global Consortium. Other partners include Eartheve from Singapore covering JAPAC, and 5CI Brazil and Colombia in Latin America.



For more information about Satellogic's Global Consortium, as well as its technology and industry applications, please visit: https://partners.satellogic.com/









DS is Embracing the New Normal During **COVID-19, Announcing Virtual Events**

The global crisis due to COVID-19 has forced a radical shift in working habits. Space companies have had to re-think their approach to employees, remote work, and virtually everything else to do with personnel. Disrupting Space was ahead of the curve with the co-founders both working together from different states. But what happened in 2019 compared to 2020? The company was founded immediately after IAC 2018 in Berlin cofounder's Megan and Nancy's first action was to join the IAF. The 2019 IAC was the highlight of Disrupting Space's first full year of operation. As part of the joint STEAMED for Space booth 116 Disrupting Space partnered with Explore Mars Inc., Taksha Terrestrial Analog Research Center (TTARC), Journal of Small Satellites (JoSS), International MoonBase Alliance (IMA). The co-founders had several speaking engagements such as at the GNF with a session titled, "Lessons from Business Women in the Space Industry", IAC, PDC, UNNOSA, just to mention some.

At the start of 2020 Megan and Nancy were poised for another full year of conferences, presentations and face to face activities. Like everyone else that did not happen. Conferences were cancelled or went on-line, like IAC. Disrupting Space adapted. Embracing the new "normal" by launching a YouTube Channel, Disrupting Space in October 2020 having for their first series-episodes with Project POSSUM. Also, Megan was moderator and presenter for several webinars in conjunction with Project Possum, expanded her virtual consulting services for space startups, and started a fun outreach video podcast, Megan2Mars. Nancy bounced back from the pandemic induced changes by expanding her academic and outreach work as Vice Chair of the IAF TC Committee on NEOs and connecting with the American Institution of Aeronautics and Astronautics (AIAA). She is participating in the AIAA virtual events such as ASCENdxSummit, ASCEND Conference and webinars on planetary defense and NEO related topics. Nancy is speaking at the IAC CyberSpace Edition 2020 and more, along with getting ready for the Planetary Defense Conference in April 2021. Our recommendations for continuing withyour space activities during COVID-19, stay calm, rethink your business





Interview with CHANG'E-4 Mission Leaders



1. Which were the biggest challenges for the Chang'e 4 mission and what have been the biggest achievements so far?

There are two biggest challenges. One is to set up relay communication between the earth and the far side of the moon; the other is to realize high-precision soft landing onto the extreme terrain of the far side.

The greatest achievement has been that we acquired high accurate scientific achievement while the probe was landing and cruising on the far side of the moon, that is the first time for mankind.

2. Chang'e 4 is the second phase of the Chinese Lunar Exploration Program. Half way through, what are your expectations on future phases and missions?

Our expectation is to witness the success of the third phase, which is known as Chang'E-5, and also hope that with the implementation of future lunar exploration missions, we can better understand the moon and utilize lunar resources.

DO NOT MISS AT THE IAC 2020:

The IAF World Space Award Highlight Lecture will feature Dr. Yu Dengyun, the Deputy Designer-in-Chief of China's Lunar Exploration Program and one of the Chang'e 4 Mission Leaders. Dr. Yu Dengyun will talk about the successful Chang'e-4 mission and their achievement to soft land on the far side of the moon for the first time in history of humankind and successfully sustain relay communication between the far side of the moon and the Earth.

Day: Monday 12 October Time: 16:40 - 17:20 CEST

3/2020 | Page 40 | October 2020

Interview

3. The IAF World Space Award is the most prestigious award in space. What it means for you to be recognized by the IAF?

We would like to extend our sincere thanks to IAF. For us and for the Chang'e 4 team, this award is a recognition of our work, and an encouragement to us. We will keep on working hard. Thus, we would like to contribute more to lunar and deep space exploration for mankind, through offering more Chinese wisdom and Chinese power.

4. What the Highlight Lecture at the IAC 2020 – The CyberSpace Edition, given by the Chang'e 4 mission leaders, will focus on?

The Highlight Lecture at the IAC 2020 will focus on technological breakthroughs and scientific progress of the Chang'e 4 mission. Its content mainly include four parts: i) What is the China Lunar Exploration Plan Before 2020, ii) What is Development history of the Chang'e 4 mission, iii) What is Major technological breakthroughs of the Chang'e 4mission from six points, iv) What is Main Phased Scientific Results of the Chang'e 4 mission from five points.



International Astronautical Federation

100 Avenue de Suffren 75015 Paris, France Tel: +33 1 45 67 42 60 E-mail: info@iafastro.org www.iafastro.org

Be part of the conversation @iafastro



To unsubscribe, please send an email to <u>newsletter@iafastro.org</u> | E-mail: <u>newsletter@iafastro.org</u> International Astronautical Federation

The next IAF newsletter will be issued in December 2020