



THE IAF YP MAGAZINE

Juventia

Volume 3, Issue 2

August 2021

Private
Spaceflight
- New Milestones



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Message

Dear friends,

It is already September and we are getting close to the IAC. We will have our usual Sunday, Tuesday, and Wednesday night receptions, as well as jointly organised events with other committees and organisations. Please follow our social media channels for more information on the actual programme over the coming two months leading up to the congress. I hope that many of you will see us in Dubai, if not please find out about the opportunities to join us online in the five Global Technical Symposiums which are happening throughout the IAC week and are simultaneously broadcast on the internet. We are looking forward to interacting with you in-person or virtually!

Meanwhile, please enjoy this issue of Juventa with a lot of interesting content, as usual, in particular with articles on private space travel, space debris, space infrastructure, and much more. Also, be sure to subscribe to our YouTube channel where we continue to expand our content year round.

See you in Dubai!

Patrick Hambloch

Chair, IAF WD/YPP Committee

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

This is volume 3, Issue 2

The International Astronautical Federation—Workforce Development Young Professionals Programme Committee (IAF-WD/YPP) is one of the administrative committees dedicated to Young Professionals and Students. The committee's scope includes all matters pertaining to international space community workforce development. The committee focuses on early career professionals in all the areas of the aerospace community and provides overall guidance to IAF's Young Professional Programme:

Leadership



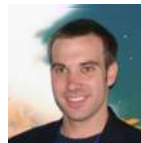
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Juventa Editorial Board

Editorial

Dear IAF Community, Young professionals and students:

I'd like to welcome you all to the latest issue of your beloved magazine "Juventa." Every issue, we attempt to bring you something special because our major goal is to guide the youth who work or are interested in space and its frontier. We'd like to hear your recommendations for improvement. Please provide feedback and do not hesitate to submit intriguing material for publishing in Juventa. The good news is that the IAF and the IAF WD/YPP committee are now in the process of obtaining an ISSN number for Juventa, and we will attempt to have some of the papers assigned a DOI number for publication and indexing in key indexing sites such as Scopus and Web of Science very soon. We shall have a special section in the magazine for the publication of scientific papers beginning 2023.

Please feel free to write to us: iaf.wdypp@gmail.com

Stay safe and strong!

Balbir Singh

Editor-in-Chief and
Vice-chair (Communications)
IAF WD/YPP Committee

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Jeanne Medvedeva

Vice President, Launch Services
Exolaunch GmbH, Berlin, Germany

Please introduce yourself to our readers in the IAF community.

Well, I am the Vice President of Launch Services at Exolaunch GmbH, a leading Germany-based provider of launch, in-space logistics, deployment and integration services for small satellites. I worked with multiple launch vehicles and rideshare missions to arrange successful launches of over 230 small satellites (as of today) for the New Space actors. I was also recognized in the Forbes 30 under 30 list (2021) for her contribution to the New Space growth and the facilitation of access to space for small satellites.

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

#access to space, #inspace logistics, #spacesustainability

As industry leader, you have been involved in Space for some time. How and why did you choose space? Was your space career always part of your development plan?

I always knew that I wanted to do something unique and on a global scale, but I never expected it to be space! I was looking for an international career with large commercial projects, cross-cultural communication, and a good amount of travelling. While considering several industries, the space industry struck me as incredibly special, romantic even, and I was lucky to end up in smallsat launches at the dawn of New Space. I studied World Economics and Finance, a bit atypical amongst my aerospace colleagues, and I had to learn a lot about the technical and programmatic side of the projects. I graduated in 2013 and started my career at the international commercial center of Roscosmos. My educational background in business, as well as my knowledge of foreign languages, enabled me to help build from scratch the offerings of smallsat launches to SSO aboard Soyuz-2 for foreign customers. I saw the opportunity to work with smallsats and the bright future for New Space. I gained a lot of unique expertise and connections across the New Space industry and in 2018 I joined Exolaunch to work with a multi-launch platform and apply my experience to different launch vehicles and better serve the launch needs of the industry.

What was your career's turning point? Did you have a mentor or sponsor at the time?

The turning point was my first launch campaign in Baikonur followed by the successful launch in the summer of 2014. Our team arranged the ride to SSO with Soyuz-2 for such prominent customers as SkyBox, Space Flight Laboratory (SFL), SSTL, and the UK Space Agency. We stayed with a lot of international teams in Baikonur for over a month for their satellites' pre-launch checks and integrations, enjoying rockets and good weather. This was a dream job. We also had to build a lot of processes from scratch, as launch services for smallsats were an absolutely new field for everyone. Only now are smallsat launches becoming more organized and standardized. Back in those days we had to learn and create many things along the way.

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

Each rocket launch is a challenge by definition. At the same time, the right experience and constant professional growth will give you a lot of confidence and know-hows. It was always challenging to handle difficult situations for the first time, for example, to manage the delays on a launch vehicle or satellite side or to work with a large number of payloads on a single mission (70+)

technically and contractually and make sure that each customer will get an optimal launch slot and will be safely deployed into space on time and on budget. Working with large clusters of smallsats is extremely complicated due to the overall logistics and a lot of attention to details, almost 24/7 involvement with the mission management. But this is what we do best, so working in a dream team at Exolaunch motivates me a lot!

The fact that I constantly contribute to making space more accessible for everyone bringing new technologies into orbit inspires me every day to keep on launching. I'm also privileged to work with so many talented teams of our customers – smallsat developers. And, obviously, working with SpaceX as a launch provider inspires me a lot.

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

I was closely involved with launching over 230 customers' satellites on 13 missions from the moment of contract negotiation up until the launch and deployment into orbit. The customers were leading New Space companies (Spire Global, Planet, Kepler Communications, AxelSpace, NanoAvionics), space agencies (DLR, the UAE Space Agency, the UK Space Agency), universities (TU Berlin, Stuttgart University, TU Munich), and scientific institutions (Würzburg Center for Telematics).

I'm proud to see the exceptional growth of Exolaunch over the last few years as we have been able to obtain very solid flight heritage on different launch vehicles and put several innovative products on the market. And I'm especially proud of our customer portfolio and the overall growth of our customers' businesses. We started working with most of our customers when they were in their early start-up days, but now I see many of them becoming the unicorns in the very near future as they continue deploying their large constellations and generating more valuable data from space.

As VP for launch services at Exolaunch, what do you do exactly and what is the coolest or most relevant thing you get to do?

As VP of Launch Services, I'm involved in many fields to ensure the overall success and steady growth of Exolaunch. I do a lot of commercial sales and take care of customer relations, business development (building relations with new customers and launch vehicle providers), work on the legal, regulatory, contractual, and

commercial aspects of launches, supervise our marketing strategy, get involved into the overall mission management, and help arrange launch campaigns and launch events. Now I'm also involved into investor relations, scaling up our business and entering new market fields. I always feel very busy, but in a good way. I believe all the things that I'm doing are very cool and there's always a lot to learn.

How do you think the space business is going to develop in the next decade?

Space is becoming accessible for everyone and this will drive the New Space industry in the next decade. We expect a very good amount of launches of hundreds of smallsats to LEO and beyond. Thanks to the cost-efficient



smallsat rideshare programs of SpaceX, Arianespace, Roscosmos, and ISRO as well as the new small launchers, there will be numerous opportunities to reach orbit for tech demo missions and constellations. Orbital transfer vehicles, including Exolaunch's Reliant, will also play an important role in in-space logistics, on-orbit servicing and space debris removal programs. Smallsats for collecting environmental data, offering "space-as-a-service" and for the IoT applications will be in a high demand. Finally, space tourism will be the next big thing that will drive a lot of public interest in the space industry.

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

It depends a bit on the role within the company. If it's more on a business side, I'd say that good communications skills and networking are obviously very important. Soft skills in general will always help in a career. Customer care, overall awareness of the latest trends in the industry, critical thinking.

