





## IAC 2020 HIGHLIGHTS

IAF Connecting @ll Space People

SUPPORTED BY:













### **WELCOME MESSAGE**

Since its first edition in 1950, the IAC, travelling the world multiple times, has been THE place for all space people to come together and discuss about the latest developments in space.

Every year, for 70 years, the International Astronautical Federation, with the support of its great partners, fantastic IAC hosts and, of course, thanks to the commitment of its members, has been able to bring to life an outstanding space gathering and at the same time to create a global, strong and resilient community. 2020 has been, undoubtedly, a challenging year for everyone. The Covid-19 pandemic made most physical meetings near-impossible and, for the safety of all, it was decided to move the IAC in Dubai to 2021.

Despite the constraints, the Federation was more than ever determined to play its unifying role for the space community, and the 71<sup>st</sup> International Astronautical Congress, IAC 2020, took place as virtual event: "the Cyberspace Edition" between 12 to 14 October 2020 under the theme "IAF Connecting @II Space People".

The event was offered free of charge to allow the entire global community to engage and it was indeed an outstanding success gathering more than 13,000 delegates from 135 countries. The virtual event featured most of the usual components of a regular IAC with Opening and Closing Ceremonies, Plenaries and Highlight Lectures, IAF GNF Sessions, Special Sessions, Technical Presentations and even a virtual Exhibition. During the three days, 21 live sessions were held and more than 1,300 on-demand video lectures were available in the Online Technical Presentations Gallery.

I am delighted to present you with this booklet capturing the main highlights of this historic event. I hope you will enjoy it and I look forward to seeing all of you in Dubai, United Arab Emirates for the 72<sup>nd</sup> IAC, in October 2021!

