



IAF President's Welcome

Dear colleagues,

Welcome to the March 2021 IAF newsletter. 2021 is a special year for the IAF celebrating its 70th anniversary. I would like to take the opportunity to wish you all a happy and safe 2021. I am confident this will be yet another successful year of collaborations: in such unprecedented times the use of our space expertise has shown to be able to provide inspiration and benefits to the wider community.



This edition will give you a complete calendar of the Federation's activities over the coming months. As per last year, tomorrow we will convene on the internet for the **IAF Spring Meetings**, including IAF Committee Meetings, IPC Paper Selection, and the Bureau Meeting. We thank you very much for your participation.

We will then **at last** physically meet in June at the historic Tavrisheskiy – or "Tauride" – Palace, one of the largest and most impressive palaces in St. Petersburg, Russia, for the long-awaited **Global Space Exploration Conference – GLEX 2021**. This third edition will also celebrate the **60th anniversary of Yuri Gagarin's spaceflight** – marking the beginning of humankind's spaceflight era.

At GLEX 2021 we will all learn about new space exploration endeavors and how space exploration investments provide benefits as well as discuss how those benefits can be increased through thoughtful planning and cooperation. It will be fantastic to finally meet again – of course all safety measures will be respected. In this sense, IAF Member ROSCOSMOS has organized a full **VIP treatment** to all GLEX 2021 attendees to ensure all **health actions** will be put in place. GLEX 2021 registration is open and I invite you all to start registering as June is the best time to visit St. Petersburg and a rich cultural programme is included in the registration fees!

Warmest Regards,

Pascale EHRENFREUND
IAF President

Connecting @ll Space People

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IAF MEMBERS' CORNER

OUR LATEST PUBLICATIONS

- [IAC 2020 Highlights](#)
- [IAF 2020 Highlights Journal](#)
- [GLEX 2021 Brochure](#)

INTERVIEW WITH:

Fabio Santoni, Associate Professor of Space Systems at Sapienza University of Rome and

Mila Savelyeva, Director of marketing communications, GK Launch Services

IMPORTANT DATES:

- Live-Streamed GLEX 2021 Press Conference – **2 April 2021**
- IAF Excellence in International Cooperation Award – **20 April 2021**
- GLEX 2021: **14 - 18 June 2021**
- IAC 2021: **25 - 29 October 2021**
- IAF Spring Meetings 2022 – **22-24 March 2022**
- GLOC 2022: **31 May – 2 June 2022**
- IAC 2022: **18 – 22 September 2022**
- IAC 2023: **25 – 29 September 2023**





It is that time of the year again! Are you ready to meet online for the annual IAF Spring Meetings? You should have received by now the calendar invitation to attend the meeting with the details to dial in. If you haven't received it yet please contact us on info@iafastro.org

MONDAY 15 MARCH

- 15:00 - 17:00 IAF 3G Diversity meeting

MONDAY 22 MARCH

- 13:00 - 14:30 IAF Next Generation Coordination Committee (NGCC)
- 13:00 - 14:30 IAA Space Debris Committee
- 14:00 - 15:00 Committee on Developing Countries and Emerging Communities (ACDCEC)
- 14:30 - 16:00 IAF Human Spaceflight Committee
- 14:30 - 16:00 IAF Space Traffic Management Committee
- 15:00 - 17:00 IAF Industry Relations Committee (IRC)
- 16:00 - 17:00 IAF Committee on Near Earth Objects (NEO)

TUESDAY 23 MARCH

- 13:30 - 15:00 IPC Steering Group
- 15:00 - 17:00 IAF Workforce Development / Young Professionals Programme Committee (WD/YPP)
- 15:30 - 17:00 IAF Technical Activities Committee (TAC)
- 16:00 - 17:30 IAF GRULAC Subcommittee

WEDNESDAY 24 MARCH

- 14:00 - 15:30 GLEX IPC Meeting
- 14:00 - 16:00 IAF Space Museums and Science Centres Committee
- 15:30 - 17:00 IAF Space Universities Administrative Committee (SUAC)
- 15:45 - 17:15 IAF Space Propulsion Committee
- 16:00 - 17:30 IAF Space Operations Committee
- 16:00 - 18:00 IAF Finance Committee
- 16:00 - 18:00 IAF Space Societies Committee (SSC)

THURSDAY 25 MARCH

- 12:30 - 13:30 D5 Symposium Coordination
- 13:00 - 14:00 IAF Space Life Sciences Committee
- 13:00 - 15:30 IAF Honours and Awards Committee (HAC)
- 13:30 - 15:00 IAF Knowledge Management for Space Organisations (KMTC)
- 14:00 - 15:00 IAF Commercial Spaceflight Safety Committee
- 14:00 - 15:30 IAF Committee for Liaison with International Organisations and Developing Nations (CLIODN)
- 15:00 - 16:30 IAF Enterprise Risk Management Committee (ERMC)

FRIDAY 26 MARCH

- 13:00 - 17:00 IAF Bureau Meeting
- 14:00 - 15:30 IAF Materials and Structures Committee
- 15:00 - 16:30 IAF Committee on Integrated Applications

MONDAY 29 MARCH

- 14:00 - 15:30 IAF Committee on Space Security
- 14:00 - 15:30 IAF Space Communications and Navigation Committee (SCAN)
- 15:00 - 16:30 IAF Space Systems Committee
- 15:30 - 17:00 IAF Earth Observations Committee
- 15:30 - 17:00 IAF Space Education and Outreach Committee (SEOC)
- 17:00 - 18:30 IAF Subcommittee on the Global Earth Observation System of Systems (GEOSS)

TUESDAY 30 MARCH

- 15:00 - 16:30 IAF Space Transportation Committee

WEDNESDAY 31 MARCH

- 15:00 - 16:00 IAF Space Economy Committee
- 16:00 - 17:30 IAF Space Habitats Committee

THURSDAY 1 APRIL

- 14:00 - 15:00 IAF Microgravity Sciences and Processes Committee





WELCOME TO GLEX 2021

The **International Astronautical Federation (IAF)** and **ROSCOSMOS** are organizing the **Global Space Exploration Conference (GLEX) 2021** that will take place in **St. Petersburg, Russian Federation** from **14 – 18 June 2021**.

This will also be the opportunity to **celebrate the 60th anniversary of Yuri Gagarin’s spaceflight – marking the beginning of humankind’s spaceflight era.**

The **Global Space Exploration Conference** will be an **essential milestone** in the world’s leading and emerging Space nations’ decision-making process. The **main goal** of GLEX 2021 is to bring together **scientists, engineers, lawyers** and **students** from different countries who want to study and **explore** space, want to **share** their thoughts and plans, and are ready to discuss them with colleagues. Only in such close **cooperation** and **mutual understanding**, we will be able to implement ambitious projects on the **Moon, Mars** and **beyond the Solar system**.

