

SGC BAKU
2023

21st Space Generation Congress

Building a Space Community to Inspire, Connect,
and Support Humankind

Baku, Azerbaijan
28-30 September, 2023



SPACE GENERATION
ADVISORY COUNCIL



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In support of the United Nations programme on Space Applications

c/o European Space Policy Institute (ESPI)
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Vienna -1010
AUSTRIA

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The Space Generation Congress (SGC) is SGAC's annual meeting in support of the United Nations (UN) Programme on Space Applications. Top university students and young professionals with a passion for space travel from all around the globe to attend three days of the congress every year. At SGC, delegates gain exposure to perspectives on space issues from the world-leading space companies and organisations, including the International Astronautical Federation (IAF), National Aeronautics and Space Administration (NASA), and the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS). Leaders from these space organisations, in return, gain fresh, innovative and bold perspectives from the incoming space generation. The delivery of SGC each year is made possible through the generous support of SGAC's sponsors and dedicated volunteers.

The 21st edition of the Space Generation Congress aimed to celebrate the role of SGAC as a catalyst for the next generation of space professionals worldwide. This year, 118 delegates connected in Baku, Azerbaijan, prior to the 74th International Astronautical Congress (IAC). With the theme "Building a space community to inspire, connect, and support humankind," the congress highlighted the pivotal role that space plays in driving progress and innovation on Earth, showcasing the immense potential of space technology in addressing global challenges, fostering international collaboration, and promoting socio-economic development worldwide. The SGC strives to bring together students and young professionals with diverse cultures and backgrounds and serve as a platform for them to connect, collaborate, and share their ideas. Furthermore, by fostering a sense of community and friendship, we seek to inspire and empower our delegates so that they can continue developing their careers in the space industry and contribute to its advancement. Our event envisages to provide opportunities for mentorship to those just starting their journey and create a space where they can learn from and be inspired by experienced professionals. Ultimately, SGC's goal is to commemorate the vital role of SGAC and the space sector in shaping the future of humankind and connecting the world.





From the Executive Office

Co-Chairs' Foreword

The Space Generation Congress (SGC) is the flagship event of SGAC. Every year, this unique event brings together the space leaders of today and tomorrow for an inspiring and invigorating three days of networking and discussions preceding the annual International Astronautical Congress. In a delicate moment of leadership transition for SGAC, and during very difficult days for the whole world, the 2023 SGC shined brighter than ever, becoming one of the most successful editions in the history of our organisation. We consider the 2023 SGC as a testament to the impressive results that can be achieved through kind leadership and heartfelt commitment. This was made possible thanks to the incredible dedication of the SGC organising team, brilliantly led by Marcos Ramirez and Alessandra Verninel, who put together an excellent lineup of presentations and discussions while still maintaining a positive atmosphere for everyone involved. Looking ahead at the future, we are grateful to all our sponsors and partners for their ongoing support to the organisation of SGC in Milan, and cannot wait to welcome you for another successful Congress.



Hamza Hameed
SGAC Chair



Antonino Salmeri
SGAC Co-chair



Executive Director's Foreword

Dear SGC Delegates, Sponsors, and Supporters,

The Space Generation Congress, happening this year in the extraordinary city of Baku, Azerbaijan, continues to serve as a pivotal platform for the next generation of space professionals. Drawing together delegates from across the globe, alongside esteemed representatives from space agencies, government bodies, industry, and academia, the SGC remains a beacon of collaboration and knowledge exchange.

Throughout the course of our congress, I encourage you to seize every opportunity to engage in meaningful dialogue, share your insights and experiences, and forge new connections that will propel our collective endeavours forward. The recommendations and resolutions arising from our deliberations will not only shape the trajectory of our respective careers but also contribute to the broader discourse on the peaceful and sustainable use of outer space.

I extend my deepest gratitude to the dedicated members of the SGC 2023 Organizing Team, whose tireless efforts have been instrumental in bringing this event to fruition.

Furthermore, I extend heartfelt appreciation to our sponsors and partners whose generous support has made this congress possible. Your steadfast belief in the potential of emerging space leaders is a testament to the collaborative spirit that defines our community.

May the Space Generation Congress 2023 inspire us to reach new heights and pioneer a future where the boundaries of space are transcended by the boundless potential of human imagination.

With warm regards,
Valentina Luchetti



Valentina Luchetti
*SGAC Acting Executive
Director*



From the Event Managers

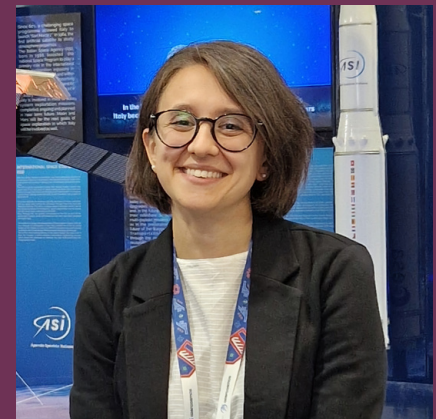
The 21st Space Generation Congress (SGC) was held in Baku, Azerbaijan, from September 28-30, 2023. The event received about 124 delegates from more than 50 different countries. Under the underlying theme of "Building a Space Community to Inspire, Connect & Support Humankind," the event delivered an incredible experience for the delegates and industry guests, filled with opportunities for learning, growth, and networking, featuring five working groups, three panels, a special panel session, a mentoring session, ten keynote speeches, and two Sunday workshops.

This year's SGC aimed to provide more activities that fostered professional development and helped introduce first-time attendees to all the opportunities SGAC provides its members. As a result, a special panel session was organized, which featured speakers from space agencies, industry actors, and academia, presenting three different perspectives on how to build a career in the space sector. At the same time, our mentoring session allowed our delegates to receive advice and guidance from experienced professionals. In addition, our SpaceGen Panel featured members of the SGAC Executive Team, who were able to share their vision about the future of SGAC and listen to ideas from the audience on how we could improve our organization.

The event successfully achieved its goal of delivering a high-quality and professional environment where everyone could participate, exchange ideas, fostering new knowledge and connect. The fundamental factor behind this success was the organizing team's ability to respond and adapt to the various challenges that emerged during the planning and execution of the event. One of the success factors relies on the team members and their active engagement before and during the event preparations. It is essential to understand the qualities of each member, allocate them to the right team, and encourage them to take the initiative, propose new ideas, and be proactive in their roles. In conclusion, this experience highlighted the importance of teamwork and effective management in organizing a successful event.