**PASCALE EHRENFREUND** 

President, International Astronautical Federation





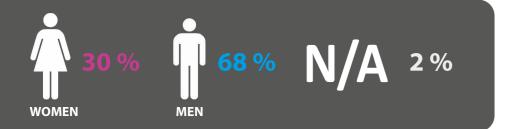
### **IAC 2020 STATISTICS**

**13 600** Registrants from **135** Countries

**36 000** views **Live Sessions** 

**33 500** views of the **Technical Presentations Gallery** 

**29 000** views of the overall **Virtual Exhibition** 







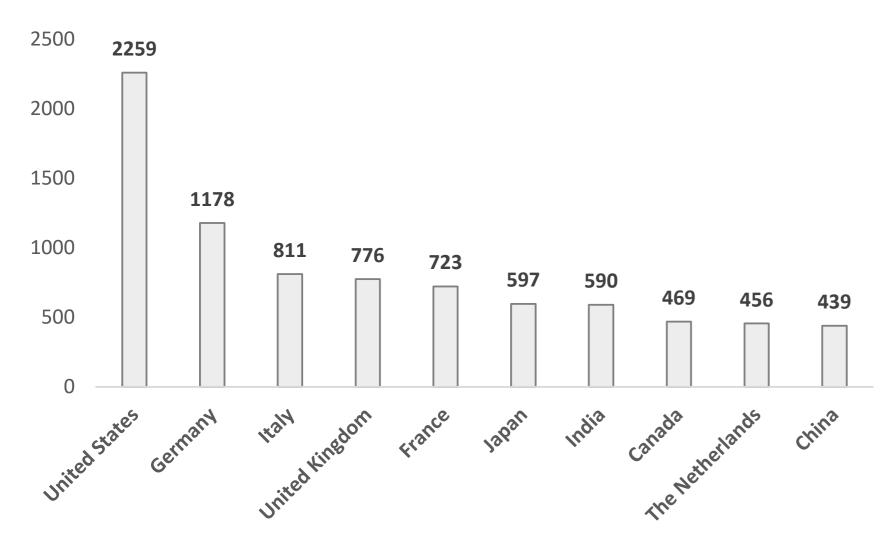
### **Geographical Distribution**

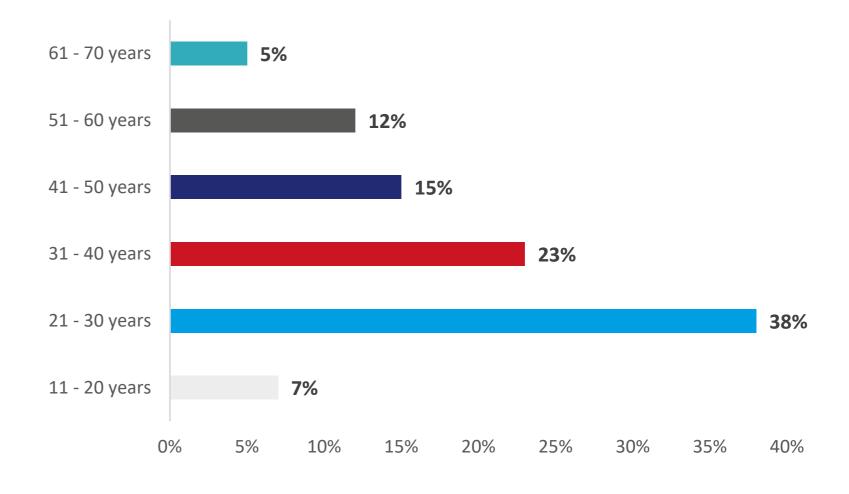


### **Top 10 Countries**



### **Participants Age**





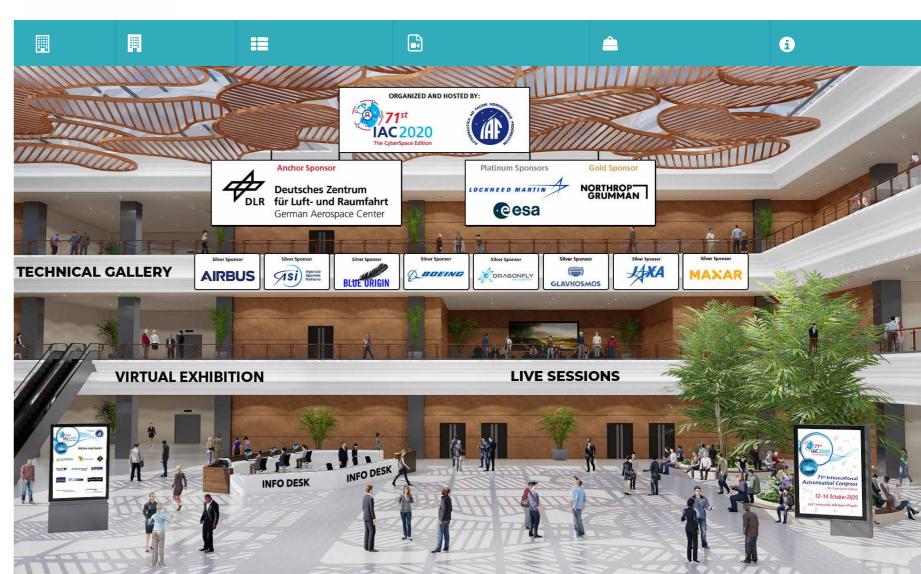
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## **IAC 2020 VIRTUAL PLATFORM**

The IAC 2020 Virtual Platform was developed by the IAF together with VFairs, a professional virtual event platform. It featured virtual environments that resembled the congress centre at a regular IAC. On the next page to the right you can see what the main Lobby Page looked like.

This booklet follow the platform's structure, the different chapters based on the IAC 2020 menu. In the online version of this booklet, the menu is interactive and will let you navigate through the different parts just as you could do on the IAC 2020 Virtual Platform.