We invite all the members of the **global space community** to register and participate in this important gathering. This will be our first **in-person event** since the pandemic began last year. Both the IAF and ROSCOSMOS assure you that all health measures will be closely implemented and followed during the whole conference to **ensure everyone’s safety**. We are looking forward to see you at **GLEX 2021** in **St. Petersburg!**



Pascale Ehrenfreund

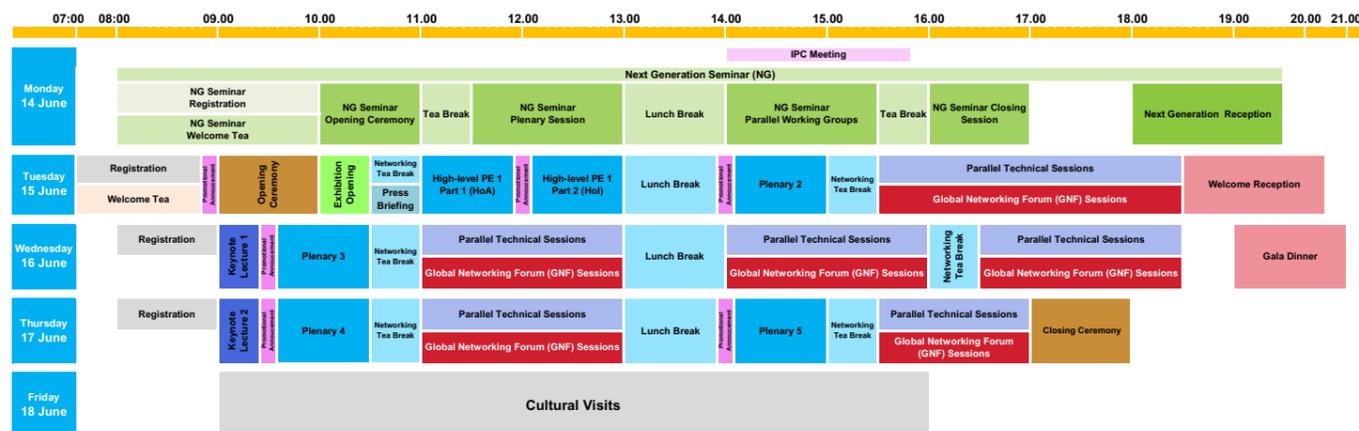
President,
International Astronautical Federation (IAF),
France



Sergey Saveliev

Deputy Director General for International
Cooperation, State Space Corporation
ROSCOSMOS,
VP for Relations with International Organizations,
International Astronautical Federation (IAF)
Russian Federation

GLEX 2021 AT A GLANCE



GLEX 2021 PROGRAMME

- an **Opening Ceremony** with prominent speakers,
- a **Plenary Programme** with panel discussions,
- **Keynote Lectures**,
- a **Technical Programme** with Sessions in several parallel technical streams,
- an **IAF Global Networking Forum (IAF GNF) Programme**,
- **Small Space Exhibition**,
- an attractive social and networking programme including a **Welcome Reception** and a **Gala Dinner**,
- a pre-conference **Next Generation Day**,
- Post-conference **Cultural Visits** to landmarks sites of St. Petersburg.
- A Closing Ceremony announcing the Best Technical Presentations Awards

VENUE

GLEX 2021 will be held in the impressive Tavrisheskiy – or “Tauride” – Palace, it is one of the largest palaces in St. Petersburg, Russia. Located in the north-east of the historic centre, next to the Tavrisheskiy Garden (formerly the grounds of the palace).



GLEX 2021 Gala Dinner

The Gala Dinner will be held in the beautiful Summer Palace in Peterhof on Wednesday 16 June. It was built and decorated in the style of early classicism. During the evening guests will have a memorable dinner with different exquisite dishes. They also will become a spectators of a fantastic cultural program, which includes ballet of the Mikhailovsky theater, performance of gymnastics and singers and even popular fragments from the most famous musicals.



CULTURAL VISITS

A very interesting Cultural Programme will be offered to the GLEX 2021 participants. This will give you a chance to discover the beautiful city of St. Petersburg and its many magnificent buildings and historic sites. Please see the list of the cultural visits that will be offered below, to know more about the cultural visit simply click on the title:



- [Youth Day at Planetarium No. 1](#) (14th of June)
- [City bus excursion](#) (14th - 17th of June)
- [Boat sightseeing tour](#) (14th - 17th of June)
- [Excursion to the Peter and Paul Fortress](#) (14th - 17th of June)
- [The Faberge Museum](#) (14th - 17th of June)
- [Visit to Peterhof Park and Palace](#) (18th of June)

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, IAF, isabella.marchisio@iafastro.org





IAC DUBAI 2021
 ORGANIZED BY:  **72nd INTERNATIONAL ASTRONAUTICAL CONGRESS**
25-29 October 2021 | Dubai
 HOSTED BY:  Inspire, Innovate & Discover for the Benefit of Humankind
 IAC2021.ORG

We would like to thank you for submitting **3356 abstracts from 86 countries**. The International Programme Committee will now select the abstracts to be presented in Dubai. For the very first time, the IAC is opening its doors to the global space community in the United Arab Emirates, the first Arab country to host the IAC since its establishment in 1950. And we thank you for responding to our call so enthusiastically. Let's keep on safely travelling and opening new horizons to young scientists by presenting and interacting with colleagues from across the world.

It is confirmed that Category A on **Science and Exploration** has received the highest number of abstracts, closely followed by Category E on **Space and Society**. A heartfelt congratulation message also to **students submitting more than 30% of abstracts!** Students are the ones that will take the responsibility of guiding the space world into a new one. It seems as at the IAC 2021 in Dubai we will have an insight of the future they are preparing.

This year, it is also particularly exciting that the Special Session format reached a **record-breaking number of 87** proposals! Special sessions are a valuable way to cast light on cutting-edge themes, theories, and methods being interdisciplinary and interactive. Final selection results of abstracts and Special Session proposals will be announced beginning of April.

The IAC has always been the most important space gathering prizing personal interactions as much as academic presentations. The IAF is working closely with IAF Member, The Mohammed Bin Rashid Space Centre (MBRSC) in order to preserve the IAC spirit during this pandemic. This impressive number of abstracts received for the IAC 2021 is a clear message from the space community showing their support and trust into the organization of a safe, inclusive and futuristic Congress.



We can't wait to see you all in Dubai.



Global Networking Forum
 Space Conversations Series
IAF GNF SPACE CONVERSATIONS SERIES

The IAF GNF Space Conversations Series are a fortnightly, free-of-charge registration, live online webinars that will touch upon the most recent developments in space, organized within the frame of the IAF Global Networking Forum (IAF GNF). Throughout these bi-weekly live conversations, the IAF is strengthening even further the ties with its Members and flagging topics that are relevant for the overall space community. These conversations offer you all the opportunity to come together, connect, be inspired and informed by leaders and experts in multiple fields of space.

The IAF GNF Space Conversations Series started in September 2020, find out more about the upcoming events on <https://www.iafastro.org/events/iaf-gnf-space-conversations-series/>

To watch again previous IAF GNF Space Conversations Series [click here](#)

IAF DISTINGUISHED SERVICE AWARD 2021



The IAF Distinguished Service Award is intended to reward active volunteers for their contributions to the progress of astronautics and the Federation and we are very pleased to announce the award recipients of the 2021 IAF Distinguished Service Award.

Congratulations to



Driss El Hadani

"Mr El Hadani has been an IAF focal point member for Morocco since 1999 and currently serves on two IAF Committees (ACDCEC and CLIODN) that have a focus on developing countries and has been actively promoting and advancing the work of the IAF by co-organising and hosting the Global Conference on Space for Emerging Countries (GLEC2019) and being a member of the IAF 2018 and 2019 Nominations Committee."



Mark Mulqueen

"The IAF Distinguished Service Award is presented to Mark Mulqueen for his tireless work and service as Vice Chairman of the Industry Relations Committee supporting the Federation and its member organizations."



Roberta Mugellesi Dow

"With good will and expertise, good things happen"



Alex da Silva Curiel

“Recognising his outstanding contribution and dedicated hard work for the IAF and its Congress technical sessions relating to small satellites for over 20 years”



Sergey Krikalev

“Mr. Krikalev has valuable practical contributions not only to the activities of the International Astronautical Federation, but to international cooperation in space field in general, both on Earth and in Space!”



Petra Rettberg

“For her outstanding services to the Federation as an active IPC member in the area of space life sciences and astrobiology since many years”



Ken Davidian

“For his outstanding engagement with the Federation as Chair of the Entrepreneurship & Investment Committee and Vice Chair of the Space Economy Committee and his numerous contributions to the development of the next generation of space leaders”



Ryan Kobrick

“For more than a decade he has contributed to the IAF’s mission in various committees and leadership positions and dedicated a significant amount of time in service of the next generation of space professionals.”



Stephanie Wan

“For more than a decade she has shown dedication in her work for the IAF in multiple committees, she has held leadership positions in the IAF and at SGAC, and in support of long term sustainability of the industry she has put herself in the service of the next generation of space professionals.”