Marcos Eduardo
Rojas Ramirez
Event Manager



Alessandra Vernile
Deputy Event Manager



Programme

DAY 01 - Thursday, 28 September 2023

| Time | Activity |
|---------------|---|
| 08:00 - 08:30 | Registration Morning Coffee |
| 08:30 - 09:00 | Welcome Speech Intro to SGC WG Overviews |
| 09:00 - 09:30 | Keynote speech by Azercosmos |
| 09:30 - 10:00 | Keynote speech by UNOOSA |
| 10:00 - 12:30 | Working Group Time |
| 12:30 - 14:00 | Lunch |
| 14:00 - 15:45 | Working Group Time |
| 15:45 - 16:30 | Coffee Break Interactive Activity Talk by Groundspace |
| 16:30 - 18:00 | Working Group Time |
| 18:30 - 19:00 | Day 1 Closing Remarks Awards Ceremony |
| 20:00 - 23:00 | International Night @ Paulaner Restaurant |



Programme

DAY 02 - Friday, 29 September 2023

| Time | Activity |
|---------------|---|
| 08:45 - 09:15 | Welcome Morning Coffee |
| 09:15 - 09:30 | Day 2 Opening Remarks |
| 09:30 - 10:00 | Keynote speech by Voyager |
| 10:00 - 11:00 | SpaceGen Fireside Chat |
| 10:00 - 12:30 | Working Group Time |
| 12:30 - 14:00 | Lunch Talk by VAST Space |
| 14:00 - 15:45 | Working Group Time |
| 15:45 - 16:30 | Coffee Break Interactive Activity Talk by AIDAA |
| 16:30 - 17:30 | Career Development Special Track Panel Session |
| 17:30 - 18:30 | Speed Mentoring |
| 18:30 - 19:00 | Day 2 Closing Remarks |
| 19:30 - 23:00 | Space Night @ City Park Restaurant |



| | |
|---------------|------------------------------------|
| 17:30 - 18:30 | Speed Mentoring |
| 18:30 - 19:00 | Day 2 Closing Remarks |
| 19:30 - 23:00 | Space Night @ City Park Restaurant |





Programme

DAY 03 - Saturday, 30 September 2023

| Time | Activity |
|---------------|--|
| 09:15 - 09:45 | Morning Coffee |
| 09:45 - 10:00 | Day 3 Opening Remarks |
| 10:00 - 11:15 | Panel: Space for Climate |
| 11:15 - 12:30 | Panel: Emerging Space Agencies |
| 12:30 - 14:00 | Lunch Talk by Telespazio |
| 14:00 - 14:30 | Keynote speech by NASA Earth Science |
| 14:30 - 15:45 | Working Group Presentations |
| 15:45 - 16:30 | Coffee Break Interactive Activity Talk by OrbitFab |
| 16:30 - 17:00 | Keynote speech by NASA Exploration |
| 17:00 - 17:30 | SGC Closing Remarks |
| 19:00 - 23:00 | SGC Closing Dinner @ Ay İşığı |



Programme

NASA SCaN Workshop - Sunday 1 November 2023

| Time | Activity |
|---------------|--|
| 10:00 - 10:30 | Welcome Morning Coffee |
| 10:30 - 11:00 | NASA SCaN Intro Workshop Description |
| 11:00 - 12:30 | Workshop Speakers Activity Prep |
| 12:30 - 14:00 | Lunch |
| 14:00 - 15:45 | Workshop Activity |
| 15:45 - 16:00 | NASA SCaN Closing Remarks |





Side Event Activities

DAY 1 - International Night

Paulaner Restaurant



The International Cultural Night is an annual tradition at the SGC where participants get the chance to present their home countries and share their culture through music, food, stories, and other aspects. Everyone is invited to wear traditional outfits from their respective countries, and delegates from the same region are encouraged to coordinate with each other to come up with ideas for the representation. With over 50 nationalities represented at SGC 2023, the night was filled with dancing, singing, and appreciation of the unique and diverse SGAC community.





Side Event Activities

DAY 2 - Space Night

City Park Restaurant

The Space Night is another SGC tradition that celebrates the love and passion for space shared by all SGAC members. One of the highlights of the SGC Space Night is the Pinning Ceremony, where new SGAC members are formally welcomed to the organization and presented with pins. This highly symbolic moment represents their formal inclusion into the SGAC community. This year's SGC Space Night was held at the CityPark restaurant, offering a dinner buffet where delegates enjoyed a delicious meal and drinks while bonding with fellow members alongside a breathtaking view of Baku's skyline. In addition, our live karaoke added to the fun and excitement of the night, allowing delegates to relate, let loose, sing their hearts out, and create lasting memories.





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Side Event Activities

DAY 3 - Closing Dinner

📍 Ay Işıği

The SGC Closing Dinner is one of the most important events SGAC hosts every year. It is an evening where SGAC celebrates its achievements and recognizes the community members who have made a significant impact in the organization and the space sector. This year, the event took place at Ay Işıği Restorani, where guests were treated to a memorable night of Azerbaijani culture through delicious food and live performances. The program included speeches by Karen Feldstein, NASA's Associate Administrator for International and Interagency Relations; Clay Mowry, IAF's President; Agnieszka Lukaszczyk, Planet's Vice President for Government Affairs in Europe, Middle East, and Africa; and Lindsey Wisner, the winner of SGAC's Leadership Award. To conclude the evening, the SGC manager handed over responsibilities to the deputy manager in a memorable manner, followed by opening up the dance floor for the rest of the night, officially concluding the successful Space Generation Congress in 2023.





Plenary Programme

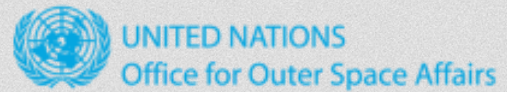
Keynote Speakers



Samaddin Asadov | Chairman of the Board
Azerbaijan Space Agency



Hazuki Mori | Expert to the Space Applications Section
UNOOSA



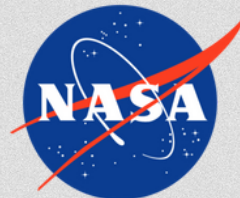
Marshall Smith | CTO and VP Exploration
Voyager Space



James E. Graf | Director for Earth Science and Technology
NASA JPL



Amit Kshatriya | Deputy Associate Administrator of M2M Program in the ESDMD
at **NASA Exploration**





Sponsor Talks



Radim Badsy | CEO & Co-founder
Groundspace



Camille Bergin | Senior Business Development Manager
VAST



Marco Brancati | Chief Technology & Innovation Officer
Telespazio



Manny Shar | Managing Director
Orbit Fab



Alfonso Pagani | Associate Professor of Aerospace Engineering
AIDAA





Panels



SpaceGen Fireside Chat



Antonino Salmeri | Co-Chair
at **SGAC**



Tatiana Komorná | Operations
Officer at **SGAC**



Nikol Koleva | Deputy Executive
Director at **SGAC**



Alessandra Vernile |
Deputy SGC Event
Manager at **SGAC**



Space for Climate

MOD



Matjia Recenlj | Research Manager
ESPI



Kate Becker | Executive Officer
NASA Earth Science Division



Camille Bergin | The Galactic Gal



Sara Rodriguez Marinas | Space Mission Architect
Airbus Defense & Space SGAC



Nina Ewerlöf | Vice President of Sales EMEA
Planet



Emerging Space Agencies

MOD



Hamza Hameed | Chair
SGAC



Michal Brichta | Director
Slovak Space Office - Industry Branch



Bekhruz Mirzaev | Chief Specialist, Department
for Innovations and Technology Transfer
Uzspace