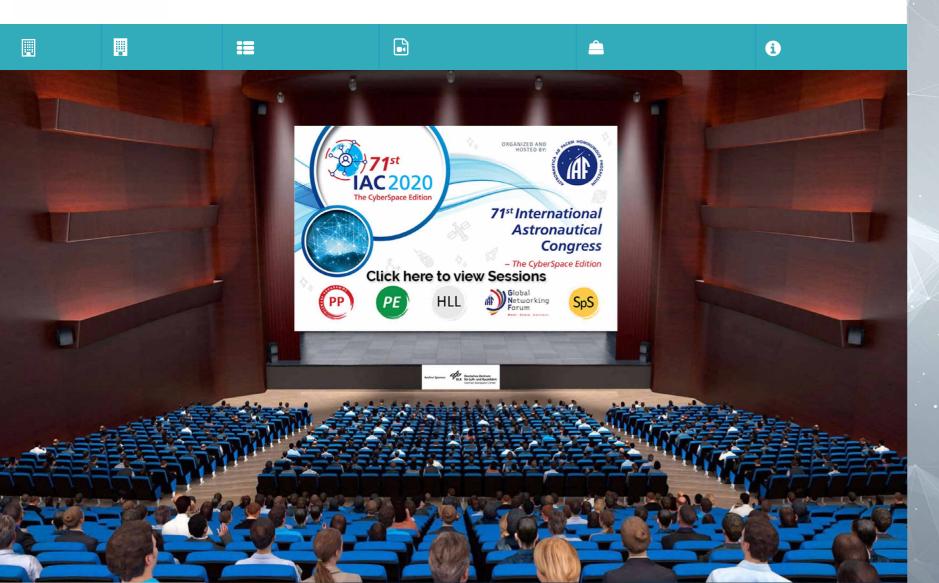
## Thank you for your participation



**Deutsches Zentrum** DLR für Luft- und Raumfahrt

German Aerospace Center



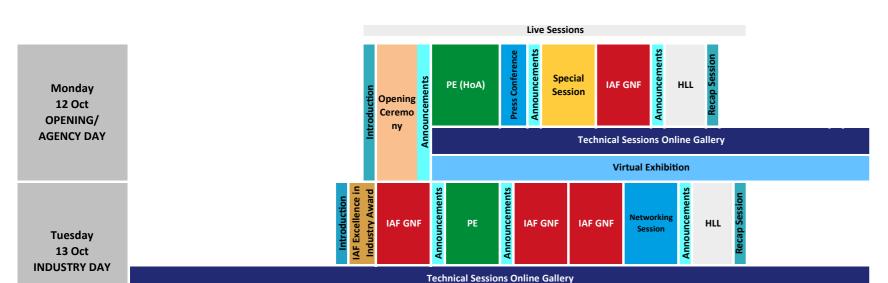


### LIVE SESSIONS



### **SESSIONS SCHEDULE**





**Virtual Exhibition** IAF GNF **Technical Sessions Online Gallery** 

Virtual Exhibition

Wednesday 14 Oct

DIVERSITY/ **OUTREACH DAY** 

Thursday

15 October

IAF General Assembly



PE

SpS







**5 GNF Sesssions** 

**2 Special Sessions** 





**1 Press Conference** 

























### **MONDAY**



"The IAF was founded to build a bridge in one of the darkest moments in our recent history—the Cold War. 2020 has been undoubtedly a challenging year for all of us and this unprecedented situation called for an unprecedented Congress."

#### Pascale Ehrenfreund













### **OPENING CEREMONY**

The 71st International Astronautical Congress was unlike any other. For the first time in the history of the congress, the entire event was virtual. The opening ceremony featured greetings from leaders around the world and also beyond with the connection from the International Space Station (ISS). The IAF President Pascale Ehrenfreund awarded the leaders of the Chang'e 4 mission with the prestigious IAF World Space Award and announced the creation of the IAF Digital Library.



IAC 2020 HIGHLIGHTS - MONDAY





"Competition is a drive, but collaboration is an enabler. We all know that we can do more when we work together and I would say it's more important now than ever before."

#### **Jim Bridenstine**



The Heads of Space Agencies met the press for Q&A after the plenary.















### PLENARY: Heads of Agencies

The leaders of the American, Canadian, Chinese, European, Indian, Japanese, and Russian Space Agencies convened to discuss recent developments at their agencies and what they see in the future of space exploration. Some major topics of discussion included the impact of the ISS for each agency, the importance of international cooperation, and how commercialization is changing the role of national space agencies.



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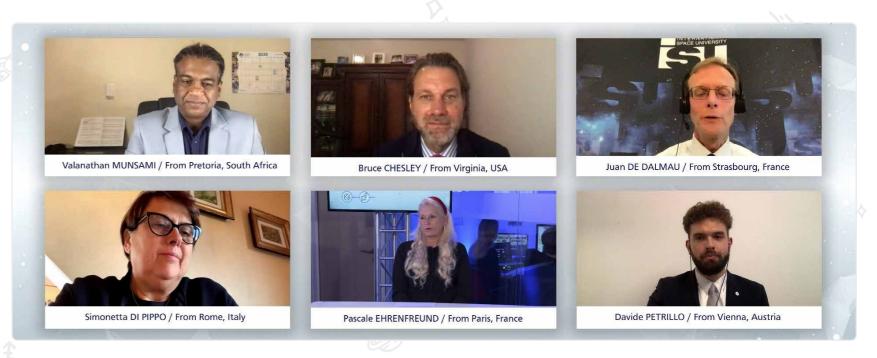


"When addressing global health crises, such as the one we are currently facing space can support both national and global policies tremendously."

**Pascale Ehrenfreund** 







## Space Sector During Covid-19

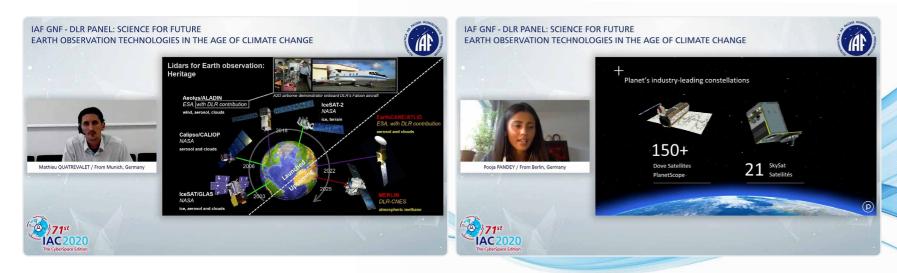
Over the past year, the world has grappled with unprecedented challenges faced as a result of the Covid-19 pandemic. In many respects, the space industry was uniquely prepared to deal with these challenges, but the ultimate impact of the pandemic is still uncertain. At this special session, a panel of industry experts with a global perspective discussed how the space sector has responded to the pandemic, its future outlook, and how to find opportunity in crisis.

