Event Report

4th African Space Generation Workshop

"A United Africa for Space Innovation: A Step Towards Our Common Future"

Accra | Ghana
25th – 26th February, 2021

SPACE GENERATION ADVISORY COUNCIL

SPACE GENERATION
ADVISORY COUNCIL

In support of the United Nations programme on Space Applications

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INTRODUCTORY REMARKS

Event Overview

The 4th African Space Generation Workshop (AF-SGW) was a two-day regional workshop held in February 2021, bringing students and young professionals together with agencies and industry representatives from across the African continent. It provided an unparalleled opportunity for the future leaders of Africa's space endeavours to proactively establish strong relationships, exchange ideas and knowledge, and collaborate on brainstorming new ideas and solutions using space technology for the benefit of Africa.
The event took place from 25 February, 2021 (Thursday) to 26 February, 2021 (Friday). The theme for this African Space Generation Workshop (AF-SGW) was "**A United Africa for Space Innovation: A Step Towards Our Common Future**".

During the workshop, the 136 delegates from 27 nations interacted in five working groups to collaborate on the challenges of the African space sector.


Recording
LIVE
on YouTube
View
Jones
Miguel Bello
Yusuf S
Josiah Fanyi Ng
Peter Onubi
Timiebi Aganaba
Derlson N'Goma
Nancy Julianna...
Tolani Oladipo
odulana oluwato...
Bernard Foing
Raman Pandey
Victor Hertel
From Kiguru Caroline Wangui to Everyone
heloooo
Tumo Fortunate ...
KUHAMBA Kudz...
Unmute
Start Video
Participants
Chat
Share Screen
Record
Reactions
Leave

Foreword from the Executive Office

Welcome to the 4th African Space Generation Workshop! Whether this is your first SGAC event or you are one of our more experienced delegates, we heartily welcome you to Ghana!

Unfortunately, this year's space generation workshop is happening in unprecedented times with an evolving pandemic. Despite these inconveniences, the 4th AF-SGW organising team has organised a hybrid event that accommodates almost the delegate pool from all around the continent and the rest of the globe, with world-class speakers, working group sessions, and vast networking opportunities for delegates.

We hope that you will learn and build your career in the space sector through the opportunities offered in the workshop either virtually or in person in Ghana.

We wish you a wonderful time with the 4th AF-SGW and remember to enjoy every bit of it!

Ad Astra,

Arnau Pons,
SGAC Co-chair

Harriet Brettle,
SGAC Co-chair

Davide Petrillo,
SGAC Executive Director

Arnau Pons
SGAC Co-Chair

Harriet Brettle
SGAC Co-Chair

Davide Petrillo
SGAC Executive Director

Foreword from the Event Managers

Dear 4th AF-SGW Delegates,

On behalf of the 4th African Space Generation Workshop organising team, we are pleased to welcome you to Ghana for the 4th AF-SGW. The two-day regional workshop will bring together students, young professionals, and industry experts to discuss a wide range of topics in space in relation to the African continent. Participants will be able to interact with their peers, subject matter experts, space agencies representatives, and more through working group discussions, panel sessions, and keynotes.

Through AF-SGW, SGAC aims to inspire the present and future workforce, provide a platform for networking, and allow you the opportunity to have your opinions and ideas heard on an international platform. The discussions and recommendations from two days at the AF-SGW will be presented at the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) sub-committee meeting.

The Organising Team has been working around the clock to make the 4th AF-SGW happen despite the extenuating circumstances due to the pandemic. We would like to thank our sponsors, speakers, and partners, whose utmost support and appreciation of the 4th AF-SGW kept us going forward.

We hope that you will join us either virtually or in-person in Accra, Ghana!