A FACTSHEET | SPACE DEBRIS: A GROWING THREAT

Space Debris

Growing Threat



UNITED NATIONS
Office for Outer Space Affairs



#SpaceCare

SATELLITES VS DEBRIS

2700 working satellites share their orbits with **8800** tonnes of space debris



≈ 1950
discarded rocket stages



≈ 2850
defunct satellites



Debris objects travel many kilometres per second. In case of impact, they may destroy working satellites



≈ 128 million
debris fragments
1 mm–1 cm in size



≈ 900 000
fragments
1–10 cm in size



≈ 21 000
unidentified debris
objects and fragments



≈ 34 000
fragments larger
than 10 cm



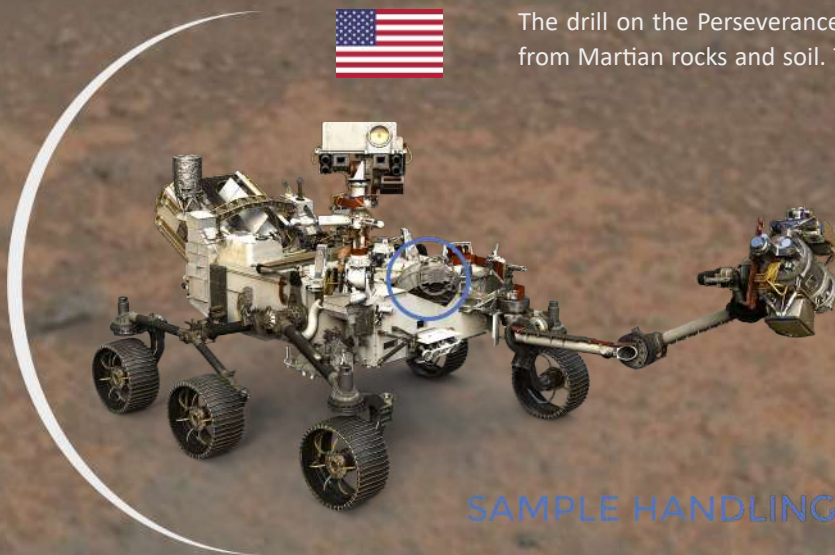
About **26 000** debris objects are **monitored from Earth**

Smaller objects that cannot be monitored **estimated by statistical models**

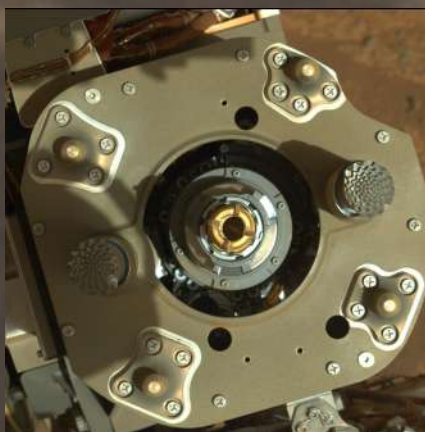


#SpaceSustainability

Up-to-date as of December 2020



PERSEVERANCE'S SAMPLE COLLECTION



The drill on the Perseverance rover will be used to collect samples from Martian rocks and soil. The sample cores will subsequently be stored in tubes on the Martian surface by the rover. This entire procedure is known as "sample caching."

Mars 2020 will be the first mission to demonstrate this on Mars. It could potentially pave the way for future missions that could collect the samples and return them to Earth for intensive laboratory analysis.

The three major steps in sample handling are:

- Step 1: Collecting the Samples
- Step 2: Sample Sealing and Storing Onboard
- Step 3: Depositing the Samples on the Surface

So, with 5 witness tubes in 43 sample containers, its major task is to collect and store a compelling set of rock and soil samples that could be returned to Earth in the future. A minimum of 20 samples must be collected.

First Attempt: The Perseverance rover failed to acquire a sample of Martian rock on August 6, and NASA believes the boulder likely disintegrated into rubble and dust rather than remaining in one piece. The rover is now heading south to its next sample location, where the crew intends to try drilling again in early September.

The multi-step sampling process appeared to move well during the first try. On August 6, the rover bore into Mars, sealed the sample tube with an airtight seal, and effectively put the tube into a module in the rover's belly. "The system functioned flawlessly," Jennifer Trosper, project manager for the Perseverance mission, said. The hardware was performing very well but the rock did not cooperate.

This week, a tool on the Perseverance rover's 7-foot-long (2-meter-long) robotic arm will abrade the surface of a rock called "Rochette," (left side top figure), allowing scientists to view inside and decide whether they wish to acquire a sample with the rover's coring bit. The sample, which is slightly thicker than a pencil, would be sealed in one of the rover's 42 remaining titanium tubes. aboard the rover.

- Text Source: NASA JPL/National Geographic



Dr. Elizabeth Barrios is a Structural Materials Engineer at NASA's Marshall Space Flight Center. She focuses on developing new technologies for the automation of surface preparation and adhesive bonding of carbon fiber composites and atomistic modeling of all solid-state lithium ion batteries. Previously, she was a Materials and Process Engineer trainee at NASA's Kennedy Space Center focusing on material selection and failure analysis of carbon fiber composites and non-metallic components of spaceflight hardware.

She recently completed her PhD at the University of Central Florida through a NASA Space Technology Research Fellowship where she focused on demonstrating the feasibility of utilizing polymer and ceramic composites for lightweight, non-toxic thermoelectric materials. Elizabeth currently serves as the Chair for the IAF Launchpad Mentorship Programme and as a Regional Coordinator for SGAC.

She is a member of the IAF YPP/WD Committee and has previously served as a member of the Workshop Organising Team for the IPMC Young Professionals Workshop (2018, 2019) and on the Space Generation Congress Organising Team (2019). Elizabeth has also spoken in the Next Generation Plenary (2020). Beyond her involvement with the IAF, Elizabeth also serves on the Board of Advisors for SEDS-

MEMBER SPOTLIGHT:

Dr. Elizabeth Barrios

Ph.D. Engineering Materials

Structural Materials Engineer, NASA Marshall Space Flight Center

**CAROL CARNETT****DR. SCOTT MADRY**

Hello all! We wanted to update our work through the committee on our series of webinars designed to assist young professionals (and others) in preparing for their papers and presentations at the IAC. Each year the dates and requirements are different, so we put on a series of free webinars on the WD/YP YouTube channel to provide practical help to navigate this process, all ending up with you making a great presentation at the IAC in Dubai in October.

For the IAC in Dubai, over 3,370 submissions were made to 182 regular Technical Sessions from people in 86 countries, and our goal is to assist people in successfully navigating this process all the way from submitting their abstract to submitting their paper and video, and finally giving a great presentation in Dubai.

We start off in the spring with a first webinar on the topic of how to submit your abstract, which is the first step in the process. There are specific requirements for writing and submitting this, and it is important that you follow the process as defined by the IAF. This one is presented in the spring, before the abstract deadline, and is the first in the series.

Our second workshop is for those whose papers have been accepted (congratulations!). Using your accepted abstract, we focus on how to write an excellent paper for the proceedings. At the IAC there is a firm “no paper, no podium” policy, so you must write your paper in the proper format and submit it on time in order to make your presentation at the IAC.

Many young professionals (and others) have never navigated this process, and we offer practical advice - both on meeting the IAF’s required structure and format, as well as on how to write a clear and convincing scientific paper that will be well received and become a part of the scientific literature.

This year our third workshop was on how to submit your 10-minute video, which is a new requirement this year. We presented this webinar in association with the new IAF Public Speaking and Presentation Skills Lab (PSLab), which was created in 2019 and which focuses attention on improving these skills for all members of the IAF and all presenters at the IAC and other IAF programs held throughout the year.



This was our first time working with the PSLab and it went really well. We had a very large turnout: over 170 people attended the webinar live and many more have viewed it online since then. In this program, we focused on how to record your required 10-minute video and submit it to the IAF website. We discussed good techniques for presenting in videos, which can be very different from live presentations, and gave tips on lighting, backgrounds, and other important skills which can help to create an excellent video that will both convey your information and also get you noticed. If you missed it, you can rewatch it by clicking on the youtube screen on the top right:



Our final webinar in the year's series, held in August, was on live presentation skills and how to create an excellent PowerPoint slide deck for making a powerful presentation at the IAC in Dubai in October. We stress basic public speaking skills, PowerPoint skills, and provide useful information specific to the IAC. This webinar is geared towards helping you to make an excellent impression at the podium by clearly presenting your information to the international and intercultural audience that makes up the IAC each year.



This year, for the first time, both of us (Carol and Scott) will present a live 1-1/2 hour presentation skills workshop in Dubai on Sunday, 24 October, 2021 from 1-2:30 PM in the Congress Center. It is free to all IAC participants, so please join us live in Dubai and get some last-minute tips on how to give your best possible presentation, both at the IAC and throughout your career.

Good public speaking and presentation skills are important tools for young professionals to develop. We really enjoy doing these webinars and hope that they serve a useful purpose by helping people around the world who may not be familiar with how the IAC process works to successfully navigate that process and succeed in getting to that podium in Dubai.

Each year is different, so in cooperation with our committee and with the new IAF PSLab, we look forward to continuing this series for IAC 2022 in Paris.

We want to acknowledge the support and assistance of our committee chair, Patrick Hambloch, and also Balbir Singh who creates our committee's magazine and

online and social media content.

We look forward to seeing you online and in Dubai!

SCOTT and CAROL:

Dr. Scott Madry and Carol Carnett are senior members of IAF Workforce Development Young Professional Programme Committee and currently Senior Associate Editors of IAF Young Professional magazine "JUVENTA".