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"Global change forecasts on the basis of scientific facts can be delivered by observation data. They are not limited by any artificial borders and not biased by political decisions and discussions."

**Hansjörg Dittus** 













# DLR Panel: Science For Future – Earth Observation Technologies In The Age Of Climate Change

The DLR Panel at the Global Networking forum was a discussion led by Hansjörg Dittus and Walther Pelzer, Executive Board Members at the German Aerospace Center (DLR), that highlighted three Earth Observation initiatives at the DLR focused on climate change. Dr. Dittus and Dr. Pelzer were joined by Paola Belingheri, Co-Founder of IceKing App; Mathieu Quatrevalet, a Lidar Research Scientist on the MERLIN Mission; and Pooja Pandey, a Customer Success Engineer at Planet. Each guest discussed different ways current and future satellites are fostering a better understanding of Earth's climate systems, from monitoring glaciers to pinpointing methane emission hotspots.





Live From Beijing, China

**Dengyun YU** 

Deputy Director of the Science and Technical Committee,

China Aerospace Science Technology Corporation (CASC)

"The Chang'e 4 mission is an innovative and complex project with great technical difficulty and big international influence."

Yu Dengyun







### HLL: The Chang'e 4 Mission

The International Astronautical Federation awarded its prestigious IAF World Space Award to the leaders of China's Chang'e 4 Mission, it was awarded to Weiren WU, Dengyun YU and to Zezhou SUN. In 2019, China became the first country to soft land on the far side of the moon. The Chang'e 4 lander and rover have changed our understanding of the lunar environment and provided an unprecedented glimpse at the far side of Earth's satellite. The IAF bestowed its World Space Award in recognition of this massive accomplishment, and the Deputy Director of the Science and Technology Committee at the China Aerospace Science and Technology Corporation discussed what Chang'e 4 has discovered so far.



"The International Space Station has been a key area where for us getting ready to that next stage to get ready for the Moon and Mars."

**Kathy Lueders** 





How will the commercialization of space resources play a part in NASA's goal to expand humanity throughout the solar system?

### NASA TV: Exploring as One

Thomas Zurbuchen, the Associate Administrator for the Science Mission Directorate at NASA, and Kathy Lueders, the Associate Administrator for the Human Exploration and Operations Mission Director at NASA, discuss how humans and robots work together to explore outer space. This topic is especially pertinent as the International Space Station approaches the 20<sup>th</sup> anniversary of a continuous human presence in space and continues to provide a platform to test the technologies that will take humans back to the moon—and beyond.



### **TUESDAY**









# IAF EXCELLENCE IN INDUSTRY AWARD CEREMONY

The IAF Excellence in Industry Award Ceremony, kicking-off another exciting edition of the IAC's Industry Day. The event was hosted by IAF President, Pascale Ehrenfreund and IAF Vice-President for Financial Matters and Industry Relations, Bruce Chesley. This year, Airbus Defence and Space has been awarded for its excellent achievements over the years, and in particular in 2019, for managing to deliver world-beating space technology to customers around the world: from the 2400 spacecraft equipment, to the 18 satellites successfully placed in orbit. This event featured a special Keynote Presentation by Dr. Jean-Marc Nasr, Head of Space Systems within Airbus Defence and Space and President of Airbus Defence and Space SAS. Dr. Nasr announced to the IAC audience that Airbus has successfully demonstrated the production of oxygen and metals from simulated lunar dust (regolith) with the Airbus-invented process named ROXY (Regolith to OXYgen and Metals Conversion).





"Our mission is to improve life on Earth and foster the possibilities beyond it by building and operating the world's first commercial space station."

Michael Suffredini







### **ISS Commercialization And** IAF GNF: Future Industry Innovation In Low Earth Orbit

For two decades, the International Space Station has been humanity's home in low Earth orbit and the proving ground for new space technologies. But as the ISS reaches the end of its planned life, NASA and its partners are looking to the commercial space industry to plot the future of exploration and innovation in LEO. This global networking forum brought together the leaders of three companies to discuss their vision for the future of the space industry close to Earth and how the commercialization of the ISS is vital to enabling deep space exploration.