Cheers,

Kingsley Ahenkora-Duodu
Event Manager

Charles-aimé Nzeussi Mbou
Deputy Event Manager

Kingsley Ahenkora -Duodu,
Event Manager

Charles-aimé Nzeussi Mbouendeu,
Deputy Event Manager

Programme

DAY 01 - Thursday, 25th February 2021		
08:00-09:00	Door Open & Registration	Transfer to venue/Arrival of delegates
TIME	**SESSION**	**MODERATOR**
09:00-09:30	Opening Ceremony - Welcome Message: - Davide Petrillo (Executive Director SGAC) - Rania Toukebri and Ilias Tanouti (Regional Coordinators SGAC Africa) - Kingsley Ahenkoara-Duodu (4th AF-SGW Event Manager) - Professor Samuel Dampare (Ghana Space Science & Technology Institute) - Dr S K Frimpong (Office of the Vice President - Economic Advisor to the Vice President of Ghana)	Kingsley Ahenkoara-Duodu (4th AF-SGW Event Manager, PhD researcher - University of Leeds)
09:30-10:30	Opening Ceremony - Keynote Addresses: - Dr Mahama Ouedraogo (Director Human Resources Science & Technology, African Union Commission, AUC) Juan de Dalmau (President, International Space University, ISU) - Dr Miguel Belló Mora (CEO, Atlantic International Research Centre) - Ricardo Conde (President, Portuguese Space Agency) - Prof Melvin Hoare (Development in Africa with Radio Astronomy, DARA - University of Leeds) - Dr Timiebi U. Aganaba-Jeanty (Arizona State University, ASU) - Peter Martinez (Executive Director, Secure World Foundation, SWF)	Charles Nzeussi (4th AF-SGW Deputy Event Manager)
10:30-11:00	Official AF-SGW21 Workshop Picture & Coffee Break (Exhibition)	

11:00-12:00	Panel Discussion 1: Directors of the Space Agencies - Regional Collaboration through Space: - Zolana João (National Space Program Management Office - Angola) - Mohammed el Quosy (Egyptian Space Agency - Egypt) - Valanathan Munsami (South African National Space Agency - South Africa) - Francis Chizea (National Space Research and Development Agency, NASRDA - Nigeria) - Yeshurun Alemayehu Adde (Ethiopian Space Science & Technology Institute - Ethiopia) - Samuel Dampare (Ghana Space Science & Technology Institute - Ghana)	Meshack Kinyua (African Union Commission, AUC)
12:00-13:00	Lunch	
13:00-14:00	Presentations 1 - All About Space in Africa 1 - Dr Agnieszka Łukaszczyk - Britt Duffy Adkins (Celestial Citizen) - Dr Nana Ama Browne Klutse (University of Ghana) - Enrico Dal Farra (United National Development Programme) - Space Hero - Deborah Sass & Thomas Reemer - Luciano Giesso	Ernest Teye Martey (All Nations University)
14:00-14:45	Panel Discussion 2: Industry Trends in International Space Collaboration - Tidiane Ouattara (Africa Union Commision)	Nelly-Helen Ebruka (Learnspace)

DAY 02 - Friday, 26th February 2021		
08:00-09:00	Transfer to venue	
TIME	**SESSION**	**MODERATOR**
09:00-10:00	Welcome address Presentations 1 - Space Education and Human Capital Development in Africa:	Joshua Kalognia (4th AF-SGW, Logistic team member)

	- Dr Mahama Ouedraogo (Director Human Resources Science & Technology, African Union Commission - Prof Melvin Hoare (Development in Africa with Radio Astronomy, DARA - University of Leeds) - Nassim Bovet (International Space University) - Dr Danielle Wood (MIT) - Dr Mthuthuzeli Zamxaka (SARAO)	
10:00-10:40	ALL ABOUT SPACE PRESENTATION - Prof Dr Alexandra R. Harrington (Centre for Global Governance and Emerging Law) - Dr Nadeem Oozer (Square Kilometre Array/SARAO) - Magda Cocco (Vieira de Almeida) - Wisdom Donkor (President, AODIRF) - Rania Toukebri (Ona Space)	Chidimma Oruche (4th AF-SGW PR & Comms)
10:40-11:00	Coffee Break & Exhibition	

	WG 1: Space Governance	WG 2: Space Business & Entrepreneurship in Africa	WG 3: Big Data and Astronomy	WG4: Space Applications and Technology to support the SDGs	W5: The role of Space Technology in a post Covid 19 Africa
11:00-13:00	Expert: Julia Selman-Ayetey (McGill University); Carolina Rego Costa (Portuguese Space Agency) Moderator: Helena Correia Mendonça (VdA) Rapporteur: Group Member	Expert: Thomas/Deborah (Space Hero); Aderonke Obafaye (CAR-NASRDA); Joan Alabart (Portuguese Space Agency) Moderator: Guido Schwartz (SARAO) Rapporteur: Group Member	Expert: Dr Nikhita Madhanpall; Marta Gonçalves (Portuguese Space Agency) Moderator: Dr Emmanuel Proven-Adzri (Ghana Space Science & Technology Institute) Rapporteur: Group Member	Expert: Agnes Kobusinge (EGNOS Africa Support Programme-Joint Programme Office (JPO)/ Dr Nana Ama Browne Klutse (University of Ghana); Monique Lagoute (Eurekâ Geo) Moderator: Dewald Lloyd (Aerospace Group)	Expert: Karunakaran (Hindustan Institute of Technology & Science) / Danielle Wood (MIT) Moderator: Carla Sharpe (SARAO) Rapporteur: Group Member