WE ARE PLEASED TO ANNOUNCE THE 2020/2021 IAF LAUNCHPAD MENTORSHIP PROGRAMME WINNERS



Danielle Rosales

Danielle Rosales embraces the complexities of integrating multiple industries and the space sector as she focuses on identifying and transforming messaging gaps into communication opportunities. Novel biomedical and technology applications in low-Earth orbit are at the core of her creative, yet strategic storytelling. As the Communications Manager at Space Tango, Danielle builds a bridge between internal and external stakeholders to establish a shared comprehension that permits a shift from R&D to sustainable manufacturing in microgravity.

Danielle completed her Bachelor of Science in Communication at Embry-Riddle Aeronautical University where she now serves on the College of Arts and Sciences’ Industry Advisory Board. She also completed her Master of Science in Space Systems Operations Management at Webster University.

Danielle strives to employ her collective experience, and the experiences of those she meets, to engage minorities through meaningful and motivational STEAM programming.



Lian Ming Goh

Resilient spacecraft engineering fresh graduate with excellent communication and teamworking skills gained through professional leadership and work experiences. Holds practical hands-on experience on Satellite Systems Engineering under the guidance of European Space Agency (ESA) Fly Your Satellite! programme. Quick in adapting to a changing work environment and maintains a can-do mentality whilst juggling between work, life, and a purpose to positively impact the local community.



Mariam Naseem

Mariam has a BSc. in Electrical Engineering from UT Austin and an MBA from the University of Toronto. She has a global and multi-disciplinary background, having worked as a commercial space consultant, as a technology strategist in the Enterprise Innovation team at one of the largest banks in Canada, as a field engineer on an oil rig in Russia, a manufacturing engineer in a Product Development center in Texas and as a business development manager for a Toronto-based Quantum computing startup. In her free time, Mariam is involved with various non-profit organizations in the space sector including SEDS Canada as an Advisory Board member and the Space Generation Advisory Council where she serves as National Point of Contact for Canada.



Charles-Aimé Nzeussi Mbouendeu

NZEUSI MBOUENDEU Charles-Aimé, is the Space Generation Advisory Council (SGAC) National Point of Contact in Cameroon and Deputy Event manager for the 4th Africa Space Generation Workshop. He is a tutor and member of the organizing team for the SGAC-DARA Big Data Hackathon competition. As an environmental and Industrial Risk Engineer, he is also secretary of the Space Technologies for Earth Applications working group (IGCP project).

Charles-aimé co-authored some papers one of which is titled “Current and Near-Future State of Space Technology for Disaster Situations”, which was presented during the 70th International Astronautical Congress (IAC) in Washington, DC. In 2019-2020. Since 2019 he is NASA’s Scientist for a Day essay contest National coordinator and the organizer of the first space-related workshop and a national essay writing competition in Cameroon.

He co-organized the Africa Need Space workshop, the Space Mission Design training, a round table on a national space policy and action space 2020, in Cameroon. Furthermore, he was an African Union Commission Youth Scholarship awardee for the 8th African Leadership Conference. He is equally leading a task force to draft a National Space Policy. He is one of the International Space Contest members of the steering committee organized by the Institute of Aeronautics Astronautics and Aviation (IAAA).



Jenna Tiwana

"I am a Management Consultant at Bain & Company, creating and implementing business strategies for clients across a range of industries, with two Masters Degrees: the first in Aerospace Engineering, the second in Space Studies from ISU, where I received the Association of Space Explorer's Award.

I am fiercely passionate about space, exemplified by my work with organizations from all over the world such as Space Generation Advisory Council, British Interplanetary Society, SPACETIDE and Moon Village Association - I choose to work with these organizations as I wish to progress the sector and contribute to its successes to the utmost of my ability.

My aim is to apply all I have learnt from my technical background and top-tier business experience, to propel the industry forward and integrate a strategic lens into the engineering innovation of today."



Alessandra Vernile

Alessandra Vernile is a young professional with a background in International Relations, Intelligence and Space Policy. After completing her studies in Rome, Alessandra started her professional career working with the NATO Defence College Foundation. In 2015, Alessandra moved her first steps in the space sector joining the ESA Strategy Department in Paris for a 6-months internship. After this opportunity, Alessandra resulted as the recipient of the ASI-SIOI fellowship, that brought her to move to Vienna to work with the European Space Policy Institute (ESPI). During the year spent in ESPI, Alessandra focused her work on the role of private actors in the space sector, and she also had the opportunity of learning more on the contribution of space technology for SDGs. Moved by the curiosity of learning more on how space can benefit society, in 2017 Alessandra joined Eurisy in Paris, where she is currently based.

Alessandra is very active within the Space Generation Advisory Council (SGAC), where she serves as Project Groups Coordinator since 2018. Since 2020, Alessandra is part of the IAF EO Technical Committee.

Alessandra has strong interest in understanding the international space cooperation mechanisms and how to foster national policies that rely on space technology to respond to environmental and societal challenges.



Likhit Waranon

More than 8 years in experience of engineering and management along significant projects, which are most in satellite technology since operated THEOS-1 satellite in the communication system and crossed to satellite system engineer along with researching to enhance ground segment capability including created new system to replace long uses instead of bought in which leads to spacecraft building manager as in current position.



Scott Ritter

Scott is a scientist / engineer at the German Aerospace Center (DLR) in Cologne, Germany. He supports ongoing human health monitoring studies during spaceflight, in collaboration with the European Astronaut Center (EAC). Prior to this, Scott worked for the United Nations Office for Outer Space Affairs (UNOOSA) in Vienne, Austria, and for the University of Pennsylvania in Philadelphia, USA.

Within the space community, Scott has served the International Space University (ISU) as a guest workshop instructor for the Masters in Space Studies (MSS) and Space Studies Programs (SSP), and as a Space Applications Associate Chair for the Interactive Space Program (ISP). Scott also serves as an instructor for the International Institute for Astronautical Sciences (IIAS).

Scott holds masters degrees for the International Space University (ISU) in Strasbourg, France and from Stanford University in California. He is a licensed professional engineer and a certified scuba driver.

ANNOUNCEMENT AND CALL FOR NOMINATIONS 2021

Introducing the new IAF Excellence in International Cooperation Award

The exploration of space has resulted in the advancement of scientific knowledge and benefits for all of humanity. As we expand further into the universe, as we learn new things, identify new problems, and come up with novel solutions, it is important to pay tribute to those at the forefront of international collaboration who help us work together and bridge our differences.

As a global federation, the IAF strives to promote a worldwide dialogue to support international cooperation as the foundation of a stable and developing space community. To this end, the IAF is excited to introduce the new IAF Excellence in International Cooperation Award as a valuable addition to existing IAF awards.

Dedicated to acknowledge the efforts and achievements in facilitating global engagement and cooperation, this award is intended to recognize outstanding contributions by an individual in advancing international cooperation including in, but not limited to, the fields of space science, space technology, space medicine, space law and space policy.

Call for Nominations 2021 is now OPEN!

The call for nominations for the IAF Excellence in International Cooperation Award is addressed to IAF member organizations in good standing, Chairpersons of IAF administrative and technical committees, and elective and appointive IAF officers.

WHO CAN BE NOMINATED?

Any eminent person in the astronautical field.

SELECTION CRITERIA:

The nominee shall have demonstrated:

- A career-long dedication to the fostering of international space cooperation.
- An exceptional contribution in a specific project, effort or area to advance international space cooperation between entities from at least two countries.
- Measurable progress in overcoming a significant challenge or obstacle to international cooperation.

PRESENTATION OF AWARDS

The IAF Excellence in International Cooperation Award recipient will be inducted at the next International Astronautical Congress (IAC) at the VIP Luncheon on Monday ("Excellence in International Cooperation Award Luncheon").

BENEFITS OF AWARD FOR THE RECIPIENTS

- A trophy and certificate furnished by IAF.
- IAC registration fees waived for the year of induction.
- The recipient will address the attendees of the VIP Luncheon on Monday with a short speech.
- The recipient will attend the Gala Dinner as guest of the IAF President (free of charge).