IAF YP EVENT | SPACE INFRASTRUCTURE GAMES @ IAC 2021, DUBAI

SPACE INFRASTRUCTURE GAMES

Organized By

LIGHTBRIDGE STRATEGIC CONSULTING
@ IAC 2021, DUBAI

Infrastructure is a relatively new word to the English language (it only entered dictionaries in 1927) and was only adopted by civil engineers in the 1970s. However, as public works, infrastructure's application goes back thousands of years. These projects often involved building giant stone structures, including Roman roads and aqueducts, many of which remain in use today. In fact, until 1999 the paved Roman road network in the UK was larger than their modern roadway network. But what is infrastructure and how does it affect us? Infrastructure is a relatively new word to the English language (it only entered dictionaries in 1927) and was only adopted by civil engineers in the 1970s. However, as public works, infrastructure's application goes back thousands of years. These projects often involved building giant stone structures, including Roman roads and aqueducts, many of which remain in use today. In fact, until 1999 the paved Roman road network in the UK was larger than their modern roadway network. But what is infrastructure and how does it affect us? There are several types of physical infrastructure: transportation, communication, urban, and energy. They all tend to share four common characteristics, as defined by Hugh Goldsmith:

Immobility - fixed in place and serving a specific geography

Longevity - take a long time to build and are expected to last decades or centuries

Expensive - high initial investment and ongoing operating and maintenance costs

Public Service - utilized by both individuals and companies

Despite all of the endeavors that humankind has achieved in Space during the last few decades, it remains a very unexplored and undeveloped arena.

Similarly, back in the age of western expansion in America, there were small settlements and outposts in the west but traveling to the Pacific was a harrowing six-month journey. The transcontinental railroad was the pinnacle of infrastructure development of that era, as



The Appian Way, one the oldest strategic Roman roads, was built in 312 BC and is still in use today

the rails, bridges, and tunnels built across the mountains and heartland allowed travel by train from New York to San Francisco in just over a week.

“The real magic of infrastructure is that linear reductions in transfer costs increase economic productivity exponentially.”

Dozens of cities and mines created along this backbone grew and flourished with their connection to the wider world and were a major factor contributing to America's industrial might in the 19th and 20th centuries. The Space sector is currently poised for this kind of transition. The deployment of space transportation infrastructure will

allow us as humans to “level up” our efforts and achievements at dramatically lower costs.

At their core, infrastructure projects are about reducing transaction costs. Like a bridge crossing a river or a road connecting two cities, infrastructure makes it easier,



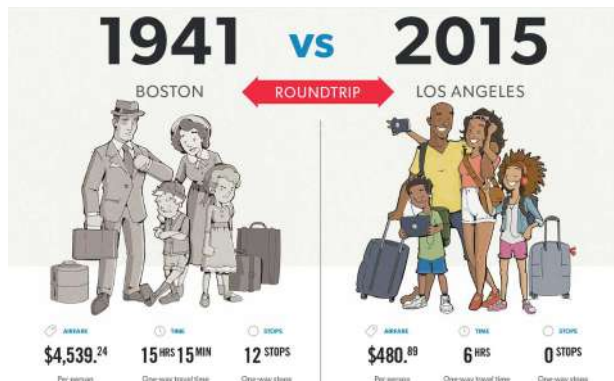
Chinese Laborers working on the Transcontinental Railroad in the Sierra Nevada Mountains, circa 1870

faster, and cheaper to transport goods and provide services. The real magic of infrastructure is that linear reductions in transfer cost increase economic productivity exponentially. For example, since the 1940's, the cost of airfare per kilometer has declined steadily, reaching an almost 10-fold reduction in price, while the usage of **air-travel has increased more than 8000-fold**. We need the leverage generated by space transportation infrastructure to boost the early-stage Space commercial sector into a great and sustainable future for decades and generations to come.

Despite their incredible value in hindsight, it is difficult to fund new infrastructure projects because unlike most business ventures, they are generally not internally productive and are very expensive. For example, the Panama Canal today is seen as a great success and defines modern global shipping standards. But it took until 1914 to complete the herculean project, despite being actively considered since 1534 by Charles V, Holy Roman Emperor/King of Spain and later invested in by President Thomas Jefferson in 1788.

Since the purpose of infrastructure is to reduce transaction costs, any method attempting to directly extract value from their service, like a toll or tax, is directly counter-productive to infrastructure's economic value and must be minimized to be effective. Thus, evaluated as a business venture trying to generate an internal profit, infrastructure is a lousy endeavor. Instead, these projects need to be considered as an economic

investment that improves the overall productivity of the region through network effects and increased capacity. Under these conditions, infrastructure is generally a low-risk investment with



Infographic showcasing the 10-fold cost reduction for air travel and increased convenience since the 1940's

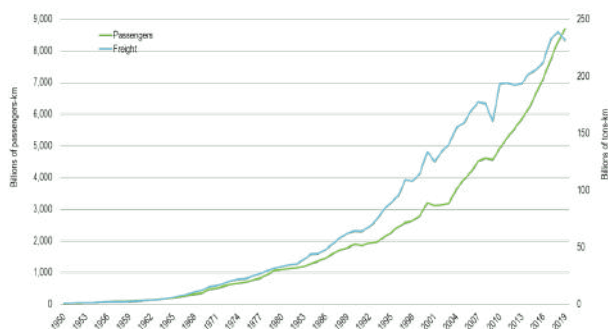


Chart showing the exponential increase in passenger and air freight travel since 1950 -- source Airlines for America

competitive returns spread over decades of use. When it comes to Space transportation, rockets (*the boats to space*) are great for bringing small loads and people to LEO or even GEO, but as you travel farther and farther away, more intermediate steps are required for refueling. With each transfer, there is loss from fuel expended. Additionally, like a giant bucket brigade, spills (meaning product lost and space debris creation) may happen along the way. Only 4% of the mass of a rocket on the launch pad can actually be delivered to LEO, 2% to GEO, 0.5% to the surface of the moon, and only 0.3% of the mass the surface of Mars. This means, **even if everything goes right, 99.7% of a rocket's mass is used up on the way to Mars.**

Reusable rockets certainly help reduce hardware cost, but the fundamental fuel requirements of the rocket If you want to learn more about Space Infrastructure Economics, and specific applications for Space Infrastructure firsthand from sector leaders, then come join us at our free Webinar on September 14th from 11:00-12:00 (EDT) / 17:00-18:00 (WET) at this link:

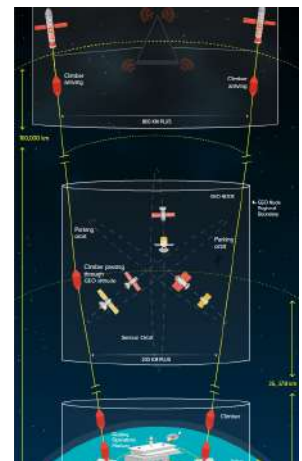
<https://tinyurl.com/myts8myd> If you want to learn more about Space Infrastructure Economics, and specific



When you need to cross a river to deliver goods, a boat is flexible and will certainly work, but with enough demand, investing in building a bridge is cheaper.

applications for Space Infrastructure firsthand from sector leaders, then come join us at our free Webinar on September 14th from 11:00-12:00 (EDT) / 17:00-18:00 (WET) at this link: <https://tinyurl.com/myts8myd>

Image: © IAF



Left - Workers laying rail across the American Heartland, Right - Depiction from the International Space Elevator Consortium (ISEC) of the proposed Galactic Harbour.

From the Authors: Lightbridge Strategic Consulting invites you to the IAC Special Session "Space Infrastructure Games", where you can engage in interactive games showcasing these models in-action alongside space students and professionals. The event will take place on October 29th at 9:45-11:15 (local time) during IAC 2021 in Dubai. This is your opportunity to engage in a conversation about the projects that will last centuries and will shape the future development of humanity as we expand off-world!

THE TECH STORY | ELSA - d PHASE 3a SUCCESSFUL CAPTURE TEST



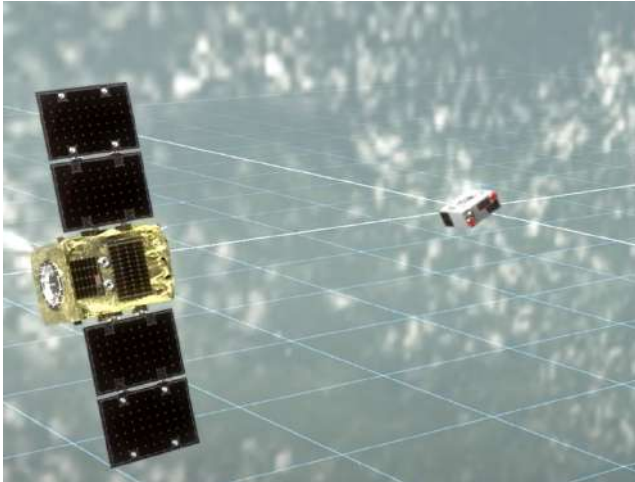
Astroscale's End-of-Life Services by Astroscale-demonstration (ELSA-d)

Successful Capture Testing
August 25, 2021



Phase - 3a
Completed

In a demonstration on Wednesday, August 25 (UTC), Astroscale's End-of-Life Services by Astroscale-demonstration (ELSA-d) successfully tested its ability to capture its client spacecraft utilizing the servicer's magnetic capture technology.



Docking with or capturing a client body is a major problem in debris removal and on-orbit servicing in general; this test demonstration served as a successful validation of ELSA-d's ability to dock with a client, such as a defunct satellite.