Natavan Hasanova | Strategy and
Business Development Director
Azercosmos



Event Statistics & Demographics

124

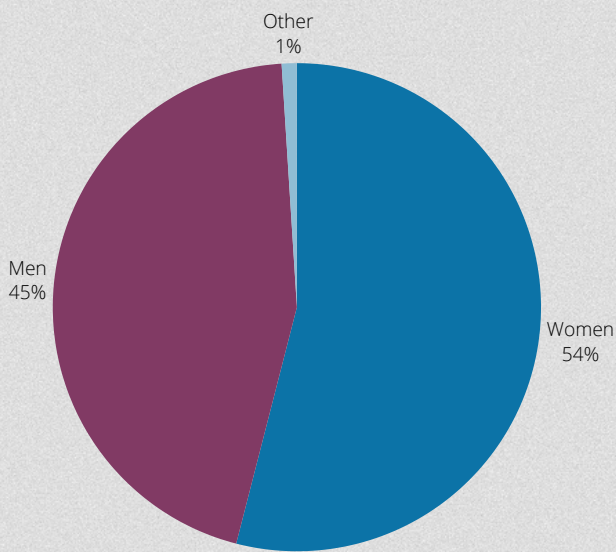
Delegates

51

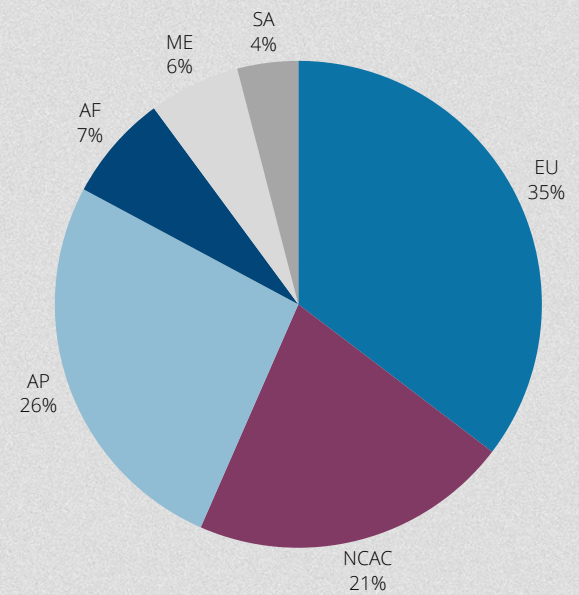
Nationalities

73

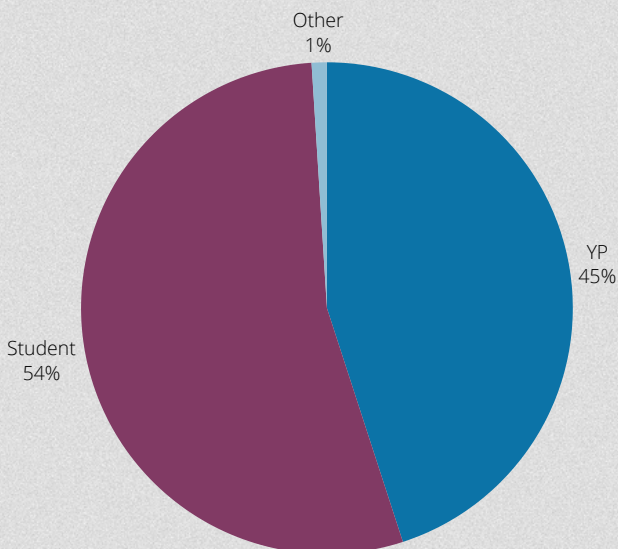
Scholarships



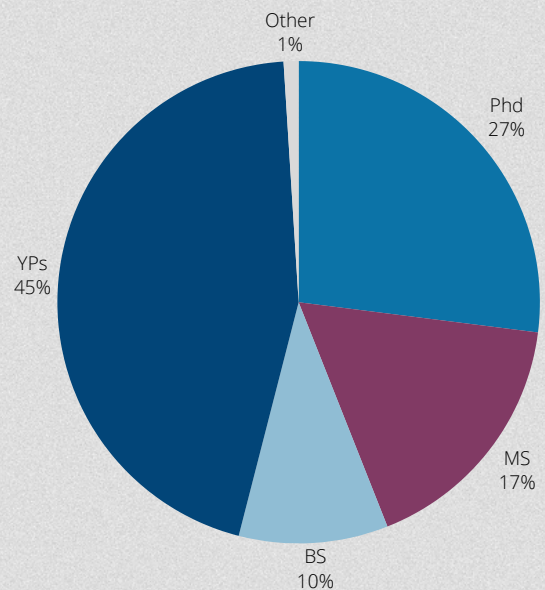
Gender Distribution



Regional Distribution



Professional Background



Student Levels



Scholarships

SGAC Global Rising Star Award

The SGAC Global Rising Star Award facilitates the attendance of space leaders from emerging countries from the 6 SGAC Regions at the Space Generation Congress (SGC) and the International Astronautical Congress (IAC). Winners represent the overall SGAC diversity, bringing unique and insightful firsthand perspectives to the SGC and IAC and back to their communities.

Gillian Chin

**David Andres
Alvarez**

Fiorella Arias

Alita Regi

Ilaria Merli

Helen Haile

Yumna Majeed

Space Generation Leadership Award

The Space Generation Leadership Award facilitates the attendance of international delegates who bring unique and insightful firsthand perspectives to the Space Generation Congress. It selects top international applicants to attend the Space Generation Congress and the International Astronautical Congress.

**Antonio
Scannapieco**

Lindsey Wiser

Gourav Namta

**Mohaddese
Daryabari**

Johanne Ekue



SGAC Nebula Award

Thanks to the generous donation of an SGAC Alumnus, SGAC brings 10 students or young professionals to attend the 21st Space Generation Congress (September 28-30) and the 74th International Astronautical Congress (October 2-6) in Baku, Azerbaijan.

Yusuf Alqattan

Thando Mathe

Carolina Velasco

Talha Noor

Dolly Manic

**Maria Alejandra
Botero Botero**

Anuja Shrestha

Mahhad Nayyer

Sindhu Belki

**Harry Ayuk-
Ngojo Tabi Ndip**

**Oluwakorede
Adejoro**

Future Space Leaders Grant Program

The Future Space Leaders Foundation provides grants for participation in the 74th International Astronautical Congress, intended for U.S. graduate students and young professionals who are pursuing space- and satellite-related careers.

**Tobias
Niederwieser**

Julia Di

Owen Marr

Elizabeth Barrios

**Srinivasa (Aditya)
Bhattaru**



OHB SE Scholarship

Nadia Lamera

Danlei Chen

Ravneet Kaur

CubeSpace Scholarship

Maren Mashor

Chioma Ezeigbo

Linda Ngozwana

UK Space Agency Scholarship

Eugene
Rotherham

Nikita Shetti

NASA SCaN Scholarship

Lauryn Leslie

Erin McGee

Italian Space Agency Scholarship

Alessandro
Paravano

Mattia Pugliatti

Andrea Capurso

Andrea Carlo
Morelli

Giacomo Borelli



ISEB Student Program

The ISEB Student Program @ IAC is designed to supplement and enrich students' experience through specialized events, presentations, and networking experiences. Every year, the different ISEB members send students to SGC and IAC.