NUMBER OF RECIPIENTS AND EXPIRATION OF NOMINATION

The Award shall be preferably granted to a single person. Exceptionally, it may be granted to two or more persons if their contributions are equal or if the contribution or contributions made were the result of their joint efforts.

A submission which is not successful in any given year may be resubmitted for later years.



NOMINATION SUBMISSION:

Nomination package:

The nomination shall contain:

- A justification detailing the exceptional effort and impact of the nominee on international cooperation in space activities (<2 pages)
- A biography of the nominee including, i.e., the person's profile, career achievements and history, education, list of publications, etc.
- at least 3 letters of support clearly addressing the contributions of the nominee in fostering, advancing and enhancing international cooperation. At least two of the support letters should be issued by colleagues from a different country as the nominee.

Nomination documents must be received by the IAF Secretariat by **20 April 2021** 15:00 CET (Paris time), preferably by email at award@iafastro.org.

(Subject line: NOMINEE'S LAST NAME Nominee's First Name – 2021 IAF Excellence in International Cooperation Award).

If email is not available, the reference, which must still arrive by the deadline above, can be sent by postal mail to:

IAF Secretariat
 Attention: 2021 IAF Excellence in International Cooperation Award
 100 Avenue de Suffren
 75015 Paris
 France



A new initiative to give IAF Members more visibility has been launched: The 'IAF Members Corner' has been created on the website. This will tighten the relations with our members, it will allow small companies to be on the spotlight, and it will attract new members. This new section is two-fold:

- **LATEST NEWS**, to highlight IAF Members latest news. Monthly 'The IAF at your disposal' emails are sent every first week of the month to all IAF Members encouraging them to submit their latest news to be promoted on IAF social media;
- **DISCOVER IAF MEMBER OF THE MONTH**, The IAF Secretariat will randomly choose one IAF Member every month to give it the chance to promote itself with a short interview videotaped posted on IAF website and social media channels, an article on the "focus on" session on the homepage of the website, 3 or 4 photos posted on Instagram;
- **BIOGRAPHIES ON COMMITTEE'S MEMBERS LIST** All biographies of committee members have been updated on each committee page on the website. Check your biography and come back to us on newsletter@iafastro.org to insert or update your biography.



NEWS!



Thales Alenia Space: to the Moon and beyond

Thales Alenia Space started the 2021 with a renewed hope, navigating steadily through challenges and looking ahead to space exploration, the Moon and beyond. One of the symbols of this tenacious energy is the newly signed contract with ESA to develop ESPRIT (European System Providing Refueling, Infrastructure and Telecommunications) for the upcoming Lunar Gateway, one of the pillars of NASA's Artemis program, supporting a sustainable presence on the Moon and its exploration.

ESPRIT comprises two main elements: HLCS (Halo Lunar Communication System), which ensures communications between Gateway and the Moon; and ERM (ESPRIT Refueling Module), which will provide Gateway with xenon and chemical propellants. In addition to extending Gateway's service life, ERM will pave the way for a reusable lunar lander and deep space transport (to Mars). ERM features a pressurized tunnel with large windows offering a 360° view. Delivery is planned for 2026, with launch the following year.

ESPRIT is highly innovative mission: chemical and xenon refueling capabilities prepare the technologies for reusable and "refillable" vehicles such as Moon return modules that could be refueled in the next generations, and it contributes to prepare technologies for Mars exploration with the concept of electric propulsion vehicles that could be refueled on each mission and would make several round trips (3 to 4) between Earth and Mars - a kind of large orbital station between Earth and Mars.

ESPRIT is thus supporting the evolution towards sustainable exploration with reusable and refillable vehicles: from the exploration of the lunar surface to inhabited exploration of Mars. And once again, this mission proves that even the most ambitious and visionary projects are ultimately designed to offer a better and more sustainable life on Earth... and beyond!

[#SpaceforLife](#)



Like many workspaces at the University of Southern California, the Viterbi School of Engineering's Liquid Propulsion Lab (LPL) needed to shut down in the spring of 2020, but luckily, it was able to transition to a hybrid mode in the fall. Students were able to do hands-on work with limited capacity. A key project LPL made progress on was the Hydra rocket. LPL's focus was to get as many new members hands-on time with Hydra as possible, while observing strictly any safety protocols in place.

LPL completed an oxygen-cleaning of the hydra and Mobile Oxygen Manifold System (MOMS) at the start of October. Several leak tests were conducted in the lab space. These procedures were repeated several times to expose as many lab members to the experience as possible before the winter break.

LPL is now back on track to complete a testing campaign this spring, which will include cold flow tests and dress rehearsals leading to a planned engine hot fire test in March.



Premier launch services company United Launch Alliance (ULA) completed important milestones in advance of the inaugural flight of its next-generation launch vehicle Vulcan Centaur later this year. At Cape Canaveral Space Force Station in Florida, modifications have been completed at the launch pad and processing facilities. At the pad, a 300,000-gallon liquid natural gas (LNG) storage area was added, the Acoustic Suppression Water System was expanded and new 100,000-gallon Centaur LH2 and 60,000-gallon LO2 storage



areas installed. A new Vulcan Launch Platform (VLP) was constructed and made its initial test run to the pad for final testing. The VLP stands 183 feet tall and weighs 1.3 million pounds. It is outfitted with the equipment and umbilicals needed to supply Vulcan with LNG propellant and liquid oxygen to the first stage, liquid oxygen and liquid hydrogen to the Centaur upper stage, and conditioned air to customer spacecraft. In the factory in Decatur, Alabama, the first booster, fitted with qualification engines, was sent to the Cape for processing and to complete an initial flight readiness firing to test the new BE-4 engines. In addition, boosters for the first four Vulcan missions are in various stages of production, while the booster and upper stage for the initial flight is nearing completion for its mission to take Astrobotic's Peregrine lander to the moon. Vulcan is ULA's innovative new launch vehicle that provides higher performance and greater affordability while continuing to deliver unmatched reliability for our customers around the world.



10 years of customized excellence

We started in 2011 with the establishment of the first satellite operator of Azerbaijan – Azercosmos. Years passed by, we launched 3 satellites into orbit, signed hundreds of partnership agreements, attended tens of international exhibitions, and were honored to be selected as the proud host of the 74th International Astronautical Congress (IAC) in Baku in 2023. We faced opportunities as well as challenges. We battled against the pandemic. We reunited with Khari-bulbul. We cried and we rejoiced. But we never backed down.

This year, we are celebrating our 10-year anniversary. In just 10 years of time, Azercosmos managed to expand across markets and succeeded in a number of areas, particularly in providing telecommunication and Earth observation services, boosting space research and development, and strengthening international collaboration. Commercial cooperation agreements signed with Intelsat, Eutelsat and Measat; organization of world-class events such as NASA Space Apps and ESA/CNES Act In Space hackathons, and CanSat in Azerbaijan, as well as Azercosmos' memberships to the International Astronautical Federation and the World Teleport Association are just few highlights of our activities over the past decade.

A lot has been achieved since its establishment and, although 10 years may sound like a serious period of time, our journey is just beginning. We are determined to turn into a global space player, focused on expanding our satellite footprint and excited to host you at the IAC in Baku in 2023!

We express deep gratitude to our friends and partners for being with us for the past decade. Cheers to many more years of exploring, learning and sharing!

Azercosmos' CEO appointed as the Minister of Transport, Communications and High Technologies

On January 26, 2021, the President of the Republic of Azerbaijan H.E. Mr. Ilham Aliyev appointed Rashad Nabiyev as the Minister of Transport, Communications and High Technologies.

The Azercosmos team is incredibly grateful to Rashad Nabiyev for the energy, vision, guidance and heart that he has put into the organization over the past ten years. Azercosmos wishes him the absolute best in all his plans and endeavors.



We, as the Azercosmos team, would like to assure that we will continue providing the highest quality services, keep moving towards our company vision of establishing Azerbaijan as one of the driving forces of the global space industry and contributing to peace and prosperity all over the world.