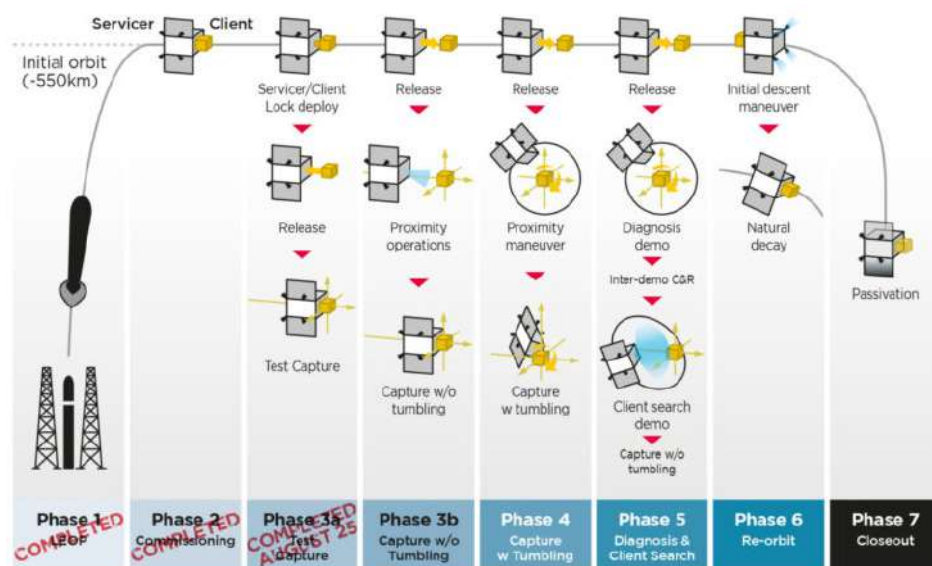
When ELSA-d was launched and commissioned, its servicer and client spacecraft were secured together by a mechanical locking mechanism. This mechanism's unlocking was the initial step in this demonstration. Once unlocked, the magnetic capture system held the client to the servicer alone, preparing ELSA-d to capture and release the client repeatedly in future demos.

The client was then separated for the first time from the servicer and captured in order to validate the magnetic capture mechanism. Astroscale's Mission Operations and Ground Segment teams checked out and calibrated the rendezvous sensors, as well as verified essential ground system infrastructure and operational procedures, during the release and capture period.

The successful completion of this stage paves the way for the remainder of Astroscale's ground-breaking space debris removal experiments. The Engineering and Mission Control teams are now preparing for phase 3b "capture without tumbling," in which the client will be separated by a greater distance and rendezvous and docking will be accomplished through a combination of on-board autonomous software and advanced ground processing of telemetry and commands. This demonstration is expected to be completed in the coming months and will be followed by the "capture with tumbling" phase, in which the client will simulate an uncontrolled, tumbling space object. The final capture demonstration will be "diagnosis and client search," in which the servicer will inspect the client, withdraw to simulate a far-range search, then approach and recapture the client.

"This has been a fantastic first step in validating all the key technologies for rendezvous and proximity operations and capture in space," said Nobu Okada, Founder & CEO of Astroscale. "We are proud to have proven our magnetic capture capabilities and excited to drive on-orbit servicing forward with ELSA-d."

Text Source: Astroscale
All Images: © Astroscale



THE COVER STORY | PRIVATE SPACEFLIGHT - NEW MILESTONES

AN ERA OF PRIVATE SPACEFLIGHT



New Milestones in Private Space Travel

In recent weeks and months, we have seen new milestones reached by Blue Origin and Virgin Galactic, while September will mark the first all-civilian mission to orbit. This new era of private space travel has prompted discussions about the cost of developing and participating in space travel, the boundary of where space begins, and what defines an astronaut.

Virgin Galactic was founded in 2004 with the aim of bringing private passengers to space. The company reached a new milestone on Sunday July 11th when its VSS Unity spacecraft launched from Spaceport America in New Mexico, USA with two pilots (Dave Mackay and Michael Masucci), founder Richard Branson, and three Virgin Galactic employees on board: chief astronaut trainer Beth Moses, lead operations engineer Colin Bennett, and VP of government affairs Sirisha Bandla. VSS Unity was released by a carrier aircraft called VMS Eve before firing its rocket engine and accelerated to faster than three times the speed of sound in a climb to the edge of space. VSS Unity then performed a slow backflip in microgravity, during which the crew floated around the spacecraft cabin for several minutes. The spacecraft reached an altitude of roughly 86 kilometres (or 53.5 miles), before retuning through the atmosphere to land back at the runway of Spaceport America from which it had taken off earlier. This marked the fourth spaceflight to date for Virgin Galactic, its second in 2021, and the first carrying more than one passenger. In addition to bringing the company's founding billionaire to space, the spaceflight also sought to continue testing its spacecraft system and customer experience, while a NASA-supported planet experiment was also onboard that aimed to study biochemistry and gene expression during a flight's few minutes of microgravity.



In August, Virgin Galactic announced it is re-opening ticket sales for the first time in years, giving anyone the chance to reserve a seat on the company's rocket-powered suborbital space plane for \$450,000 USD. The next flight is scheduled for the fall of 2021, which will be a test flight carrying paying customers, the Italian air force, who bought the flight for two researchers to conduct experiments.

Shortly thereafter, Blue Origin celebrated its own achievement on July 20th – the anniversary of the first human moon landing on this date in 1969 – with the first launch of Blue Origin's New Shepard reusable launch vehicle with four humans aboard. This included Wally Funk, 82, who became the oldest person to fly in space, Oliver Daemen, 18, who became the youngest person to fly in space, as well as founder Jeff Bezos and his brother Mark – the first siblings to ever fly in space together. In 1961, Funk was among a group of female pilots testing whether women were fit for space travel, who became known as the Mercury 13, and was personally invited by Bezos to join the July 20th flight.

The rocket reached an altitude of roughly 66 miles (106 kilometres), which also accelerated to three times the speed of sound to get the capsule to this peak altitude, before separating and landing with a parachute shortly thereafter.

New Shepard lifts off from a standing position on a launch pad, compared to Virgin Galactic's rocket-powered spaceplane that was dropped from a carrier plane in mid-air. The Blue Origin New Shepard flight on July 20th spanned 11 minutes and marked the first uncrewed suborbital flight with an all-civilian crew, as New Shepard is a fully autonomous rocket-and-capsule combination that cannot be piloted from inside the spacecraft. Blue Origin hopes to fly more crewed



flights this year, with others planned for 2022. Although the company has not yet revealed per-seat pricing, it is expected to also be six-figure range.

Next on the timeline of highly-anticipated private space travel milestones is the Inspiration4 mission – the world's first all-civilian mission to orbit. The Inspiration4 mission aims to raise \$200 million for St. Jude Children's Research Hospital, and will be commanded and funded by Jared Isaacman, the founder and CEO of Shift4 Payments. Currently planned for launch in mid-September, the four-person crew also includes cancer survivor and physician assistant at St. Jude's Children's Research Hospital Hayley Arceneaux (who will also become the first in space with a prosthesis), U.S. Air Force veteran and Lockheed Martin aerospace industry data engineer Chris Sembroski, and geoscientist, science communicator and artist Sian Proctor. Inspiration4 is the first crewed orbital spaceflight since the NASA/ESA Hubble Space Telescope servicing mission in 2009 whose primary objective is not to visit an orbital space station. The Inspiration4 crew is set to take-off from Kennedy Space Center's Launch Complex 39A in Florida, USA. Launched on a Falcon 9 rocket, the crew will then orbit the Earth for three days at an altitude of 360 miles (580 kilometres) in the SpaceX Crew Dragon Resilience capsule.

This will be the second flight of the spacecraft, which first flew as part of the SpaceX Crew-1. The capsule's docking adapter, which is typically used to dock with the International Space Station, has been replaced for this mission by a domed glass window to



allow for 360-degree views out of the spacecraft, providing views of space and the Earth like those on the ISS from the Cupola Module. The crew will then return to Earth by splashing down in the waters off the Florida coast. While in space, the four-member crew will perform medical experiments, calling patients at St. Jude, and personal activities: Sembroski is planning to perform a song and Dr.

Proctor anticipates teaching an art lesson. TIME Studios is producing a documentary series on the Inspiration4 mission, which will be streamed on Netflix.

The streaming company states that "Countdown: Inspiration4 Mission To Space" is the first Netflix documentary series to cover an event in near real-time and will premiere in five parts leading up to and following the mission. The series will premiere on September 6, 2021.

Capturing the attention, excitement, inspiration – and sometimes controversy – of many worldwide, these three private spaceflight milestones in the Summer of 2021 have sparked new discussions about the future of space travel and what is yet to come.



KNOW YOUR COMMITTEE - PART II

Interview with Patrick Hambloch - Chair, IAF WD/YPP Committee



Patrick Hambloch Chair, IAF W/YPP Committee

Could you please introduce yourself to the IAF Community? Also, could you please indicate three words we can use to best describe you?