"A lot of times small and mid-sized companies go for aggressive growth. You see opportunities and you want to step it up. But I think it serves as a good reminder that we should not lose sight of good business fundamentals."

Lynette Tan



Nobu OKADA



# Small And Medium Sized Companies – Strategies For Survival And Recovery In The Age Of Covid-19

A panel with representatives from small and medium-sized companies around the world discussed how Covid-19 has impacted their business and the space industry in general. Although small and medium-sized businesses have experienced the brunt of the economic fallout from the pandemic, each panelist offered advice on how to weather the storm going forward and what they've done in their own business to make it sustainable during this unprecedented crisis.



"The reason people say let's go to the moon was not necessarily just to go to the moon, it was about how we can expand the knowledge base and then be able to use that to solve our big problems here on Earth."

**Kathryn Lueders** 



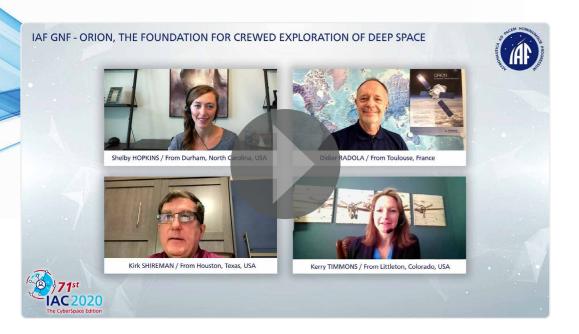




### **IAF GNF:** The Artemis Mission

In 2024, the first woman and next man will set foot on the surface of the Moon as part of the Artemis mission, an ambitious plan to establish a permanent human presence around the Moon. Artemis is led by NASA, but it is fundamentally an international mission that also depends on dozens of companies in the space industry. This panel brings Kathryn Lueders, Associate Administrator for the Human Exploration Operations Mission Directorate at NASA, in conversation with Walter Cugno, the Vice President of Exploration and Science Domain at Thales Alenia Space Italia, and Brent Shrewood, Vice President of Development Programs at Blue Origin, on the role of government and industry in the return to the moon.

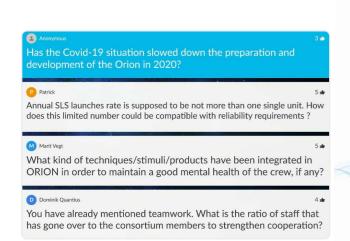


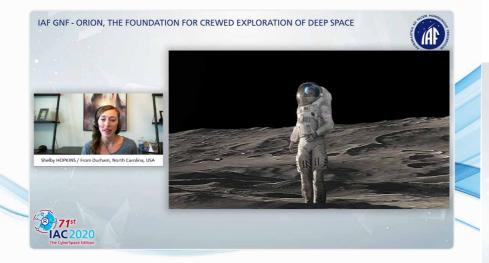


"Artemis is not just about doing amazing science on the moon. It's also about preparing us for our next destination, which is Mars."

**Shelby Hopkins** 







Orion, The Foundation For Crewed Exploration Of Deep Space

Before humans return to the surface of the Moon in 2024, they'll have gazed upon the lunar surface from orbit out of the window of Orion. Next year, NASA's new human-rated capsule will make its first journey into deep space by doing a lap around the Moon. The mission will be uncrewed, but it will lay the foundation for Orion's first crewed orbit around the Moon in 2023. At this Global Networking Forum panel, several Orion engineers and program managers came together to discuss the challenges of building Orion and how to design a capsule for deep space exploration.















LIVE SESSIONS -WEDNESDAY

### IAF LAUNCHPAD MENTORSHIP PROGRAMME ANNOUNCEMENT

The IAF launched a new initiative focused on mentorship and career development, pairing early- to mid-career professionals with experienced senior professionals in the space industry. The Mentorship Programme aims to facilitate career development and leadership capabilities of the mentee, and provide a platform for enhanced communication between the various generations represented within the IAF.



### **NEXTGEN NETWORKING SESSION:** INSPIRATION AND INNOVATION

This year's IAC's NextGen Networking Session brought together the best and brightest of students and young professionals dealing with Public/Private Partnerships (PPPs). The session showcased how the next gen is working to ensure that space is both sustainable and attainable through effective PPPs. The panel was very interactive, answering mostly questions from social media. Public/Private partnerships emerged as one of the best ways to drive innovation and new business models. It was also outlined the importance of making new connections to have new business ideas. This is facilitated by the current interconnectivity all over the world – a great advantage for this young space generation. The role of emerging space nations and non-space fairing nations was also described as paramount to generate new businesses for the next generation.





"The hypothesis for our business is that a cost effective, reliable and safe method for extending the lives of these satellites would make existing operators more cost effective and break down barriers to entry to help grow the market for new and existing operators alike."