Cheyenne Powell

Frank de Veld

Jaeyoul Ko

Jimin Choi

Inchul Moon

Seungho Lee

Ben Campbell

**Perla Latorre-
Suarez**

Airbus Scholarship

Ciarán Jenkins

**Sara Rodriguez
Marinas**

Space Solar Power Competition Winners

**Connor
MacRobbie**

Takahiro Ohnishi

Megan Campbell



NASA Earth Science Scholarship

**Mary Angelique
Demetillo**

NASA Exploration Scholarship

Katie Guhl

Space is Business Competition Winner

Valentina Zancan

SGAC SSS PG Essay Competition Winner

**Emilie
Seneclauze**





IAF Emerging Space Leaders

The programme, run by the International Astronautical Federation, enables up to 30 students and young professionals to participate in the International Astronautical Congress, the UN/IAF Workshop and/or the Space Generation Congress.

Yaqoob Alqassab

**Julia Alvarez
Vallero**

**Valeria Dittel
Tortós**

**Imane El
Khintouti**

**Eden Abeselom
Habteslasie**

Akanksha Hale

**Aya Hesham
Sayed**

**Mohammad
Iranmanesh**

Saroj Kumar

**Nur Awatiff
Mohamad Rizal**

Sumbal Mushtaq

**Ahmed E S
Nosseir**

**Sebastian Alejandro
Ogalde Castro**

**Danny
Tjokrosetio**

**Raihana Shams
Islam Antara**

Shrava Hariharan

Madelyn Hoying

Maren Hülsmann

Matej Poliacek

Eliza Sapkota

**Oshan Sharma
Kattel**

**Salman Ali
Thepdawala**

**Didunoluwa
Obilan**

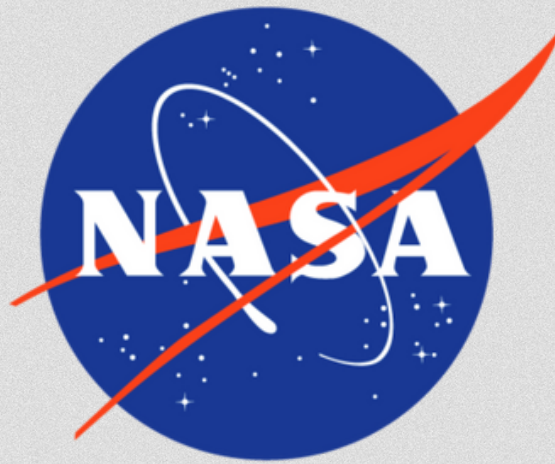




Working Groups

Working Group 1: NASA Exploration

Supported by the NASA Exploration System Development Mission Directorate (ESDMD)



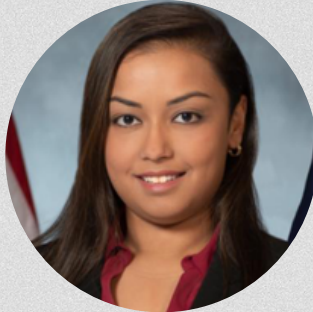
Through a simulated mission planning scenario, participants in this working group reviewed NASA's Moon to Mars Objectives and discussed how they might plan requirements, elements, and missions using a list of campaign elements. Each of the campaign elements had an associated cost and the group had to create an architecture that fit within specified budget constraints. Delegates were split into three smaller groups: National Leaders, Scientists, and Engineers. Within these three groups, delegates performed a simulation with a high budget constraint and a simulation with a lower budget constraint. The three groups were then mixed up so that National Leaders, Scientists, and Engineers were all in one group. We then performed the simulation one more time with a small budget constraint. The intent was for delegates to focus on creating an architecture that satisfied the objectives, constraints, and their group's interests. Through this process, delegates learned how to listen to different perspectives and backgrounds and create solutions that satisfy partners and stakeholders. The delegates also learned how to explore the challenges and opportunities present in the simulation to better understand how partnerships play a critical role in the next era of human deep space exploration.



Subject Matter Experts



Patrick Morris | Executive Officer to the Associate Administrator at **NASA ESDMD**



Debrosi Sadhukhan | Executive Officer to the Deputy Administrator at **NASA ESDMD**



Ruth Siboni | Chief of Staff, Moon to Mars Program Office at **NASA ESDMD**



Ashley Peter | Technical Integration Manager, Moon to Mars Program at **NASA ESDMD**



Darcy Elburn | Communications Integration Manager, Moon to Mars Program at **NASA ESDMD**



Moderator

Elizabeth Barrios | Avionics Materials SME & Failure Analyst at **NASA**



Moderator Rapporteur

Katie Guhl | Human Health and Performance Moon to Mars Integrator at **NASA / KBR**



Working Group Statistics

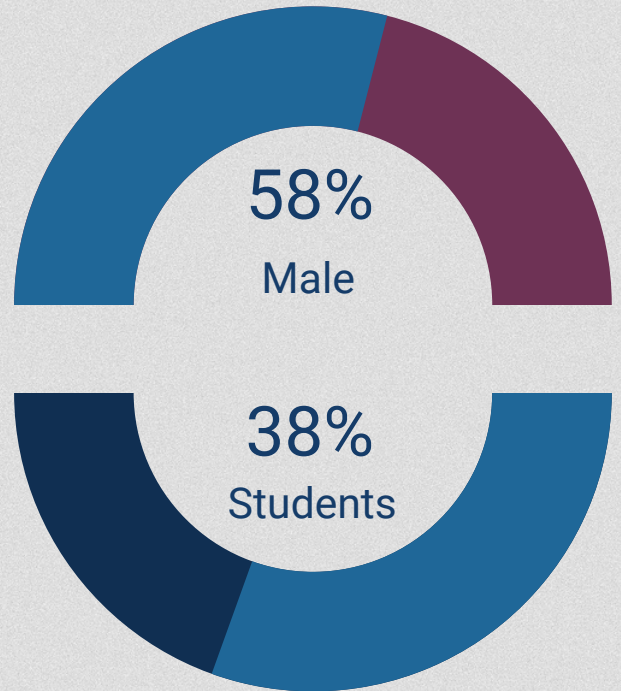
Working Group participants comprised:



Delegates



Nationalities





Main Objectives

Increase the delegates' awareness and understanding of NASA's Moon to Mars Objectives; strategy and architecture processes; challenges and opportunities for international participants in human exploration activities; and paths for future engagement with the agency and Artemis

Feedback for NASA based on the delegates experiences throughout the simulation and discussion to help the agency better communicate with, support, and grow the critical next generation workforce that will make future Moon to Mars missions a reality

Learnings for NASA based on delegates experiences throughout the simulation and discussion to help the agency better communicate with, support, and grow emerging space communications that will be a part of future Moon to Mars missions

Guiding Questions

What were the biggest challenges your community group and the larger working group dealt with in defining your mission profile?

The biggest challenge for the delegates was budget constraints. For each simulation, delegates were given a budget constraint which made it very difficult to include everything that the group wanted in the architecture. Another major challenge was finding compromises between the different community groups because they each had different priorities. For example, deciding between landing humans on the moon or collecting as much science data as possible, and creating an architecture that satisfied all parties required a lot of negotiation. Other challenges included the integration of different elements and determining the type / location of experiments, and re-emphasizing priorities of the different roles.