My name is Patrick Hambloch, I am from Germany and an Aerospace Project Manager in my day job. I am involved in the IAF since about 2007 and part of a couple of committees. I spent about six years in the United States before moving back to Europe at the end of last year. I am not sure if these words best describe me, I guess others have to decide whether this is true or not, but the first three that come to my mind are: Fun, Organized, Innovative.

Please describe your current position. What does the position as Chair of the IAF WD-YPP involve in terms of key responsibilities, planning, coordination and community outreach?

I am currently Chair of the WD/YPP committee. In that position I am responsible for the overall operational aspects of the committee, organizing the committee and leadership meetings, taking care of all membership matters, as well as being the interface with other committees, the IAF as a whole, as well as outside organizations that we regularly work with like SGAC and ISU. Luckily, the committee has a fantastic leadership and membership that makes all of the Young Professional Programme possible, at the IAC and beyond.

KNOW YOUR COMMITTEE - PART II

Interview with Patrick Hambloch - Chair, IAF WD/YPP Committee

When did you volunteer for the IAF WD-YPP and what are the most notable achievements so far?

I first witnessed the YPP at the IACs in Hyderabad and Glasgow and was impressed with the events. Starting in Prague I was attending them regularly and after I was part of the Next Generation Plenary in 2012 in Naples I wanted to join the committee to help organize the overall programme. Shortly after being part of the committee, I became Vice-Chair and was responsible for the networking events. That was a very interesting job and every IAC provides different challenges in organizing these events. Every year we have to put together an inspiring programme with interesting speakers and a lot of networking, without being too repetitive as that might be boring for the YPs. Finally, in 2018 I became Chair of the committee and I was recently re-elected for a second term as Chair through 2024. It is very difficult to name one notable achievement, but if I have to pick one it is the evolution of our committee's team structure that helped spread the different tasks out amongst more people.

What role did the structure of the IAF WD-YPP play in achieving these milestones?

The committee has a very robust structure that supports the many activities that we organize each year. Therefore, it is easier for me as chair to focus a little bit more on the strategy for the next few years without having to get too involved in the day-to-day operation of the different teams.

What is your vision for the future activities of the WD-YPP and what is the timeline that you would need to implement it?

I believe that we have a solid programme that we organize every year, that many YPs have embraced and love to attend at each IAC. However, the fallout from the COVID pandemic has shown that you have to always be on your toes and evolve to not become irrelevant. We have been doing online sessions at the IAC for many years, which now is a standard feature at many different conferences. Using that as an example, I would like to see the committee develop new activities that enhance the conference experience of the next generation that currently nobody is thinking about. However, it is difficult to put a timeline on these kinds of experimental events.

Apart from that, we are expanding our online activities throughout the year and will be looking to evolve that programme over the next few years.

If you could implement with priority only one thing to the IAF WD-YPP, what would it be and why?

I would love to create a podcast series where experienced professionals share their career stories with the YPs. We have many events at the IACs that feature high level speakers from industry and space agencies. However, with the limited time we have, we cannot get all the people on stage that have valuable lessons to share. We are in the early stages of talking about a series like that, but are still a bit away from that. So, if I had to pick one new thing to implement, that would be it.

Have you noticed any change in the needs and requests from the young professionals involved in space activities during your mandate so far?

Overall, I think that young professionals are more and more aware that they need to go the extra mile (or extra 1.6km whatever you prefer) to advance their career. Through my involvement YPs have always been interested to learn from the more experienced colleagues but especially over the last few years, with many members of the older generation retiring, it feels like that the next generation is more aware of the opportunities that are out there, as well as that they are more in the driver seat than even 5 years ago.

What skills and abilities should a young professional have to become a member of the IAF WD-YPP and what would he gain from volunteering to this Committee?

We need a wide variety of different skills to organize the events of the YPP, so we are not really looking for specific skills in our new members. That said, we also have to make sure that potential new members are aware of what this committee actually does. We are not a committee primarily made up of young professionals (although many YPs are part of it), but we are organizing events for the next generation. So, we are always interested to hear from people that have a passion for that!

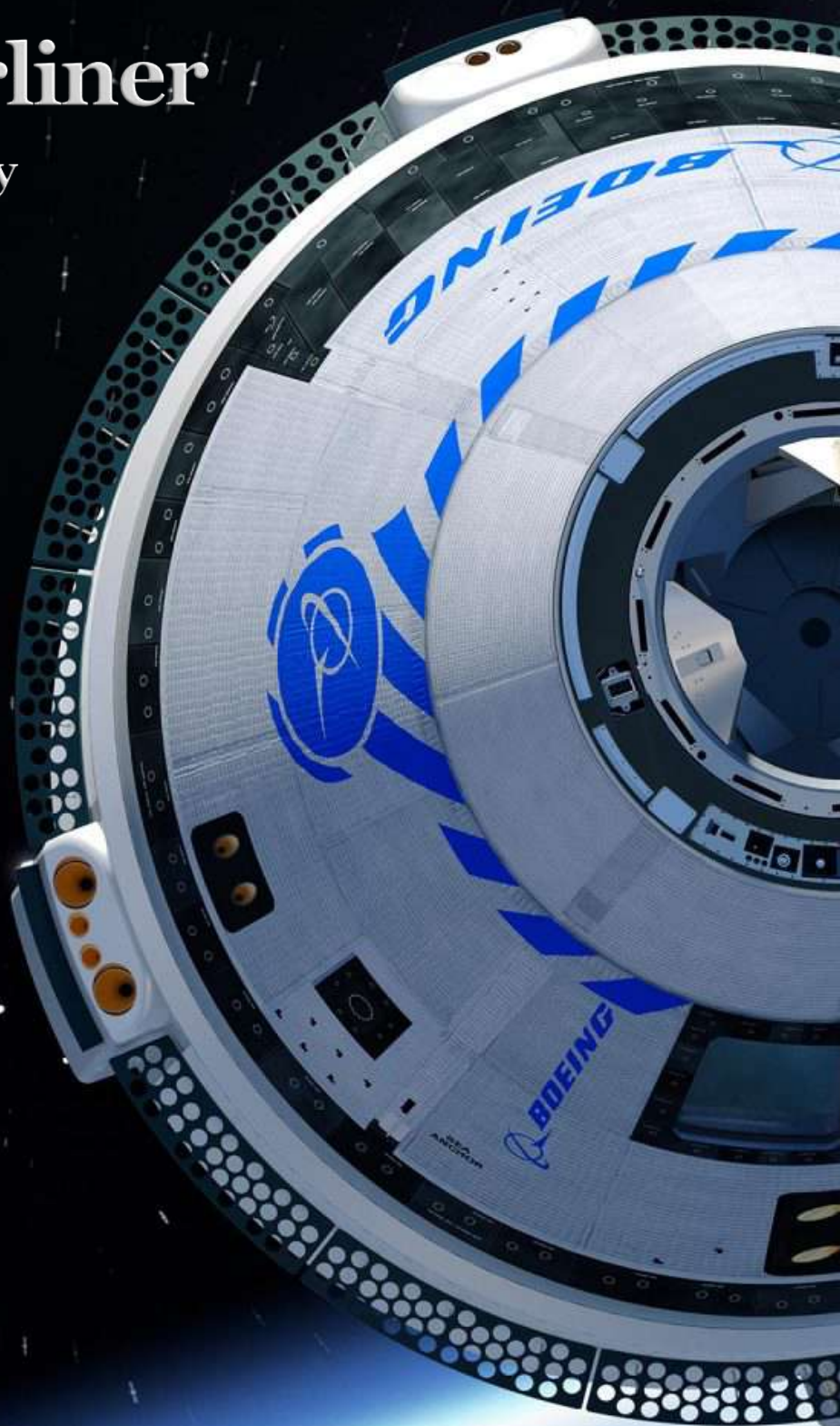
Is there any additional message that you would like to transmit to the young professionals, IAF community or to the broader community?

In these times, first of all I wish that everyone is doing well, health-wise and job-wise. But apart from that, I am looking forward to our community coming together again in Dubai in a couple of months!

A REPORT | CAN WE SEE STARLINER AS ONE OF THE TRANSPORT VEHICLES TO ISS ?

Boeing Starliner

- Potential ISS Ferry





Boeing is developing the Crew Space Transportation (CST)-100 Starliner spacecraft in conjunction with NASA's Commercial Crew Program. The Starliner was planned to transport seven people, or a combination of crew and cargo, to low-Earth orbit. It will transport up to four NASA-sponsored crew members and time-critical scientific research to the International Space Station during NASA service missions. The Starliner has a revolutionary, weldless structure and may be reused up to ten times in six months. For crew interfaces, it also has wireless internet and tablet technology.

It is lightweight, highly mobile, minimalistic and Innovative. The architecture of Boeing's newly designed spacesuit combines the first-hand experience of veteran astronaut Chris Ferguson with David Clark Co.'s decades of suit design, development, test and evaluation insight as the makers of more than a dozen air and space suits, including those for Gemini, Apollo and Space Shuttle missions. The "Boeing Blue" suit will be worn by all Starliner crew members during launch, ascent and re-entry and will be customized for each crew member to maximize protection, capability and comfort.