**Joseph Anderson** 







## Mev 1: The World's First Commercial On-Orbit Servicing Mission

In this highlight lecture, Brian Weeden, Director of Program Planning at Secure World Foundation, discusses the historic Mission Extension Vehicle mission with Joseph Anderson, the Vice President of Business Development and Operations at SpaceLogistics LLC. MEV-1 is the world's first satellite life-extension mission that was successfully launched in early 2020. Anderson describes it as the beginning of a new era for satellite operators, which have now the ability to extend indefinitely the lifetime of their spacecraft indefinitely.





"We are passionate proponents of the ideal of international collaboration. We are one human race and we are in this together."

Sarah bint Yousef Al Amiri







# NASA TV: Participation in the Artemis Program

**NASA Session - International** 

During a historic session at the International Astronautical Congress, NASA Administrator Jim Bridenstine outlined the Artemis Accords, the agency's plan for fostering the peaceful uses of outer space. Bridenstine was joined by leaders from seven other space agencies in signing the Artemis Accords, which commits them to abiding by the principles of the Outer Space Treaty. The eight signatories to the Artemis Accords are the United States, Australia, Canada, Japan, Luxembourg, the United Arab Emirates, Italy, and the United Kingdom.

### WEDNESDAY



"The space age has changed our mentality, when you understand that there are no horizons, no boundaries, for exploration, that is something amazing."

**Dmitry Loskutov** 















# CGTN TV/IAF: New Era In Commercial Space

The CGTN session was a unique experience at the 2020 International Astronautical Congress. Set aboard a fictional spaceship, it was a panel that explored the present and future of commercial activities in space. The panel brought together leading voices from global space companies that are working on everything from launch services to Earth observation systems. The diverse panel agreed that there is massive potential in the commercialization of space and that this new era for the space sector is just getting started.















# IAF EXCELLENCE IN "3G" DIVERSITY AWARD CEREMONY

This event was held in the frame of the IAC's Diversity and Outreach day. This year, the IAF Excellence in "3G" Diversity Award has been awarded to the European Space Agency (ESA), for their commitment to create a modern and inclusive working environment and striving to enhance the innovative perspectives brought in by a diverse pool of talents. The event was hosted by IAF President, Pascale Ehrenfreund, Deganit Paikowsky, IAF Vice-President for Diversity Initiative and Science and Academic Relations and IAF Vice-President for Communications, Publications and Global Conferences, Mary Snitch. Ersilia Vaudo, ESA's Chief Diversity Officer gave a special Keynote on ESA's Diversity Initiative.



"Al powered space exploration might offer new perspectives and new understanding of life and its origins, and answers to questions we haven't even asked yet."

**Andrea Sapera** 







# Unleashing the potential of Artificial Intelligence & Machine Learning into Space

Space exploration has always depended on intelligent robots capable of performing their duties without human intervention. But as artificial intelligence becomes cheaper and more sophisticated, it is opening up entirely new possibilities for machine intelligence in space. This special session brought together leaders in spacebased AI to discuss how artificial intelligence is changing space exploration today and what to expect in the future.









"What we're really doing is building international knowhow for exploring beyond Earth. There are thousands of people who contributed to these missions and the excitement that all those people feel in achieving Mars exploration is really the main contribution that we all achieve with these robotic missions."

**Albert Haldemann** 



20205 - LAUNCH OF WORLDWIDE MISSIONS TO MARS









### Early 2020s – Launch Of PLENARY: Worldwide Missions To Mars

The global pandemic has made 2020 an especially challenging year, but it's also been an incredibly exciting year for Mars Exploration. Three national Missions to Mars were launched this summer, an unprecedented robotic train to the Red Planet that will be used by scientists to search for evidence of ancient microbial life and lay the foundation for the first sample return mission. During this plenary, leaders of the different Mars Missions discussed their exploration ambitions and the challenges involved with sending a robot to another planet.









"In the 1920s and 30s, commercial aviation was something that was only reachable by the very wealthy. Now people get on a plane without thinking much about it. One day we will see that kind of access to space."

Michael Lopez-Alegria











### IAF GNF: IAF/ASE Astronauts Panel

Just like the rest of the space sector, astronautics is changing fast. For the past few decades, low Earth orbit was the sole domain of professional astronauts, but now that the world is on the brink of a full-fledged space tourism industry, spaceflight is coming into reach for an increasing number of people. At the same time, astronauts are changing the way they train to prepare for long duration missions to the moon and eventually to Mars. This Global Networking Panel brought together a group of current and past astronauts to discuss how their profession is changing and what they are looking forward to in the future.





"For us, exploration is much more than just sending some people or robots into space. Space exploration is an aspect where cooperation can totally make a difference."