What tools and skills were required to achieve most or all of your mission objectives?

One of the main skills needed for these simulations was compromise. Another skill was being able to balance things like risk, reliability, safety, value, need, and want. We had to discuss how much risk we were willing to accept and if it'd be worth it, and what was critical for our architecture versus something more of a desire. Another important skill was being able to advocate for your position. Lastly, being able to give an "elevator pitch" became very important when we had to give a quick summary of the architecture we created.



What did you learn by taking part in the simulated mission definition process that you wish the wider spaceflight community and new entrants to aerospace knew?

One thing we learned during this simulation was the importance of keeping an open mind. In our breakout groups, we had representatives with different backgrounds and nationalities which brought many different perspectives. For the groups to be successful in creating an architecture sufficient for everyone, we had to keep open minds and allow everyone to voice their perspectives. We also wish that the wider spaceflight community knew the importance of agility and flexibility of requirements. For this simulation, we were given very high-level objectives / requirements. This allowed us a lot of flexibility and led to more innovative solutions.

Recommendations

Recommendations to the Space Generation Advisory Council and UN COPUOS

- Establish more guidelines for National Space Agencies to share more science and medicine data related to space

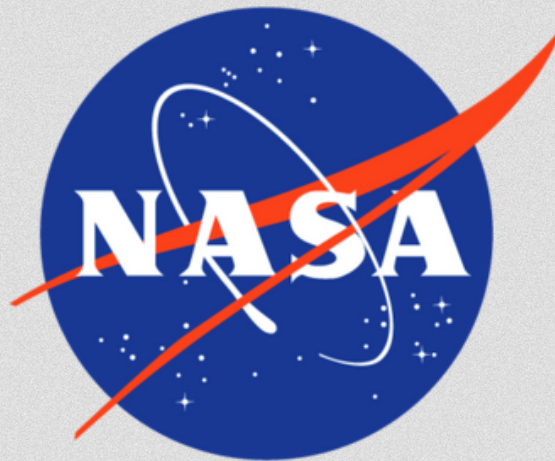
Recommendations to the sponsor/partner and industry at large

- As an agency, advocate for the removal or reduction of International Traffic in Arms Regulations (ITAR)
- Encourage the Space Technology Mission Directorate to promote engineering technology demonstrations on the same level as science demonstrations
- Improve communication with academic institutions
- Increase the amount of international collaboration the agency does



Working Group 2: Expanding Global Efforts to Implement Earth Science to Action Strategies

Supported by the NASA Earth Science Directorate



In this Working Group (WG), delegates were informed about NASA's plans for implementing Earth Science to action strategies and provided feedback on these plans towards expanding the use of NASA's earth science infrastructure and observational data products. Delegates identified stakeholders of Earth observations (EO) at local, regional, and global scales and discussed potential strategies for NASA and established and emerging space nation roles in accelerating the expansion of EO use by non-traditional and underrepresented entities (general public, farmers, etc...).

In WG session 1, delegates were divided into subgroups representative of major regions (Europe, Africa, Middle East, Americas, and Asia-Pacific) and tasked to address focus questions 1 and 2. In WG session 2, each region provided a brief summary of their results to the entire group. In WG sessions 3 and 4, new groups were created through random assignment for a global perspective discussion to address the remaining questions and prepare for SGC-wide presentation. In each session, delegates discussed technical, policy, economic, and social approaches to increase participation of non-traditional and underrepresented entities in the use of Earth science.

Delegates engaged in enthusiastic, creative, and thoughtful discussion with conversations often continuing outside WG sessions. Common themes of proposed solutions include increasing sustainable capacity building and awareness; aligning national and local agendas and demonstrating value (if possible, through income generation) of EO observations; and leveraging and supporting local space leaders (government, start-ups, or universities).



Subject Matter Experts



Kate Becker | Executive
Officer, Earth Science Division
at **NASA HQ**



Nicole Hermann | Program
Executive, Earth Science Division
at **NASA HQ**



Moderator

Fiorella Arias Bonilla | Lead
Strategist at **Orbital Space
Technologies**



Rapporteur

Mary Angelique Demetillo |
Post-doctoral Researcher at
NASA LaRC



Working Group Statistics

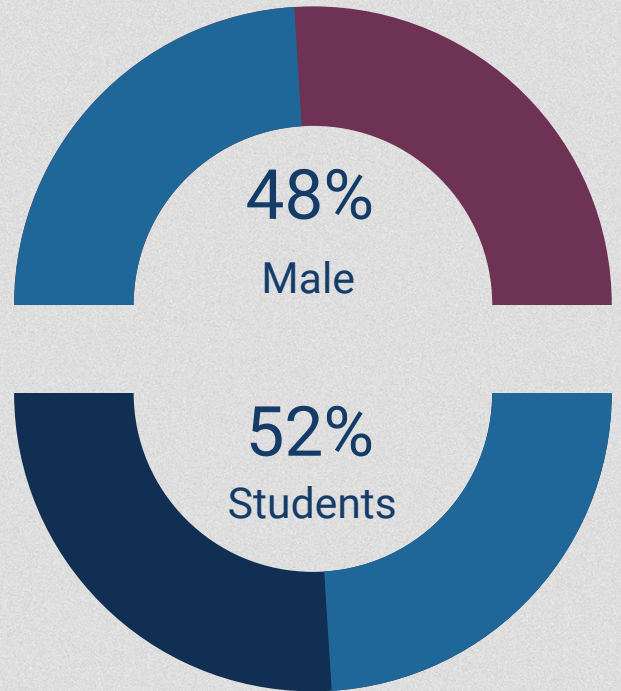
Working Group participants comprised:



Delegates



Nationalities





Main Objectives

Inform the Working Group members about NASA's Earth science to action strategies in the context of global efforts of relevant organizations.

Generate informed feedback from the Working Group members including identifying novel ways of increasing collaboration with both traditional partners in government and non-traditional parties in the space industry in a way that is meaningful and sustainable to accomplish the goals of NASA's Earth science to action strategies.

Inspire members of the Earth science community to see themselves as vital participants in the Earth science to action strategy endeavor.

Guiding Questions

How can established and emerging space nations contribute to Earth science to action strategies in meaningful ways?

We note that established space nations (EsSN) are better positioned to assist in infrastructure and framework development of a sustainable Earth science to action strategy. We recognize emerging space nations (EmSN) can introduce new discovery and innovation in Earth science to action strategies as upcoming talent in the industry.

What are the obstacles for emerging and established space nations to implement Earth science to action strategies?

We identified the common obstacle across EmSN represented in our group to be lack of infrastructure. While there may be scattered interest across sectors (e.g. private vs academia vs government agencies), Earth science to action (EStA) strategies are limited by lack of awareness of data availability and utility and support for research. EmSN non-traditional end-users (farmers, general public) require demonstrated value of EStA prior to repositioning priorities from established profit generating work to investment in learning new methodology and tools. In EsSN, main obstacles identified are lack of awareness and current market for EStA are limited to research use.



How can NASA engage non-traditional partners in implementing the Earth science to action strategies?