The Moon Base Educational Project

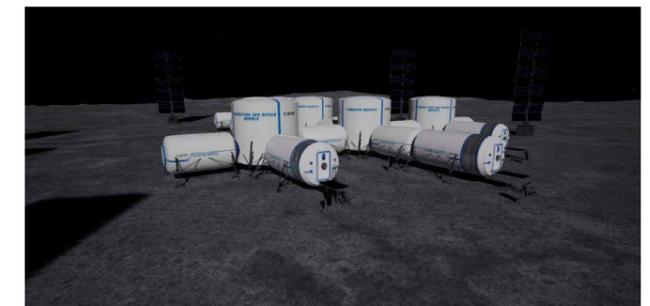
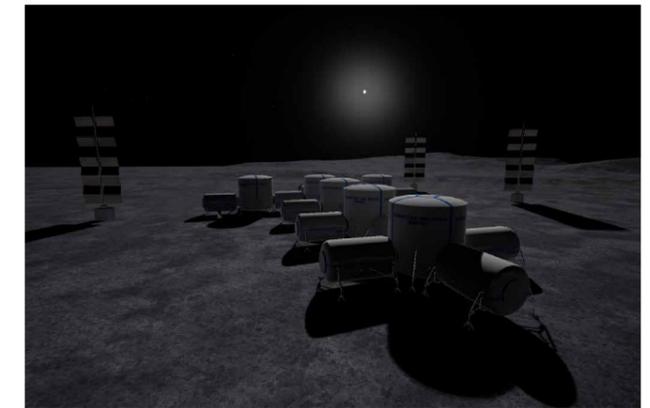
What are the modern rocket engineers working on?

The S.Korolev National Space Museum now can offer its visitors to glimpse behind the scenes of an ambitious project which is to be implemented by the Ukrainian space industry leader - Yuzhnoye Design Office. On Sergei Korolev's birthday the educational team of the museum presented a new interactive program developed in cooperation with the experts from Yuzhnoye Design Office.

In the last few years the Ukrainian space design office has been consistently pursuing the goal of creating a pilot-scale Moon base using the latest technologies, long-standing expertise and experience in creating different types of spacecraft and their components.

And that means that a Moon settlement may appear in the foreseeable future thanks to the efforts of the Ukrainian scientists. The idea has already taken a real shape specified by designers. The future base will consist of several modules: an airlock module designed to access the lunar surface, a command module, a habitation module and a maintenance module. The vivarium module which is an integral part of the system, will be used to grow plants to sustain life of the crew. The good news is that we will not have to wait long for the project to be

completed. Virtual reality and Oculus Quest headset provide a possibility of exploring the Moon base in full explorer mode without leaving the museum.





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:



von Braun Symposium: The 2020 von Braun Memorial Symposium took place online October 26-28, with a record number of attendees. This conference included discussions on the Artemis program, Human Landing System, human space exploration, workforce and education, policy, international collaboration, and other important topics. Featured speakers included Jim Bridenstine, Carissa Christensen, Kara Cunzeman, Mary Lynne Dittmar, Mike Griffin, Kathryn Lueders, Wayne Monteith, Scott Pace, Jim Reuter, Jody Singer, and more!



Glenn Symposium: AAS held the second annual John Glenn Memorial Symposium from July 15-17 online, which turned out to be a great success. 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 taking place online July 13-15, 2021. Check out last year's symposium here: <https://bit.ly/2EBavbu>.

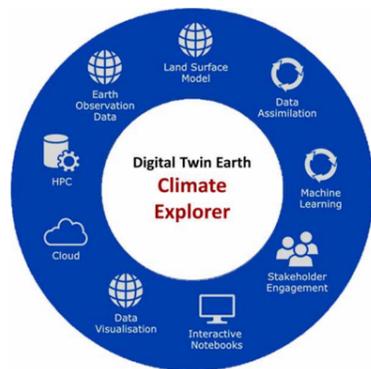
Goddard Symposium: The annual Goddard Symposium will take place online May 4-6. This year's event theme is *Planetary Stewardship*. Our speakers, panelists, and audience members will discuss advances and innovations in the study of Earth, our solar system, and the broader universe. For more information and to register: astronautical.org/goddard. Please join us!

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



Telespazio UK Awarded Digital Twin Earth Precursor Contract to Advance Understanding of Local Impacts of Global Climate Change

- Tool will enable decision makers to generate and visualise, in real-time, decision-ready information relating to regional impacts of climate change
- Activity supports ESA's flagship Digital Twin Earth Initiative
- Telespazio will work in close collaboration with leading UK academics exploiting world-leading capabilities in EO and Climate Data analytics



Telespazio UK, a subsidiary of Telespazio – a joint venture between Leonardo (67%) and Thales (33%) – has been awarded a European Space Agency (ESA) contract to develop a Digital Twin Earth Precursor (DTEP) to advance our understanding of local impacts of global climate change.

“Digital Twin Earth” will be a high-resolution dynamic reconstruction of our planet and its complex processes. The output will provide advanced science-based decision support

capabilities, including enhanced predictive and simulation capacity, at resolutions and accuracies necessary to respond to the urgent challenges and targets addressed by the EU's Green Deal.

The innovative *Climate Explorer* proposed by the Telespazio UK team will use advanced Earth System Models, processed using High Performance Computing infrastructure and state-of-the-art data assimilation techniques with satellite Earth Observation data. Optimised model simulation outputs will be delivered via Machine Learning emulation to the end user through a cloud-based Interactive Data Portal. As an example use case, this will include soil moisture and drought metrics that impact agriculture in Africa.

The prototype *Climate Explorer* tool will be developed using an Agile approach, in close collaboration with a diverse stakeholder group. This will ultimately enable decision makers without expert technical knowledge to generate and visualise, in real-time, decision-relevant information relating to regionalised impacts of climate change.

Dr Geoff Buswell, Head of Marketing and Sales at Telespazio UK, said: “We are excited to be supporting ESA's flagship Digital Twin Earth initiative. Telespazio will build on our established relationships with leading UK academics, exploiting our complementary capabilities in EO and Climate Data analytics to develop relevant tools that can improve our understanding of climate-related impacts on our daily lives”.



Fly me to the Moon: Europe's contribution to NASA's Artemis programme



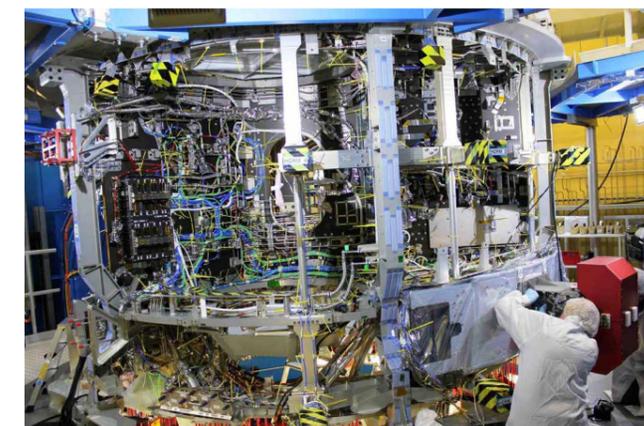
The European Space Agency (ESA) has signed a further contract with Airbus for the construction of three additional European Service Modules (ESM) for Orion, the American crewed spacecraft for the Artemis programme.

The ESM, built at Airbus in Bremen, is the centerpiece of NASA's Orion Spaceship. In addition to its function as the main propulsion system for the Orion spacecraft, the ESM is responsible for orbital manoeuvring and position control. It also provides the crew with critical life support elements such as water and oxygen, and regulates thermal control while attached to the crew module.

The first service module has already been delivered to NASA. Two further service modules are currently being built at Airbus in Bremen and now another three are in the pipeline.

Artemis I, the first non-crewed Orion test flight with a European Service Module will fly in 2021. It is as part of the following mission, Artemis II that the first astronauts will then fly around the Moon and back to Earth. With Artemis III, NASA will land the first woman and next man on the Moon, using innovative technologies to explore more of the lunar surface than ever before.