#### Jan Woerner





ON AND AROUND THE MOON AND MARS: A DISCUSSION RETWEEN ESA AND NASA LEADER!

JROPEAN YOUNG PROFESSIONALS ON EUROPE'S SPACE EXPLORATION CONTRIBUTIONS AND AMBITIONS



Program Manager Platform Equipment & Subsystem Business Area, Leonardo

ON AND AROUND THE MOON AND MARS: A DISCUSSION RETWEEN ESA AND NASA LEADERS

OPEAN YOUNG PROFESSIONALS ON FUROPE'S SPACE FXPLORATION CONTRIBUTIONS AND AMRITION





## IAF GNF: Europe On And Around The Moon And Mars

In 2024, humans will return to the lunar surface for the first time in more than half a century as part of the Artemis missions. Artemis is an international program that aims to establish a permanent human presence on and around the moon and to use Earth's satellite as a proving ground for the technologies that can carry humans to Mars. During this Global Networking Forum, young engineers from leading space companies in Europe discussed their contributions to the Artemis mission and the future of deep space exploration with ESA director general Jan Woerner and NASA administrator Jim Bridenstine.





CLOSING CEREMONY



















### **CLOSING CEREMONY**

The Closing Ceremony provided a formal end to the activities of the IAC 2020 - CyberSpace Edition. The event featured a video summary of the week's highlights, presentation of the IAF Awards, proper salutations to the outgoing IAF Vice-Presidents and at the end of the ceremony, the official invitation to the 72<sup>nd</sup> International Astronautical Congress in Dubai, United Arab Emirates, 25 - 29 October 2021. HOSTmi was the winner of the IAF ISEP 2020 Startup Pitch Session and was announced during the closing ceremony.







# TECHNICAL PRESENTATIONS GALLERY

















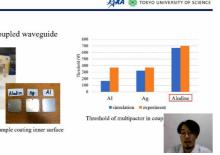








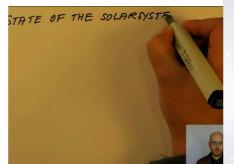


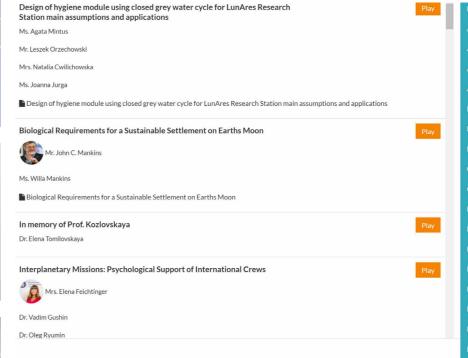


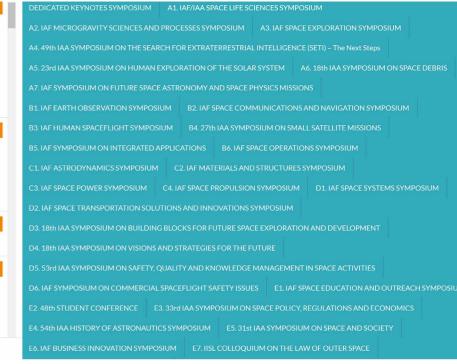












# TECHNICAL PRESENTATIONS GALLERY

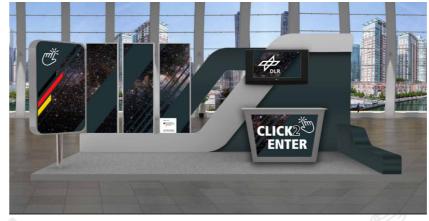
The IAC 2020 – The CyberSpace Edition featured a Virtual Technical Programme based on a compilation of 10-minute video lectures. More than 1,300 Video Lectures had been submitted and available to view in the IAC Virtual Technical Presentations Gallery. It was a very rich and diverse Technical Programme presenting the latest research outcomes in space. In addition to the regular presentations there were also 13 dedicated Symposium Keynotes presentations. During the congress days, the Virtual Technical Presentations Gallery received more than 33,500 views in total.





