As per Boeing here are some of the quick facts about this amazing vehicle.



The Starliner is a reusable spaceship that blends a proven capsule architecture, materials, and subsystem technologies with cutting-edge advancements from the twenty-first century. The economic impact of the Starliner can be observed across the United States, with more than 425 suppliers in 37 states. The pusher abort mechanism allows the crew to escape safely throughout the mission's launch and ascent phases. Wireless internet will assist with crew communication, entertainment and docking with the International Space Station. A novel weldless design avoids the structural concerns associated with traditional welds while simultaneously reducing mass and production time. Boeing-developed training devices give Starliner crews with thorough training on the most technologically advanced, proven, and integrated systems, enabling astronauts learn how to manage any emergency that may happen in the harsh environment of space, even with an autonomous spaceship.



NASA has scheduled six Boeing crew rotation trips to the International Space Station aboard the Starliner, in addition to an uncrewed and a crewed flight test. These will be Boeing's first commercial human spaceflight missions. Boeing or one of Boeing's legacy firms designed and built every American spacecraft that has taken astronauts into space.

The crew access tower of Starliner is the first new access tower built along Florida's Space Coast since the Apollo era. Crews will begin boarding the Starliner before launch in the crew access arm and white room, which are located around 169 feet (51.5 meters) above the launch pad surface of Space Launch Complex 41.

Space Launch Complex 41 has been used only for non-crew spacecraft to this point, hosting Titan rockets beginning in 1965 and then the Atlas V since 2002.

The Viking robots that landed on Mars, the Voyager spacecraft that toured the outer planets, the New Horizons probe that sailed past Pluto, and the Curiosity rover that is presently traversing Mars were all launched from the Starliner launch pad.

Boeing aimed to have three Boeing Starliner spacecraft in service by January 2020 to meet the needs of the Commercial Crew Program, with each spacecraft capable of being reused up to 10 times with a six-month refurbishing time.

Boeing stated their plan on August 25, 2020, to cycle between only two capsules for all planned Starliner trips, rather than three.

There is no backup vehicle contingency for spacecraft problems (or loss) during the NASA Commercial Crew contract because Boeing does not expect to build fourth Spacecraft. Due to the fact that Boeing only has two Starliner spacecraft, it is unable to pursue commercial space prospects (Axiom commercial station, space tourism) during the NASA crew contract time.

Text Source: Boeing.com/Wikipedia

Images: © Boeing/NASA



Image: © Inspiration 4

INSPIRATION 4 LAUNCH NEARS AS INTENSE TRAINING CONTINUES

Just weeks from launch, SpaceX has started final preparations for the crewed Inspiration4 (I4) mission. I4 will be the first free flight Crew Dragon mission and the first orbital, all private crewed mission. I4 will also be the first worldwide crewed flight that will not dock with a space station since the final Hubble servicing mission on STS-125 in May 2009.

SpaceX is currently targeting the morning of September 15 to launch the flight-proven Crew Dragon Resilience (C207) atop a flight-proven Falcon 9 Block 5 (B1062-3) from Launch Complex 39A at the Kennedy Space Center.

For mission description, please visit the page 34 of this magazine.

- Source: <https://www.nasaspaceflight.com/2021/08/inspiration-4-update/>

Kaori Sasaki

Director
JAXA Space Education Center



Ms. Kaori Sasaki is the Director of JAXA Space Education Center, after 6 years of experience as a manager of the center. She is responsible for the proper execution of the center's budget, work management of its staff, planning and term evaluation of achievement tasks based on its policy and strategy as well as development and operation of various space education programs. In her capacity, she works with many entities for space education such as other space agencies, local boards of education as well as NPO and private companies. She has served JAXA for more than 30 years. She first joined NASDA - one of the former organizations that converged into JAXA - in 1989, and has led in various capacities, including as the manager of public relations, the deputy administrative manager of space exploration and international relations. She has been an active member of the Space Education Organizing Committee as well as of the Young Professional Program Committee for IAF/IAC. She also contributes as a board of directors of World Space Week Association. She has a Bachelor's in laws from Hokkaido University and a Master of Space Studies from International Space University.

Hello Kaori-San, thank you for being willing in sharing a bit of time for the interview! Let's start by describing yourself in three hashtags.

Thank you for giving me the opportunity to introduce myself to the IAF community! My name is Kaori Sasaki. I work in JAXA and currently the Director of JAXA Space Education Center.

Three hashtags for me would be #joy of life, #harmony, #natural

You are now Director of the Space Education Center at JAXA, and you have been involved in Space for some time. How and why did you choose space?

When I was a student, studying international policy and law, I was interested in space exploration activities – as they expand the range of human's activities as well as have the potential to expand intellectual frontiers of humanity. From the viewpoint of political and legal issues, I had strong concerns about the balance between international competition and international collaboration on these activities.

In the beginning of my career at JAXA, I was involved in the planning and management of summer school programs for students, part of an outreach activity toward the next generation. After working in several different departments, I am now working as the Director of the Space Education Center.

That's interesting! Any big projects you and the center are working on right now that you would like to share?

It is very important to actually experience and interact with new friends who are interested in space in different regions, but it is difficult to do so, as face-to-face, hands-on space education activities are currently restricted by the



COVID-19 pandemic. Our challenge/current task is to develop/create and provide online programs which can be even better than offline activities.

How long have you been involved with the IAF, and what convinced you to join?

Around 15 years ago, I was thinking to create a meet up program for young professionals in JAXA to interact in groups with those from other space agencies and deepen mutual understanding, as a potential boost for their careers. When I attended a COPUOS meeting, I got to hear about the YPP. Having participated to the IAC as an exhibitor, I had the chance to join a YPP committee meeting during the Congress. This was what I was looking for!

As part of the IAF Space Education and Outreach Committee (SEOC), what do you do exactly and what is the most relevant thing you get to do?

Paper selection and session chair for the technical sessions. Since primary and secondary educations are the most relevant to my work, I am in charge of these sessions specifically.

If people wanted to contribute to the activities of the IAF SEOC, how should they do? Who should they reach out to?

I hope that more school teachers, science museum curators, and educational researchers from around the world will increase their participation to make the sessions more active. It would be great if we can build a platform where anyone can use the materials and programs introduced and shared.

What advice would you have wanted to receive, when you started working in the space sector, and what is your advice for students and young professionals to thrive in the space community?

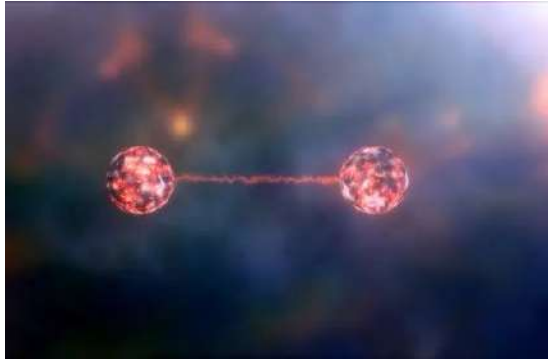
Space activities create the future. There is a great possibility of shaping jobs that do not exist yet today, so I think it is important to get new information, learn, and look for fields that interest you, finding out what you can do to contribute, and to acquire a wide range of basic skills and knowledge in preparation.

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August 31, 2021

QUANTUM CRYSTAL HELP HUNT FOR DARK MATTER

Using a quirk of quantum mechanics, researchers have created a beryllium crystal capable of detecting incredibly weak electromagnetic fields. The work could one day be used to detect hypothetical dark matter particles called axions. The researchers created their quantum crystal by trapping 150 charged beryllium particles or ions using a system of electrodes and magnetic fields that helped overcome their natural repulsion for each other, Ana Maria Rey, an atomic physicist at JILA, a joint institute between the National Institute of Standards and Technology and the University of Colorado Boulder, told Live Science. When that beryllium "crystal" encountered an electromagnetic field, it moved in response, and that movement could be translated into a measurement of the field strength.

- Source: [space.com](https://www.space.com)



August 29, 2021

ASTRA ROCKET'S SMOOTH SLIDE BEFORE ITS FAILURE

Astra's first rocket launch since it the company went public wasn't exactly the success the company hoped for. An engine failing to fire a second into the launch caused the rocket to hover sideways before attempting to reach orbit. The flight safety crew purposely stalled the engines 2 minutes and 28 seconds into the flight after a piece of the rocket appeared to break off. Before returning to earth it had reached an altitude of 31 miles. The two-stage Launch Vehicle 0006 (or LV0006) was originally scheduled to launch from the Pacific Spaceport Complex in Kodiak, Alaska on Friday, August 27. That launch was delayed until August 28 after the rocket's guidance system called an abort. According to Space the initial abort was due to an engine configuration issue.