We believe NASA is uniquely positioned to consolidate Earth Observations (EO) and upcoming cloud platform to house “playgrounds” of application development for wider-use of EO towards EStA. Combining cutting-edge technology (Artificial Intelligence techniques, Augmented Reality applications, Virtual Reality demonstrations) with the NASA brand, for example, “NASA-GPT,” can bridge the existing technical gap in non-traditional users and expand stakeholders to the general public. To be more sustainable in EmSN, EStA strategies and EO applications need to be profit generating.

How will the Earth science to action strategy need to evolve over time, and how can long-term sustainability and enhancement of capability both contribute to, and benefit from, research programs?

EStA strategies will need to eventually create and maintain a network of EO-user leaders across space nations to stay relevant. Each use-case will be dictated by the needs of each nation while infrastructure and training assistance from NASA specific to local users will ensure continued viability of space products. Research programs may be a potential avenue for sustainability if it includes training of local end users with the goal of independent analysis and application. This is a potential avenue for countries where academia has funding and/or government backing for earth science research. This same framework can be translated to start-ups if they are the existing space leader in the nation which may be the case for nations without

How do the goals/objectives of the Earth science to action strategies align with other global efforts?

In the represented EsSN, we find NASA’s EStA strategies currently align with global efforts to mitigate climate change impacts (especially early warning and forecasting). In represented EmSN, NASA’s EStA strategies broadly align with efforts but would be better aligned with country-specific use-cases. NASA’s strategy to leverage partnerships and co-develop tools are key to ensuring EO-use sustainability at the global level.



Recommendations

Recommendations to the Space Generation Advisory Council and UN COPUOS

- WG2 recommends UN COPUOS develop an international policy/agreement on the usage, commercialization, and rights of Earth observations such that all available data useful for mitigating climate-related impacts such as disasters be widely accessible.
- WG2 finds the UN COPUOS to be uniquely positioned to lead more cross-sector (private, public, academic) capacity-building initiatives in emerging space nations through country-specific profit-generating uses of Earth observations.
- WG2 suggests that SGAC encourages more technological innovation biased towards bridging capacity-building for specialized and highly practical skills between established and emerging space nations.

Recommendations to the sponsor/partner and industry at large

- WG2 recommends NASA/the industry develop locally sustainable end-to-end initiatives (data processing to tool and program development) to increase awareness of and capacity building in using available Earth Science observations in partnership with emerging space nations. WG2 recommends Earth Science and NASA observation centered education programs for elementary and high school students.
- WG2 strongly recommends NASA support the development of a simple user interface with cutting-edge technology (e.g. LLM AI) aimed at widening the access station of earth observations to include non-traditional, non-technical end-users.
- WG2 encourages the industry to widen the public perception of space (and Space Science communication) from exploration to Earth-focused utility especially through climate-relevant initiatives across private, public, and academic sectors.
- WG2 commends ongoing NASA initiatives such as ARSET and TOPS that highlight open data and training. WG2 encourages NASA to build upon those existing initiatives and include other languages and encourage Earth Sciences be deliberately incorporated in elementary and high school curricula.



Working Group 3: The Role of Space Agencies in the NewSpace Era

Supported by the UK Space Agency



The space sector has been increasingly moving from specialised activity within the domain of superpowers and large industrial conglomerates and corporations to a more democratised and accessible undertaking. The spur of new actors, both public and private, as well as emerging space countries, creates a new impetus for space agencies and governments as key space sector enablers.

The emergence of private space participants has major implications for the incumbents of the space industry, especially for traditional space agencies. While NewSpace is primarily driven by commercial entities, space agencies continue to play a crucial part in supporting and regulating this sector. Hosted by the UK Space Agency, this working group explored various ways in which space agencies should be participating in the space ecosystem with the presence of new actors in the industry.



Subject Matter Experts



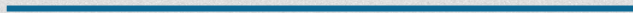
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Eva Georgiou | International Relations Manager at **UK Space Agency**



Dr. Sarah-Jane Gill | Head of International Relations at **UK Space Agency**



Moderator

Daniel Wischert | Space Systems Engineer at **European Space Agency**



Rapporteur

Lindsey Wisner | Astrophysics PhD Candidate at **Arizona State University**



Working Group Statistics

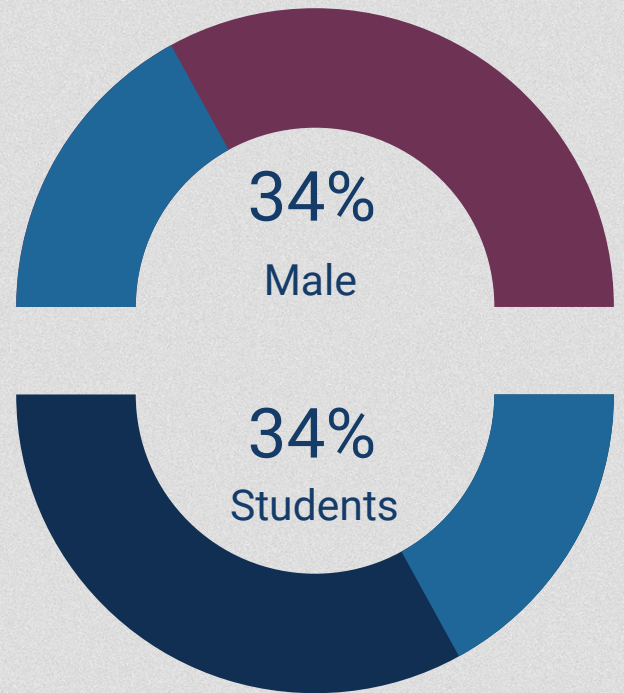
Working Group participants comprised:

23

Delegates

18

Nationalities





Main Objectives

Presentation of key points discussed and recommendations in the form of a panel discussion

A report detailing the discussions of the key focus areas, recommendations and clear actions from the working group on their recommendations of how the role of space agencies can be revolutionized in NewSpace.

The findings from this working group should also allow for participants to be able to take these recommendations in their countries to influence their national space ecosystem.

Guiding Questions

Regulating and Licensing: How can agencies establish and enforce regulations to ensure the safety and security of space activities? What important areas need to be addressed with new players in space (e.g. ambiguity in OST, space sustainability)

UKSA should provide not only incentives for companies to follow agency/industry standards, but also enforcement when there are implications for safety, security, and the environment. Environmental concerns should apply to both Earth and Space, and includes manufacturing, launch, in space operations, and disposal.

UKSA should continue hosting technical interchange meetings to discuss incentives/regulation/licensing/enforcement mechanisms. Private actors should not define regulation, but they can/should advise. UKSA should share this system and best-practices with other nations, encouraging international feedback from nations and companies to build consistency between nations.



Safety and Standards: Discuss how space agencies should work together to establish safety guidelines and standards for private companies involved in NewSpace.

UKSA should continue to develop a standardised process, with industry, to develop best practices, standards and metrics, which can be shared internationally with continuous feedback. UKSA should provide incentives for adoption and understand disincentives. UKSA should facilitate flexibility in standards so as not compromise on speed of innovation. UKSA should maintain a single source of information for requirements and standards for the industry/research community.

Technology Research and Development: What type of research and development activities should we invest in to technologically advance? What principles should the UK Space Agency follow to develop a sustainable space economy?