As part of wider European-led Moon activities, Airbus has also been awarded a CLTV (Cis-Lunar Transfer Vehicle) study by ESA to define the design for an autonomous logistics vehicle to transport cargo or fuel for refuelling in lunar orbit. It will help establish the first building blocks for humans and machines to work together between the Earth and the Moon.





Serbian Office for Space Sciences, Research and Development | Канцеларија Србије за свемирске науке, истраживања и развој

Serbian Office for Space sciences, Research and Development (SERBSPACE) was established in August 2016 as a non-governmental organization based in Belgrade with the general aim of developing the Space sector in Serbia through Academia, Industry and Societies as three main pillars of the wider Space ecosystem. SERBSPACE's scope of work includes Space sciences and industries, improvement of research and development relating to Space, cooperation with national and international universities, associations, Governments, United Nations, Space agencies and companies, participation in and organization of events, congresses, workshops and other space related activities and events, development of Space strategies, road maps, applications and other Space related projects. For the purpose of achieving its goals the Office particularly organizes scientific and professional conferences, meetings and other events related to Space sciences, industry and societies; develops Projects, Space strategies, Road maps, Applications and other space related projects; participates in national or international projects, programs, conferences and workshops in the space related fields; gathers national and international Members of Academia, Industry, Societies and Governments in field of Space, particularly in Serbia and South East Europe with the aim to establish cooperation for the future projects and activities of the Office; cooperates with national and international universities, associations, organizations, Governments, United Nations, Space agencies and companies; cooperates and informs competent authorities on projects and initiatives of national interest and Space strategies and road maps, such as Serbian Space agency project, membership within international organizations (UNCOPUOS) and representation before international stakeholders.

SEE|UNIVERSE

SOUTHEAST EUROPE SPACE CONFERENCE 2020
BELGRADE, SERBIA

Serbian Office for Space Sciences | Канцеларија Србије за свемирске науке, истраживања и развој

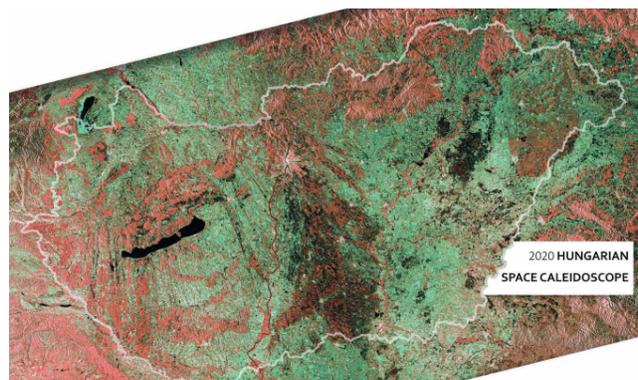
Opening ceremony

 Milan Mijovic, LL.M <small>Serbia</small> <small>President and Founder Serbian Office for Space sciences, Research and Development</small>	 Dr. Sasa Lazovic <small>Serbia</small> <small>Assistant Minister Ministry of Education, Science and Technological development</small>	 Dr. Christian Feichtinger <small>Austria</small> <small>Executive director International Astronautical Federation</small>
 Luc St-Pierre <small>Canada</small> <small>Chief, Space Applications Section (SAS) United Nations Office for Outer Space Affairs (UNOOSA)</small>	 H.E. Ruth Stewart <small>Australia</small> <small>Ambassador of Australia to Serbia, Montenegro and North Macedonia Australian Embassy in Serbia</small>	 H.E. Susanne Shine <small>Denmark</small> <small>Ambassador of Denmark to Serbia Embassy of Denmark in Serbia</small>

www.serbpace.rs
www.seeuniverse2020.rs



Hungarian Space Kaleidoscope 2020



The Hungarian Astronautical Society (MANT), with the support of the Ministry of Foreign Affairs and Trade, published a book introducing the diverse activities of the Hungarian space sector. After the 2019 issue, this is already the second, updated and extended edition of the Hungarian Space Kaleidoscope, prepared



in both Hungarian and English languages and made available for free download from our home page (www.mant.hu). The 64-page book covers small and medium-sized enterprises, research centres and university research groups working in the country. For each entity, a short introductory text is accompanied by basic data as staff headcount and annual revenues, and the list of their major space-related projects and achievements. The Space Kaleidoscope identifies key research areas and technological competencies of the organisations, and allows for a quick search by topic. It is an indispensable source of information for those seeking potential business partners in space industry or space research collaborators in Hungary.



Women in Aerospace Europe y

The Women In Aerospace Europe network are proud to have been supporting women in the Space sector for the last 10 years. The past year has been exceptional for everyone. But the support network in our Local Groups, virtual networking lunches and conversations with our Corporate members and Partners made the continuous exchange between our members possible and have kept us all going. This has further strengthened our community, opening new possibilities for exchange and collaboration.

We were delighted to celebrate the career of astrophysicist Pascale Ehrenfreund, our most recent recipient of the WIA-Europe Outstanding Achievement Award. Over the next 12 months we are excited to be launching a new dedicated WIA-E student committee and look forward to a range of initiatives with our dedicated corporate members. So, if you are starting out on your career in Space or are already a leader in your field, we welcome you into the WIA-Europe network where we will continue to strive for a more equal, diverse and inclusive aerospace sector. Find out more about our programmes and sign up to WIA-Europe here.



International Lunar Observatory Association (ILOA Hawaii'i) is ready to conduct Astronomy on and from the Moon in less than 7 months! It is working with its first dedicated, professional Lunar Astronomers to help prepare for, enhance and share ILO-X Milky Way Galaxy images with the network of participants from ILOA Galaxy Forum (which has had >100 events in 17 countries, and online). Precursor ILO-X payload instruments will attempt Galaxy First Light and other imaging, and act as a testbed for more advanced technologies to be utilized on ILO-1 flagship mission to the Moon South Pole and its back-up ILO-2, being developed by Canadensys Aerospace. Advancing Astronomy and Communications from the Moon, the 3rd ILOA Southeast Asia Lunar Commercial Communications Workshop was held 25 February, cohosted by Singapore Space and Technology. As numerous nations and private ventures set sights on Moon missions near-term, these Workshops will further expand LCC possibilities with participants at other venues. ILOA and its affiliated Space Age Publishing Company are also raising awareness and advocating for the pioneering possibilities of First Women on the Moon and Multi World Civilization.



Space Hardware On Time and Within Budget - The Valispace Manifesto

Have you ever wondered how modern engineering companies such as **Tesla & SpaceX** constantly beat their competition?



VALISPACE

Although the year 2021 is still in its infancy and despite the enormous challenges that were faced in 2020, much has been achieved in the aerospace industry already this year - proving that with effective collaboration, slick processes and a collective will, this sector and indeed, our species can adapt and thrive in adversity.

To successfully land another of humanity's creations on the red planet whilst at the same time another group of innovators make strides forward in the delivery rockets that might one day take us there, in the middle of a global pandemic, is an incredible accomplishment.

By reimagining the processes and tools that are used, such feats can be attained. Amazing work can happen when processes are fluid and engineers are motivated. This year, Valispace is working with companies across many industries that are achieving amazing things.

From building electric powered logistics trucks to designing in orbit-manufacturing plants to create new supermaterials made using carbon negative methods, organisations that interact with our software are utilising lean and agile practices to push the limits of what can be done with human minds.

In March, we launched The Valispace Manifesto, a guide that helps organisations dealing in complex hardware engineering identify sources of waste in their ways of working that can be a barrier to success and excellence.

The manifesto gives insights on how you can harness digitisation, and practical tips on taking your team to the next level. To join innovators who are already working the new way, read the whole manifesto [here](#).



Satellogic Announces Multiple Launch Agreement with SpaceX

Satellogic announced a Multiple Launch Services Agreement (MLA) with SpaceX. Through the agreement, SpaceX becomes Satellogic's preferred ride to orbit via SpaceX's SmallSat Rideshare Program. The first launch, presently scheduled for June 2021, will deliver Satellogic satellites to Low Earth Orbit on a Falcon 9 rocket.