- Source: [theverge.com](https://www.theverge.com)



August 31, 2021

SMALL CRACKS FOUND IN ZARYA MODULE OF ISS

Russian cosmonauts discovered small cracks in the International Space Station (ISS)' Zarya module, according to Reuters. The fissures are superficial but may spread over time, the report said. It is unclear whether the cracks are causing any air leaks from the orbiting lab. Zarya was launched in November 1998. It is part of the ISS' Russian segment and was the first piece of the station to reach orbit. Most of the equipment of the ISS is starting to age. Vladimir Solovyov, chief engineer of rocket and space corporation Energia told RIA news agency that there could be an "avalanche of broken equipment" after 2025.

- Source: [spacewatch.global](https://www.spacewatch.global)

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August 28, 2021

ISRO'S SUCCESSFULLY TESTED SDM OF GAGANYAAN

On August 28, 2021, ISRO successfully conducted the first hot test of the System Demonstration Model (SDM) of the Gaganyaan Service Module Propulsion System for a duration of 450 s at the test facility of ISRO Propulsion Complex (IPRC), Mahendragiri, Tamil Nadu. The system performance met the test objectives and there was a close match with the pre-test predictions. Further, a series of hot tests are planned to simulate various mission conditions as well as off-nominal conditions.

The Service Module is part of the Gaganyaan Orbital module and is located below the crew module and remains connected to it until re-entry.

-Source: [ISRO](https://www.isro.gov.in)

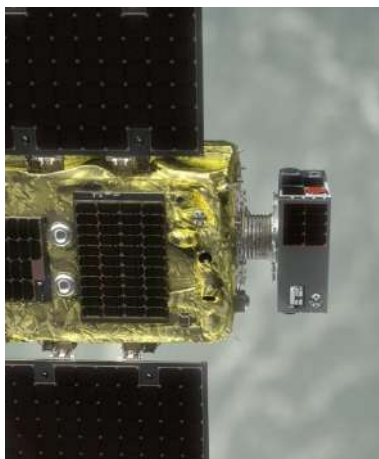


August 30, 2021

ISS EXPEDITION - 65 HEROES

Akihiko Hoshide (born December 1968), is a Japanese engineer, JAXA astronaut, and current Commander of the International Space Station. On August 30, 2012, Hoshide became the third Japanese astronaut to walk in space. **Robert Shane Kimbrough** (born June 1967) is a retired United States Army officer, and a NASA astronaut. Kimbrough is a veteran of three spaceflights, the first being a Space Shuttle flight, and the second being a six-month mission to the ISS on board a Russian Soyuz craft. He was the commander Expedition 50. **Thomas Pesquet** (born February, 1978) is a French aerospace engineer, pilot, and ESA astronaut. From November 2016 to June 2017, Pesquet was part of Expedition 50 and Expedition 51 as a flight engineer. Pesquet returned to space in April 2021 on board the SpaceX Crew Dragon for a second six-month stay on the ISS. **Megan McArthur** (born August, 1971) is an American oceanographer, engineer, NASA astronaut. McArthur has flown one space shuttle mission, STS-125 and one SpaceX mission, SpaceX Crew-2 on Crew Dragon Endeavour.

- Source: [Roscosmos/wikipedia](https://www.roscosmos.ru/en/wiki/)



August 25, 2021

SUCCESSFUL REPEATED MAGNETIC CAPTURE OF ELSA-d

Astroscale's End-of-Life Services by Astroscale-demonstration (ELSA-d) successfully tested its ability to capture its client spacecraft using the servicer's magnetic capture system, in a demonstration performed on Wednesday, August 25 (UTC). A major challenge of debris removal, and on-orbit servicing in general, is docking with or capturing a client object; this test demonstration served as a successful validation of ELSA-d's ability to dock with a client, such as a defunct satellite.

- Source: [Astroscale](https://www.astroscale.com/)

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June 16, 2021

ILRS GUIDE FOR PARTNERSHIP BY CNSA AND ROSCOSMOS

CNSA and ROSCOSMOS provide series of cooperative opportunities for all interested international partners in the phases of the plan, demonstration, design, development, implementation, operation and scientific research of ILRS project. Both countries welcome international partners to participate in all the above phases and all levels of above phases. The definition, scientific areas, cooperation domain and opportunities of ILRS are all discussed and approved by the joint working group of both the agencies and are described in the guide, used to facilitate the partners to find the applicable areas and missions to participate in.

-Source: [CNSA](#)

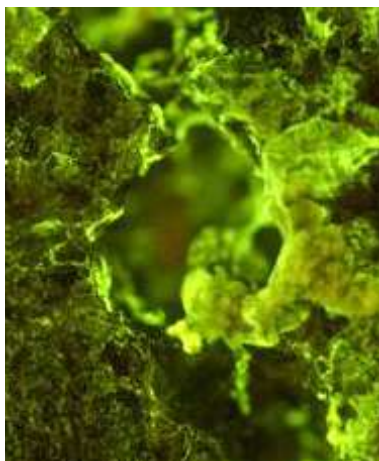


August 30, 2021

ISS EXPEDITION - 65 HEROES

Oleg Viktorovich Novitskiy (born October 12, 1971) is a former Lieutenant Colonel in the Russian Air Force who logged over 700 hours of flight time and was awarded for bravery. He is currently serving as a Russian cosmonaut with Roscosmos and has participated in multiple expeditions, during which he has spent over 340 days in space. **Mark Thomas Vande Hei** (born November 10, 1966) is a retired United States Army officer and NASA astronaut[2] who served as a flight Engineer for Expedition 53 and 54 on the International Space Station. **Pyotr Valerievich Dubrov** (born 30 January 1978) is a Russian engineer and cosmonaut selected by Roscosmos in 2012. Dubrov launched aboard Soyuz MS-18 in April 2021 for his first long duration mission aboard the International Space Station along with his above two colleagues. Both Pyotr Dubrov and Mark Vande Hei will help with filming a science fiction movie aboard ISS by Russian film director Klim Shipenko.

- Source: [Roscosmos/wikipedia](#)



August 31, 2021

RESEARCHERS SUCCESSFULLY BIOMINE VANADIUM

Vanadium is an element commercially added to steel to fabricate high strength, corrosion-resistant materials that could be used in buildings, tools, and construction processes on other planets. "Mining is a necessary part of civilization, and it has been going on since people first started settling in villages and cities," says Charles Cockell, Biorock principal investigator and professor at the UK Centre for Astrobiology at the University of Edinburgh. The results were promising. "We were surprised gravity did not have an effect," says Cockell, "But we think the reason is that for the period of the experiment, 21 days, the microbes were able to grow to their maximum concentration, even in the absence of sedimentation or convection on the space station.

- Source: [NASA](#)

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July 6, 2021

FENGYUN 3E TO ENHANCE GLOBAL WEATHER FORECAST

Fengyun 3E, the world's first early morning orbit weather satellite that China launched for civil use on Monday, will improve global weather forecast by filling in the data gap in a certain time of a day and assist in achieving 100 percent global data coverage every six hours, experts said. Zhang Peng, deputy director of the National Satellite Meteorological Center, also the chief commander of the Fengyun 3 series ground system, said Fengyun 3E with a designed lifetime of eight years belongs to the polar-orbiting satellite group whose combination monitors weather, climate and environment of the whole world.

- Source: [CNSA](#)



August 23, 2021

ESA TO PROCESS RECORD 23000 APPLICATIONS TO ITS ASTRONAUT VACANCIES

Astronaut hopefuls are being asked for their patience as ESA processes over 23000 applications to its Astronaut and Astronaut (with a disability) vacancies. This number far exceeds the Agency's most optimistic forecasts. Head of space medicine at ESA's European Astronaut Centre (EAC) Guillaume Weerts is part of the team leading the astronaut selection. He says the number of applications is a positive indication of the level of interest in space activities in Europe, but it will take some time to work through. "At ESA, we firmly believe that every application should receive the attention it deserves. With the considerable number of applicants, it simply takes more time than initially foreseen," explains Guillaume. Under the revised processing timeline, it is expected that all candidates will be notified of the outcome of their application by the end of November 2021 at the latest.

-Source: [ESA](#)



August 24, 2021

NASA'S PSYCHE MISSION MOVES CLOSE TO LAUNCH

As part of NASA's Discovery Program, the mission to explore a metal-rich asteroid is well on its way to an August 2022 launch. With NASA's Psyche mission now less than a year from launch, anticipation is building. By next spring, the fully assembled spacecraft will ship from the agency's Jet Propulsion Laboratory in Southern California to NASA's Kennedy Space Center in Florida for a launch period that opens Aug. 1, 2022. In early 2026, the Psyche spacecraft will arrive at its target, an asteroid of the same name in the main asteroid belt between Mars and Jupiter. Scientists believe asteroid Psyche, which is about 140 miles (226 kilometers) wide, is made largely of iron and nickel and could be the core of an early planet.