				Rapporteur: Group Member	
13:00-14:00	Lunch				
14:00-15:30	WG 1: Space Governance Expert: Julia Selman-Ayetey (McGill University); Carolina Rego Costa (Portuguese Space Agency)	WG2: Space Business & Entrepreneurship in Africa Expert: Thomas/Deborah (Space Hero); Aderonke Obafaye (CAR-NASRDA); Joan Alabart (Portuguese Space Agency)	WG 3: Big Data and Astronomy Expert: Dr Nikhita Madhanpall; Marta Gonçalves (Portuguese Space Agency)	WG4: Space Applications and Technology to support the SDGs Expert: Agnes Kobusinge (EGNOS Africa Support Programme-Joint Programme Office (JPO)/ Dr Nana Ama Browne Klutse (University of Ghana); Monique Lagoute (Eurekâ Geo)	W5: The role of Space Technology in a post-Covid 19 Africa Expert: Karunakaran (Hindustan Institute of Technology & Science) / Danielle Wood (MIT)

Invited Speakers

Dickson Adomako | Director of Ghana Space Science and Technology Institute

Rania Toukebri | Regional Coordinator at SGAC

Samuel Frimpong | Economic Advisor to the Vice President of Ghana

Iliass Tanouti | Regional Coordinator at SGAC

Davide Petrillo | Executive Director of SGAC

Mahama Ouedraogo | Director Human Resources and Technology at AUC

Juan de Dalmau | President at ISU

Timiebi Aganaba-Jeanty | Assistant Professor at Arizona State University

Miguel Mora | CEO at Atlantic International Research Centre

Zolana Joao | General Director of the National Space Program Management Office- Angola

Ricardo Conde | President of the Portuguese Space Agency

Mohammed Quosy | CEO of the Egyptian Space Agency

Dewald Lloyd | Business Development and Sale Manager at Aerospace Group

Carla Sharpe | Africa Programme Manager at SARAO

Allen Herbert | VP Business Development and Strategy at Nanoracks

Wisdom Donkor | President of AODIRF

Linzi Stirrup | Project Manager at DARA Big Data

Aderonke Obafaye | Scientific Officer at CAR-NASRDA

Bernard Foing | Director of Africa Moon Mars

Alexandra Harrington | Executive Director of Center for Global Governance and Emerging Law

Nassim Bovet | Head of Admissions and Alumni Affairs at ISU

Nadeem Oozer | National Outreach Coordinator at SARAO

Mthuthuzeli Zamxaka | Manager at SARAO

Magda Cocco | Partner of Vieira de Almeida

Melvin Hoare | Professor of Astrophysics at DARA-University of Leeds

Ahmed Farid | Spacecraft Operations Controller at Telespazio VEGA/ German Operations

Agnieszka Lukaszczyk | Senior Director at Planet Labs

Thomas Reemer | Founding Partner and Co-CEO of Space Hero

Valanathan Munsami | CEO of the South Africa National Space Agency

Yeshurun Adde | Deputy Director General of the Ethiopian Space Science and Technology Institute

Deborah Sass | Founding Partner of Space Hero

Luciano Glesso | Satellogic

Francis Chizea | Director General of the NASRDA Nigeria

Enrico Farra | Climate change and Energy Specialist at United Nations Development Programme

Britt Adkins | Founder of Celestial Citizen

Subject Matter Experts

Subject matter Expert

Subject matter Expert + Invited speaker

Susan Ip-Jewel | CEO of Mars-Moon Astronautics Academy and Research Sciences

Nikhita Madhanpal | DARA Big Data Fellow at the Portuguese Space Agency

Marta Gonçalves | Industrial and Projects Officer at the Portuguese Space Agency

Carolina Costa | Legal Adviser at the Portuguese Space Agency

Agnes Kobusinge | GNSS Operations Expert at EGNOS Africa Support Programme-Joint Programme Office

CS Karunakaran | Hindustan Institute of Technology and Science

Danielle Wood | Assistant Professor at MIT

Julia Selman-Ayetey | Lawyer, McGill University

Nana Klutse | Senior Lecturer at University of Ghana

Cultural Tour of Accra

The tour covered iconic places in Accra, the capital of Ghana (e.g., Independence Square, Black Star Square, Independence Arch, and the Arts Centre), as well as principal streets.