This agreement with SpaceX will enable Satellogic to maintain and extend their position as the global leader in high-resolution, high-frequency geospatial analytics. Satellogic expects to complete the initial buildout of their Earth Observation Constellation by Q1-2023. At that point the company will have the capacity to deliver weekly, high-resolution coverage of the entire landmass of the planet. Through a series of rideshare launches over the next two years and beyond, the company will be moving from weekly to daily world remaps by 2025 with more than 300 microsats in orbit.

The multiple launch agreement also puts Satellogic in a unique

position to capitalize on SpaceX's competitive rideshare program and frequent launch schedule. By securing SpaceX as their preferred partner for rideshare missions, Satellogic is now able to accelerate the time between satellite development and deployment. This accelerated timeline allows Satellogic to continue to rapidly expand their in-orbit capacity, while also increasing revisit capabilities to monitor the planet on a high frequency basis, serving customers at the right price.

Satellogic's robust capacity and today's MLA with SpaceX represent a new and exciting phase in Satellogic's growing relationship with the US space ecosystem, commercial partners and customers.



MOON VILLAGE ASSOCIATION HIGHLIGHTS

The Moon Village Association (MVA) has been created in 2017 as non-governmental organization (NGO) based in Vienna. Its goal is the creation of a permanent global informal forum for stakeholders like governments, industry, academia and the public interested in the development of the Moon Village. The MVA fosters cooperation for existing or planned global moon exploration programs, be they public or private initiatives. It comprises more than 200 individual members from 48 countries and 27 Institutional members around the globe, representing a diverse array of technical, scientific, cultural and interdisciplinary fields.



MVA is organizing webinars dealing with all the activities of the Association ranging from Cultural consideration to policy and technical issues. The average number of participants were several thousands, adding value to all people interested in the Moon Exploration and Settlement. At the present, a new Working Group about Lunar Commerce and Economics has been created.

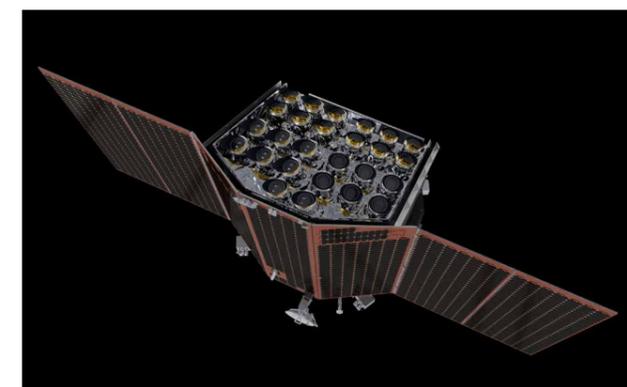
Together ahead. RUAG

RUAG Space: Sunshield Solar Array Subsystem for PLATO

RUAG Space, Europe's largest independent supplier of space subsystems and components, will deliver the Sunshield Solar Array Subsystem for the European "planet-hunting" mission PLATO to satellite builder OHB.

The "planet-hunting" mission PLATO (PLANetary Transits and Oscillations of stars) of the European Space Agency (ESA) is a space-based observatory to find and study extrasolar planetary systems with emphasis on the properties of terrestrial planets in the habitable zone around solar-like stars. It is scheduled to launch in 2026. Mid-January RUAG Space and OHB, Germany's first listed space and technology company, signed the contract for the Sunshield Solar Array Subsystem. RUAG Space will provide mechanisms, structures (panels) as well as thermal insulation, a transport container and other ground support equipment. A solar array consists of several solar panels that generate electricity for the satellite. The solar array also shields the 26 cameras and electronic units of the PLATO observatory from the sunlight.

RUAG Space is one of the major space mechanism suppliers worldwide. Precision mechanisms have been a specialty of RUAG Space since the early days of space technology. With its in-house capabilities to provide clients with turn-key solutions consisting of Mechanism and associated drive and control electronics, significant reduction of efforts can be achieved at prime contractors. Products from RUAG Space are particularly sought after for precise positioning and motion control within payload instrument mechatronics, solar generators, thrusters and antennas.



The Phase 1 of the Participating for Emerging Space Countries (PESC) program has been completed in 2020 with the issue of Roadmaps to involve in the Moon Village the following countries: Jordan, Egypt, Kuwait, Kenya, Mongolia, Nepal, Thailand, Mexico, Colombia, Chile. The phase 2 has started and is dealing with the implementation of their roadmaps.

The 1st Global online Moon Village Workshop & Symposium was held on 9 and 10 November 2020 and it was attended by more than 700 people from 67 countries. This workshop was a turning point since MVA received a strong support from 7 space agencies that participated in the Key note speeches. Many innovative presentations were made, from all the world, and are available on the MVA website. In 2021 the Workshop & Symposium is planned in November in Cyprus.

On December 14-16, the MVA Architecture Working Group workshop took place. The workshop discussed in detail the reference Moon Village architecture in 2045, this is important in order to understand interdependency of the relevant building blocks under development.

In order to reduce the risk of accident and increase international cooperation for the future lunar missions, MVA has defined the Best Practices for Sustainable Lunar Activities, however, to engage the world community the Global Expert Group on Sustainable Lunar Activities (GEGSLA) has been created. This group involve major stakeholders like space agencies/governments, industry, academia, international organizations and the public. The goal of GEGSLA is to define a common level playing field for sustainable lunar activities as well as define, in detail, critical issues like definition of safety zone, lunar debris mitigation guidelines, interoperability, etc. GEGSLA Kick-off took place on February 25 and there is still the possibility to become observer in this Group



Many new national coordinators have been appointed, especially in Africa. The Global Network is growing and has reached about 30 countries.

For more information, please visit: www.moonvillageassociation.org





GMV CEMENTS ITS LEADERSHIP IN THE THIRD PHASE OF THE BIGGEST EUROPEAN COMMISSION'S SPACE ROBOTICS PROGRAM

After featuring prominently in the program's first and second phases, GMV will be acting as a strategic partner of the projects playing a key role in all third-phase projects of the H2020 Strategic Research Cluster (SRC) on space robotics technologies

In the three new robotics projects GMV will be taking on responsibility for the robotics components' autonomy systems and cooperation capability, and will also contribute to the guidance, navigation and control systems (GNC)

The aim is to take one more stride towards a final demonstration of the orbital mission and set up a robotic collaboration demonstrator in a Mars-like terrain scenario



Madrid, 27 January 2021.- The European Commission (EC) has recently announced the three new third-phase projects of the Strategic Research Cluster (SRC) on space robotics technologies, coordinated by the PERASPERA project under the Horizon 2020 program (H2020).

The first phase of this ambitious, groundbreaking endeavor involved six projects (three led by GMV) to tackle the design, manufacture and testing in representative environments of various high-performance robotic Common Building Blocks suitable for operation in orbital or planetary space projects. The main objectives of the second call, now drawing to a close, are the integration of the previously prepared Common Building Blocks for space robotics resulting from the first phase

into demonstrators on ground, targeting specific applications of space robotics in the field of orbital and planetary (Lunar-Martian terrains) use.

The remit of this third call, as far as on-orbit servicing missions are concerned, is, to take one more step towards a final demo in an orbital mission. Secondly, as far as planetary-exploration missions go, it aims to develop a robot-collaboration demonstrator in a Mars-like terrain.

GMV's performance in the first two phases has won the company the ranking of a strategic partner in the three new projects resulting from the third call (CoRoB-X, EROSS+ and PERIOD), keeping its responsibility for critical systems like the robotics components' onboard autonomy systems and cooperation capability, while also contributing towards the guidance, navigation and control (GNC) systems.

The Cooperative Robots for Extreme Environments project (CoRob-X), led by DFKI, will develop and demonstrate enabling technologies for multi-agent robotic teams, with the ultimate aim of improving inter-robot collaboration. The main application is the exploration of planetary surfaces, focusing on areas that are hard to reach like craters and lava tubes. CoRob-X will offer priceless insights for future robotic exploration missions in critical areas like locomotion, autonomy and inter-robot cooperation. A second use case, developed in the frame of this project, will reuse this technology for a ground mining scenario. GMV is a key partner in both use cases.