UKSA should continue enabling R&D infrastructure. For example, with testing facilities, data architectures, and space business clusters. UKSA should enhance access to data, software, and user-friendly resources. Space agencies should be encouraged to share intellectual property. UKSA should promote publishing of industry/research technology and prioritize cross-sector technology transfer potential. Policy Think Tanks should be established to address future regulatory and skill requirements.

Education and Outreach: Discuss the importance of space agencies in the promotion of public awareness and education about space exploration and the NewSpace sector. What ways can space agencies can bring more awareness of space and make space more meaningful to younger generations?

UKSA should continue to develop engaging space awareness campaigns for the general population. Short-term: Target cross-sector downstream applications and users for eco-social benefits. Long-term: Develop passive brand awareness by placing space and its benefits in the public periphery.

UKSA should incorporate space specific teaching objectives within the national curriculum. Short-term: develop accredited teacher professional development training and a UKSA-led career portal. Long-term: develop a custom platform utilising AI technology for the development of student requirements/interest specific learning for practical driven education.



Recommendations

Recommendations to the Space Generation Advisory Council and UN COPUOS

- The UN should encourage national enforceable regulation for space activities with potential for harm, including risks to safety, security, and the environments of both Earth and space.
- The UN should encourage technical and policy interchange between nations to learn from each other and progress towards effective and equitable national regulatory systems on New Space.
- The UN or nations should develop a global or national fund to support environmental/sustainability best practices of emerging space actors. Through this fund, established actors will help to financially support emerging ones.
- The UN and nations should develop campaigns showcasing people from diverse backgrounds pursuing careers in space. Take inspiration from existing campaigns in the UK.

Recommendations to the sponsor/partner and industry at large

- Space agencies should host meetings with industry and government to define national standards, best-practices, regulation, and enforcement mechanisms. Governments should ultimately determine regulation, but with industry input and while keeping industry informed on reasoning.
- Space agencies should maintain a single public source containing information on requirements and standards in the space sector.
- Space agencies should enable R&D infrastructure through mechanisms such as: providing accessible testing facilities, software tools, access to data, user-friendly resources, and space business clusters where industry and other space actors can benefit from a strong local space community .
- Space agencies should incorporate space specific teaching objectives within the national curriculum. For example: Develop an accredited teacher professional development training. Develop a platform for individualised (via AI technology) and practical driven education showing how space influences everyday activities. Manage and support space clubs/societies at universities without space educational programs.
- Space agencies should incentivise those submitting funding proposals to support the education and outreach initiatives. For example, include interns or outreach projects within the budget.



Working Group 4: NewSpace Revolution

Supported by the Space Generation Advisory Council



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WG4 split into three groups to discuss subtopics within the theme of the “New Space Revolution”: How can we build a global ecosystem for space startups, what are the investment trends and sectoral interests for this, and how can we support start-ups and the challenges that they face?

The first group included key discussions were about why we need a global ecosystem, comparing space to the aviation industry to identify which factors made this similar sector successful, outlining specific challenges and differences that startups in emerging nations face, as well as analysing and proposing optimisations of the “Handbook for Space Capability Development” (R. Croshier). The second team analysed how investments shifted from being purely governmental to also involving commercial programs and looked at downstream, upstream, and the end user sector. Technology push (applications) and user demand (pull) were distinguished. In the third group, the specific challenges that startups face in the current New Space Revolution were identified and ideas were discussed, how these challenges can be addressed by the different players in the sector.

Working Group 4 discussions were structured along the following leading question: What should the ideal entire lifecycle and ecosystem of the space economy, including manufacturing, ground and launch segment, startups and end-user services look like?



Subject Matter Experts



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Robin Pradal | Senior Manager at **PwC**



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Working Group Statistics

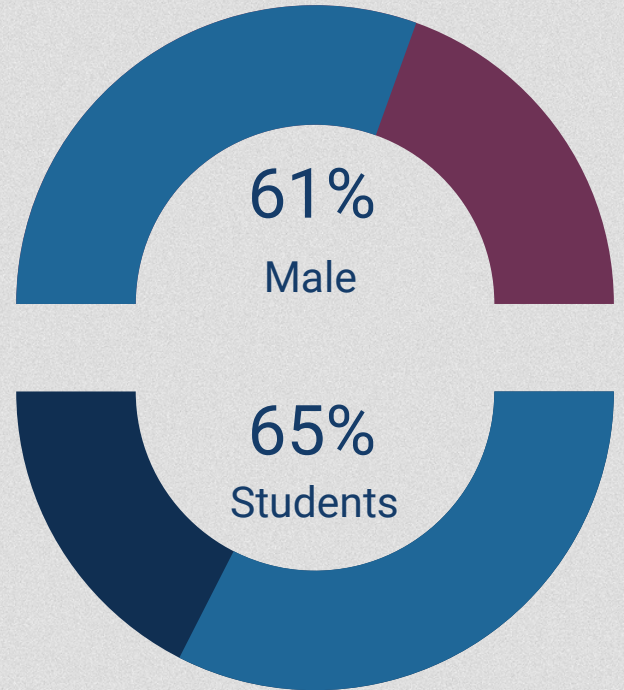
Working Group participants comprised:

23

Delegates

17

Nationalities





Main Objectives

Ensure that investors all over the globe can identify which segments of the space industry are particularly of interest to investors.

Should provide insight into what the recent investment trends in the space industry are, and what the challenges faced by space startups are and what can stakeholders in the industry do to provide support in overcoming these. Of particular interest is also capturing the methodology by which the analysis is conducted.

Find insights that unlock the potential of investors by capturing R&D value of space startups to every investor in space technology and space development across the globe.

Guiding Questions

How can we build an ecosystem of space startups to serve countries' space projects and plans?

We should leverage the untapped potential of space industries in society, create awareness of space benefits among civil society, address the geopolitical divide: use resources efficiently, enhance the governmental support for space activities with inclusive world agreements, and create fair access to markets to level the playing field.

Which sector of the space industry is particularly of interest to investors and what are the recent investment trends in the space industry?

There have been a lot of investments into the upstream segment, but today it appears like a saturated market with established players. Mid-stream with e.g., commercial earth observation and communications is well established with still some open opportunities. Currently, the end-user domain is most interesting to investors as this is where most opportunities are (the opportunities span into different sectors: energy, infrastructure, agriculture, marine, defence and security, location-based services, etc.)



What are the challenges faced by space startups and what can stakeholders in the industry do to offer support?

Challenges are that venture capitalists are mainly looking for short term investment, that clients may need to take risks with the startup, that entrepreneurship is not taught enough, that some nations restrict workers by nationality, and that secrecy leads to redundant efforts. Further challenges are the high cost of entry along with high salaries to retain talent hinder the success of startups and the loss/lack of knowledge/skill transfer between academia and industry.

Support can be provided by creating a collaborative ecosystem and strong network between academia-industry, space-end user, innovators-investors and startups-startups. Also, provide education on technology and specific knowhow.