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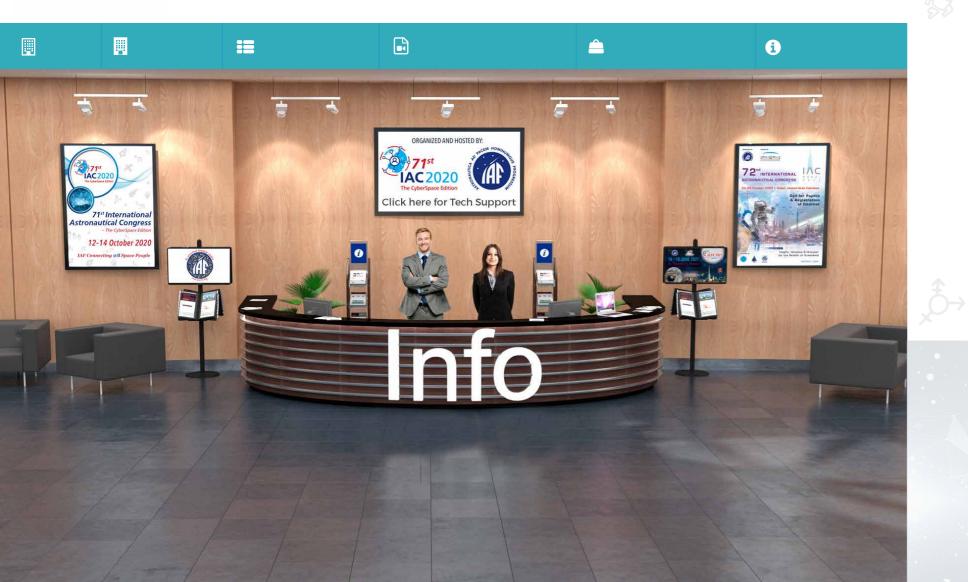




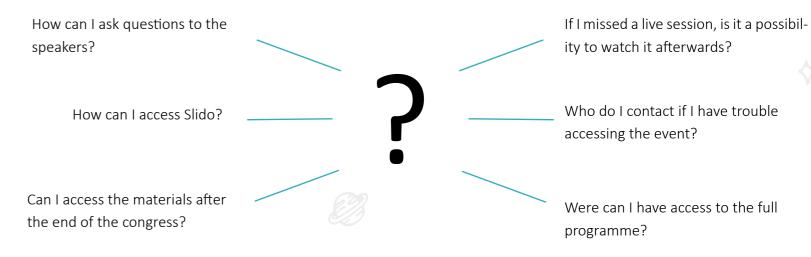
### **EXHIBIT HALL**

In a regular IAC the Exhibition is always a big part of the congress even though we had a virtual event this year it was still important for us to provide the delegates with a similar experience. 34 Exhibitors could be found in the IAC Virtual Exhibit Hall. Each Exhibitor had prepared their own virtual exhibition booth which allowed the deleagtes to browse content and even chat with representatives.





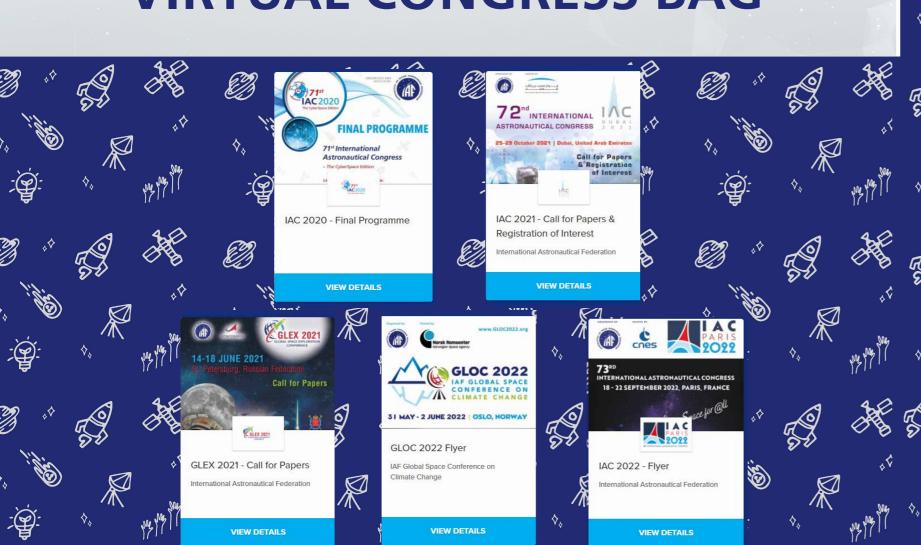
### **INFORMATION DESK**



### INFORMATION DESK

An Information Desk was available on the IAC 2020 Virtual Platform, here the delegates could ask questions and receive technical support if needed. You could also find information about the IAC 2020 programme and other IAF upcoming events.

### VIRTUAL CONGRESS BAG







VIEW DETAILS





#### Sponsored by:

LOCKHEED MARTIN

A Virtual Congress bag was available for all Congress delegates. The bag was sponsored by Lockheed Martin and included the IAC 2020 Final programme along with brochures from the IAF and sponsors. The bag was greatly appreciated and received more than 6000 visitors and 29 000 page views.

### **BEHIND THE SCENES**















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