- Source: [NASA](#)

SPACE NEWS

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July 30, 2021

RUSSIA BLAMES SOFTWARE GLITCH FOR MISFIRED ENGINES

Russia's space agency blamed a "short-term software failure" for ISS engine mishap with its new science module. The module's thrusters unexpectedly fired hours after docking, shifting the International Space Station off its normal position. The software glitch caused the Nauka module to think it was supposed to back away from the station. The space station, a football field-sized research laboratory floating 270 miles up in low-Earth orbit, was shoved 45 degrees off track once Nauka's thrusters started firing. NASA said it lost control of the station's positioning minutes later, but it was eventually repositioned back to normal after thrusters from another Russian module counteracted Nauka's errant firings.

- Source: theverge.com

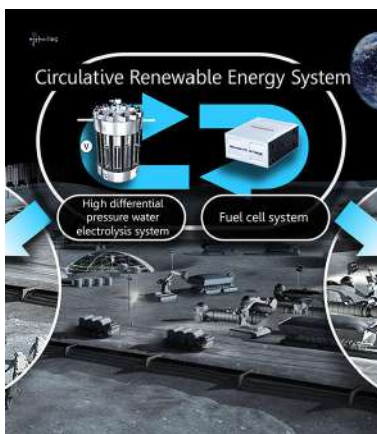


July 21, 2021

VEGA EVOLUTION ADVANCED BEYOND 2025

ESA will further increase the competitiveness and environmental sustainability of Europe's Vega launch system beyond 2025 through a contract signed with Avio in Italy. Vega operates from Europe's Spaceport in French Guiana to launch light satellites to one or multiple orbits in a single launch. This contract takes Vega a step further and marks the start of a new phase in preparation of a new Vega launch vehicle called Vega-E, which will make extensive use of Vega-C building blocks. The objective with Vega-E is to further increase the competitiveness and performance of Vega-C – which is planned to have its first flight in 2022. This will increase its flexibility in terms of payload mass and volume and reduce the launch service cost and globally the cost of launch per kilo offered in the market. The key for achieving these objectives is the use of new technologies for a completely new upper stage, featuring a new low-cost liquid-fuelled engine.

- Source: [ESA](https://esa.eu)



July 14, 2021

JAXA AND HONDA TO BEGIN FEASIBILITY STUDY OF CIRCULATORY RENEWABLE ENERGY SYSTEM

The Japan Aerospace Exploration Agency (JAXA) and Honda R&D Co., Ltd. (Honda) today announced the plan to begin a joint feasibility study on a "circulative renewable energy system" in space, which is designed to supply oxygen, hydrogen, and electricity for human outposts and rovers. JAXA and Honda have been conducting a joint research on this system to create an environment in space where people can stay and conduct activities over an extended period of time.

- Source: [JAXA](https://jaxa.jp)



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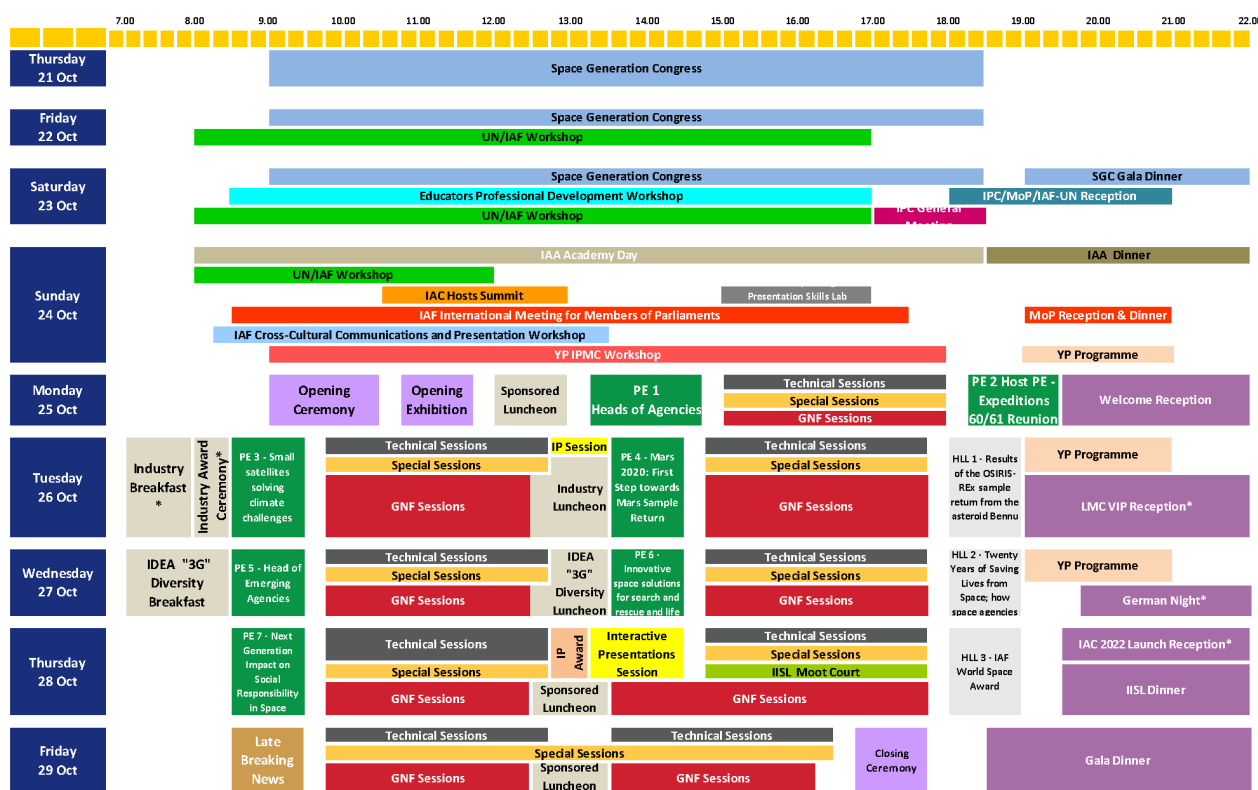
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IAF EMERGING SPACE LEADERS 2021

Congratulations to all the 26 awardees for being awarded
2021 IAF Emerging Space Leaders (ESL) award!



Ahmed Baraka



Giuliana Rotola



Alan Mattos



Angel Arcia Gil



Atipat Wattanuntachai



Carlos Rodriguez



Chloé Carrière



Edward Burger



Eleni Antoniadou



Fahd Moumni



Fiorella Arias Bonilla



Gladys Ngetich



Hari Ram Shrestha



Isidora (Isi) Pacheco



Jiten Thapa



Katherine Herrera-Jordan



Kawsihen Elankumaran



Marco Rojas



Mariam Naseem



Matias Campos



Nishanth Pushparaj



Pooja Lepcha



Ruvimbo Samanga



Sepideh Faghihi



Shankar Bhattarai



Tania Robles

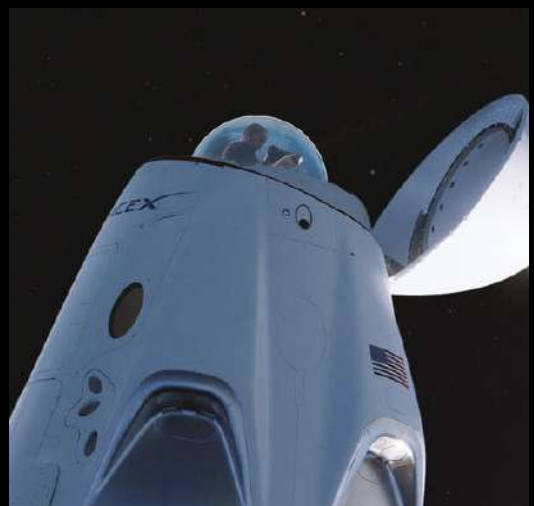


SPACEX INSPIRATION 4

Inspiration4 is the world's first all-civilian mission to orbit. The mission will be commanded by Jared Isaacman, the 38-year-old founder and Chief Executive Officer of Shift4 Payments and an accomplished pilot and adventurer. Inspiration4 will leave Earth from Kennedy Space Center's historic Launch Complex 39A, the embarkation point for Apollo and Space Shuttle missions, and travel across a low earth orbit on a multi-day journey that will continually eclipse more than 90% of the earth's population. Named in recognition of the four-person crew that will raise awareness and funds for St. Jude Children's Research Hospital, this milestone represents a new era for human spaceflight and exploration.

Spacecraft: The Dragon spacecraft (Crew Dragon Resilience capsule) is capable of carrying up to 7 passengers to and from Earth orbit, and beyond. It is the only spacecraft currently flying that is capable of returning significant amounts of cargo to Earth, and is the first private spacecraft to take humans to the space station.

Launch vehicle: Falcon 9 is a reusable, two-stage rocket designed and manufactured by SpaceX for the reliable and safe transport of people and payloads into Earth orbit and beyond. Falcon 9 is the world's first orbital class reusable rocket. Reusability allows SpaceX to reflly the most expensive parts of the rocket, which in turn drives down the cost of space access.



- Text Source: <https://inspiration4.com/mission>



Jared Isaacman
(Leadership)
Spacecraft Commander

Sian Proctor
(Prosperity)
Spacecraft Pilot

Hayley Arceneaux
(Hope)
Chief Medical Officer

Christopher Sembroski
(Generosity)
Mission Specialist





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