The two projects European Robotic Orbital Support Services + (EROSS+) and PERASPERA In-Orbit Demonstration (PERIOD) will design two mission concepts of respectively on-orbit servicing demonstration and in-orbit assembly with the aim to provide a European system to cater not only for service-providing satellites, but also the service-receiving satellites. All this will be based on the robotic technologies developed in the previous H2020 calls (1st and 2nd) of the space robotics SRC.

The demonstration mission concept of EROSS+, led by Thales Alenia Space, Joint Venture between Thales (67 %) and Leonardo (33 %), will take in the complete orbital rendezvous phase with a collaborative satellite prepared for on-orbit servicing. This includes the capture, service operations (refuelling, payload-replacement and -repair) plus in-orbit assembly. The idea is to vet the capability of carrying out in-orbit operations of this type for future missions.

PERIOD, led by Airbus Defence and Space GmbH, aims at a very ambitious demonstration scenario of an orbital factory concept. Under this project, a satellite will be built by the factory equipped with manipulators and tools and then inserted in an operational low-earth orbit (LEO). Manufacture includes the construction of an antenna, assembly of components and reconfiguration of the satellite in the factory itself. The demonstrator is housed on

the ISS Bartolomeo platform, which will be upgraded to increase the capability-vetting level from structure manufacture and assembly right through to refuelling experiments.

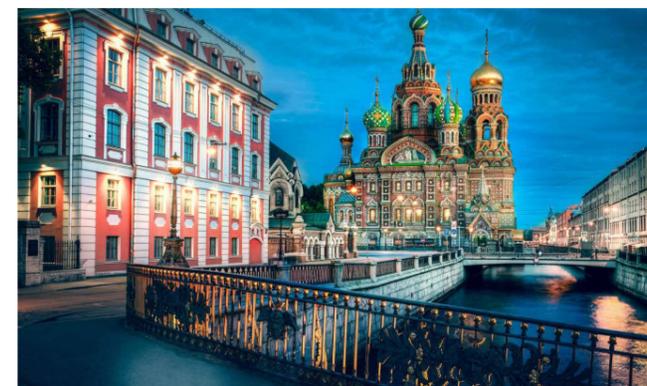
GMV's crucial role in these three projects confirms its European leadership in OBA (On-Board Autonomy) and GNC (Guidance, Navigation and Control) for orbital and surface applications.

"After more than 5 years of hard work we are very proud to reaffirm and reinforce our roles within this 3rd phase of the SRC on Space Robotics technologies. Our goal is now to collaborate with

the main robotic institutions and companies and with the two big LSI enabling the use of robotic elements from former projects for enhancing and fostering commercialization of New Space and Industry 4.0. It is GMV's aim to input its new-application expertise towards not only the future needs of exploration and exploitation of space but also potential spin-off and spill-over uses to other areas of robotic activity and applications on Earth, such as mining, nuclear, oil&gas, agricultural, automotive, or underwater applications" stated Mariella Graziano, Executive Director of Space Segment and Robotics in GMV.



14 – 18 June 2021



Interview with Fabio Santoni, Associate Professor of Space Systems at Sapienza University of Rome and Mila Savelyeva, Director of marketing communications, GK Launch Services



SAPIENZA WildTrackCube-SIMBA Spacecraft is designed for:

Demonstrating a spaceborne method for improving the monitoring of the wildlife behavior in the Kenyan National Parks. The satellite is equipping innovative spread-spectrum modulation receiving equipment in order to receive data from radio tags installed on wildlife of various sizes (ideally from birds to large mammals) in the National Parks of Kenya. The system is addressed at acquiring both positioning (Global Positioning System, GPS) and health from the animals.



Fabio Santoni, Associate Professor of Space Systems at Sapienza University of Rome

1. Can you tell us about the research you did that led you winning the GK Launch Competition?

We have been involved for several years in a multidisciplinary collaboration program with Kenya Universities. The Italian Space Agency, in the mainframe of the Intergovernmental Agreement for the Broglio Space Center, foresees the support to the Kenya Space Agency, promoting research and education programs of common interest.

Among the several research programs, developed by Sapienza and Kenya partner universities, the research program IKUNS (Italy-Kenya University NanoSatellite) is aimed at having students and researcher from both countries design, develop, launch and operate in orbit a Cubesat on a regular basis. This and other programs benefit from the Postgraduate Course in Capacity Building in Astronautics, jointly established by Sapienza and Machakos University and supported by the Italian and Kenya Space Agencies. Students from Italy and from Kenya participate in this program, under the supervision of experts from Kenya and Italy, including, professors and professionals in several fields related to space disciplines, including mission development and use of space infrastructures and data for social and economic benefits.

Among the aims of IKUNS and the Capacity Building Course are the direct involvement of Kenya experts and students in identifying possible problems and needs that can be addressed by the used of space technology.

Understanding the behaviour of dangerous large mammals, such as elephants, that cause damage to crops and sometimes endanger human lives, is a problems faced by Kenya, which could be possibly monitored by tracking the animals.

2. Can you briefly explain what your project was about?

The project is a technical demonstration of a low cost mean for tracking animals using a Cubesat-based system. If the technical demonstration proves successful, then it will possible to deploy tracking units on a large scale and track the animals systematically, to the benefit of scientists and operators in the Kenya National Parks.

The main idea is to use a compact, autonomous self contained tracking system equipped with a low power and low data rate transmitter, capable of reaching the satellite. Animal data will be stored on-board and downloaded to the ground station in the next useful passage.

3. How did you feel the day of the announcement of the winner? And the day of the actual launch?

The day the winner was announced I was feeling a bit nervous, since we were among three possible finalists and the winner was going to be announced "real time" at IAC19. When I realised we were the winner, I was very happy and grateful to our students. I mean the Sapienza, Machakos University and University of Nairobi students, who were really dedicated in defining the idea and in preparing the proposal. Unfortunately not all of them could be at the ceremony, but I am sure they were feeling happy and proud, knowing that a flight opportunity was there to implement the technology demonstration. Just after the announcement, when the opportunity for implementation of the mission became a reality, funding, time schedule, procurement, testing ... all thoughts that came to my mind. I was hoping and confident we could count on the continuing support from ASI, which actually happened and allowed us to implement the mission at our best, compatible, with the strict time schedule and 1U Cubesat limited on-board resources. My deep regret is that no student from Kenya could participate in person, because of mobility restrictions due to COVID-19. We all are committed to do our best so that all of them will be fully involved in the satellite operation phase and data analysis.

GK Launch Services

GK Launch Services is an operator of commercial launches. The company was established by the decision of Roscosmos and is authorized to conclude and implement commercial contracts for the launch of spacecraft using Soyuz-2 family launch vehicles from the Russian spaceports



Mila Savelyeva, Director of marketing communications, GK Launch Services

1. Why did GK Launch decided to launch this competition with IAF Members?

IAF is the largest space organization that brings together key members of the international space market. We aimed to offer different universities and commercial entities a unique opportunity to work with Soyuz-2 more closely and obtain valuable experience in spacecraft preparation and launch.

2. What advice would you give to space universities entering the competition next time?

First of all, we believe that it is essential to concentrate on the spacecraft's mission, its novelty, importance and current relevance.

Then, the mission presentation should contain a clear and coherent structure and emphasis.

Moreover, we appreciate if a participants' project has an international scale. It gives a great advantage when the latter represents teamwork based on global cooperation and engagement.

Last but not least, the contestants should monitor and accept opportunities offered by other players in the space community. It shows the participants' involvement and interest in the field.

3. Which skill do you think is most important for students to learn before applying?

To us, any successful project is based on vivid enthusiasm, remarkable persistence and perpetual development. These qualities are key to substantial and striking achievements.





International Astronautical Federation

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International Astronautical Federation

The next IAF newsletter will be issued in June 2021