Recommendations

Recommendations to the Space Generation Advisory Council and UN COPUOS

- Startup founders should focus their efforts in their respective competitive advantage, downstream applications or upstream.
 - This is because the global space value chain is continually transitioning from a traditional upstream-driven technology push (upstream creates assets to be exploited by the downstream market) into a market-demand pull (downstream drives space systems development with needs for new services).
- UN Space Representatives should establish a 'UN Space Representative Knowledge Transfer Initiative'.
 - The goal is to empower government-appointed space representatives with specialised knowledge. Through focused workshops within the United Nations, these representatives will leverage their expertise to advise their governments, tailoring space policies for specific socio-economic contexts, thus promoting global cooperation in space activities.
- We recommend that local space agencies or government authorities create an enabling network and database to support an ideal space ecosystem.
 - In such a network, startups shall be guided through a process for fast adaptation to their local requirements and challenges. This platform shall catalyse knowledge transfer and education on technology and space capabilities and connect all relevant entities of the space ecosystem.



Working Group 5: Harmonizing Airspace, Land, and Maritime Protection from Space Vehicle Reentry Risks

SGAC Special Track



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The recent development of mega-constellations and frequent rocket launches is leading to an increase in the number of space vehicles and debris re-entering back into the Earth's atmosphere from space, thereby creating hazards in airspace and landing intact on populated landmasses and waterways in some cases. Extensive international coordination with both private and public entities is needed to integrate and enable these space launches and reentries to occur safely and sustainably, especially for people here on Earth. This issue cuts at the core of space safety and sustainability since the space environment is an international domain which requires responsible, collaborative efforts from all nations to ensure it remains equally accessible and beneficial to all. This working group examined some technical aspects of space vehicle reentry risks and hazards, existing laws, policies, and safety regulations, and recommended frameworks for enabling greater international coordination. Developing the frameworks to harmonize airspace, land, and maritime protection from space vehicle reentry risks will require international collaboration across all nations and domains.



Subject Matter Experts



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Moderator



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Rapporteur



Working Group Statistics

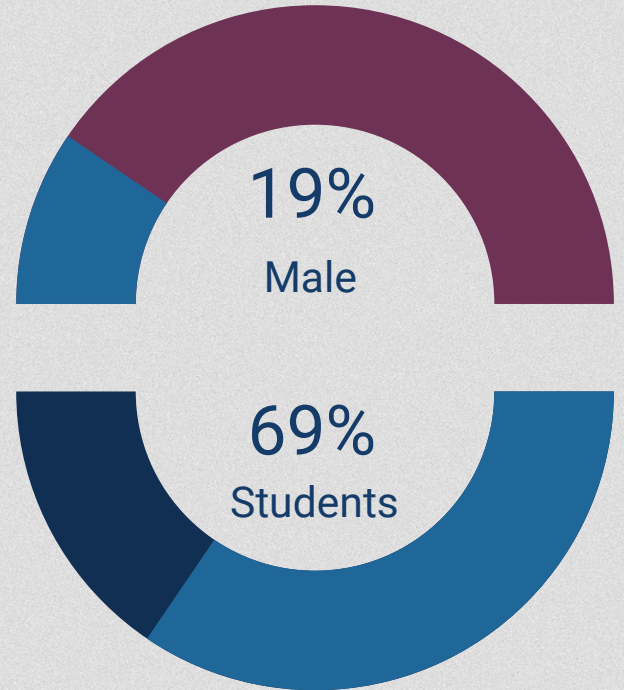
Working Group participants comprised:

19

Delegates

11

Nationalities





Main Objectives

Examine some technical aspects of space vehicle reentry risks and hazards, existing laws, policies, and safety regulations

Learn about the current state of re-entry risks and hazards, existing laws, policies, and safety regulations

Recommend frameworks for enabling greater international coordination in re-entry safety measures

Guiding Questions

Can we examine hazards from space vehicle re-entries and review the current state of global actors (public and private) contributing to airspace, land, and maritime protection from these hazards?

Is there a way to propose a framework for harmonising protection through international collaboration?

What mitigation strategies can we propose for space operators?



Recommendations

Recommendations to the Space Generation Advisory Council and UN COPUOS

- We recommend that UNOOSA and member states to incentivise new companies to implement space body controllability in orbit until end of life, controlled re-entry, and contingencies for re-entry including design for demise.
- We recommend that UNOOSA and member states to incentivise research towards Technology Readiness Level progression and higher safety standards for design for demise. Additionally, we recommend increased research in understanding the climate effects of re-entering space objects in the upper atmosphere.
- We recommend that UNOOSA and member states to define orbital object re-entry risk levels for maritime, aerospace, and ground space, and create corresponding safety response guidelines for authoritative bodies in these domains. We recommend UNOOSA to encourage rapid and open communication about potential re-entry risks to affected States.
- We recommend that UNOOSA and member states to direct the states to incentivise their insurance policy based on the companies' readiness in the guidelines proposed in point one.



Organising Team



Marcos Eduardo Rojas Ramirez - Event Manager

Marcos is an Associate Systems, Product and PLM Engineer working at Capgemini in Toulouse, France. He currently supports Airbus on the development and implementation of their Model-Based Systems Engineering (MBSE) activities. He has a master of science in aerospace engineering, specializing in space systems engineering. He previously

worked for the French Space Agency (CNES) and the french engineering school ISAE SUPAERO gaining experience as a space systems engineer and researcher in various technical areas concerning space exploration and human spaceflight. In 2021, Marcos was recognized as one of 25 Emerging Space Leaders by the International Astronautical Federation (IAF) at the International Astronautical Congress (IAC) held in Dubai, UAE.



Alessandra Vernile - Deputy Event Manager

Alessandra is a young professional with a background in International Relations, Intelligence, and Space Policy. Alessandra took her first steps in the space sector in 2015, joining the European Space Agency (ESA) Strategy Department in Paris with a focus on Member States' space policy developments. In 2016, Alessandra was the recipient of

the ASI-SIOI fellowship, bringing her to Vienna to work at the European Space Policy Institute (ESPI). There she investigated the role of private actors in the space sector and had the opportunity of learning more about the contribution of space technology to SDGs. Currently, Alessandra works full-time at Eurisy, facilitating the uptake of satellite-based solutions by societal actors. Since 2021, Alessandra has been a member of the IAF EO Technical Committee and is part of the organizing committee of the IAF Launchpad Mentorship Initiative. Within the Space Generation Advisory Council (SGAC), Alessandra served as Project Groups Coordinator between 2018 and 2022. She is now SGC Deputy Manager for 2023 in Baku.



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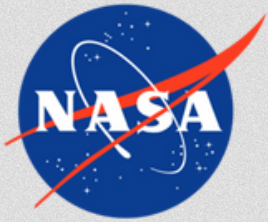
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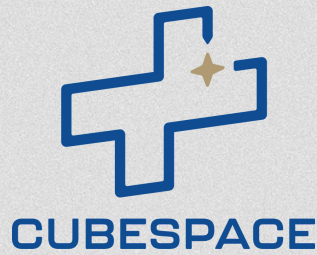
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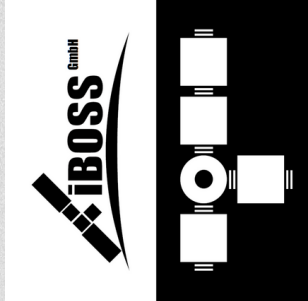


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