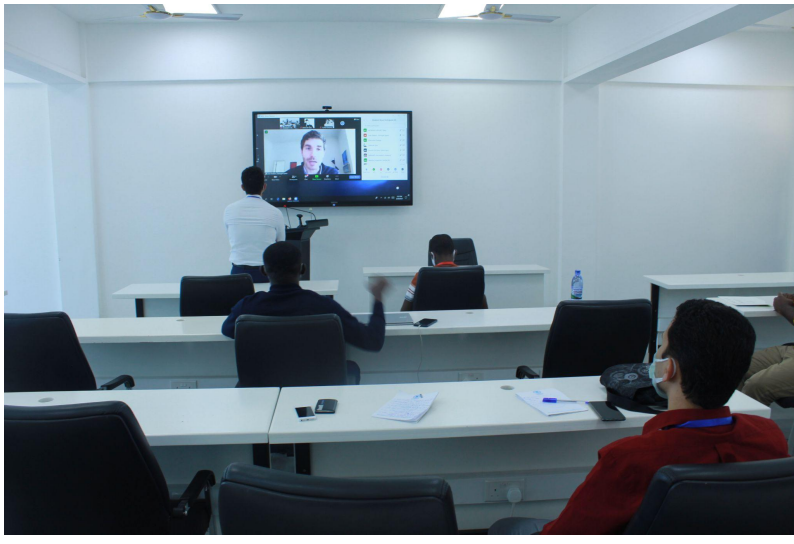
The Independence Arch

Gala Dinner

The Gala Dinner which took place at the +233 jazz bar and grill was a joyous, unforgettable occasion filled with Ghanaian cuisine and local music. People throughout Africa attended and received their certificates of participation from event managers. Members were very grateful to all sponsors and partners who helped make this event possible. They were also happy to see many of them attend the gala.

Event Pictures

Workshop Lunch

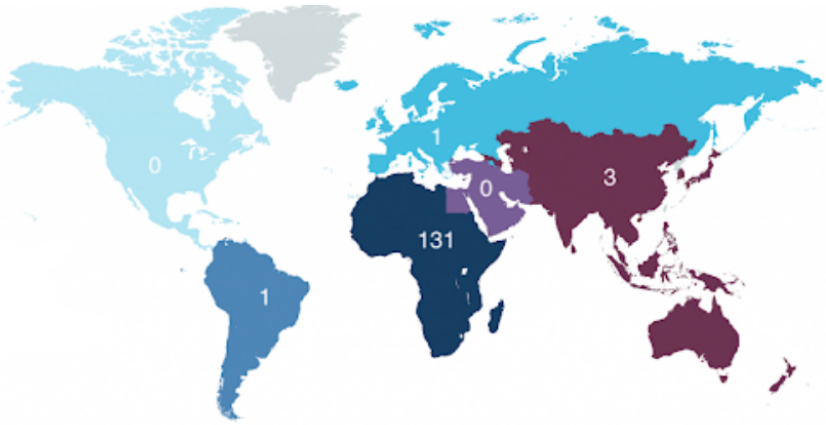


Working Groups in Action

Special Panel for the African Space Agencies's Directors

Media Interaction with AF-SGW

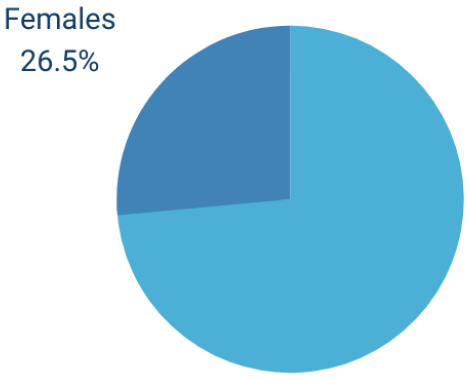
Event Statistics

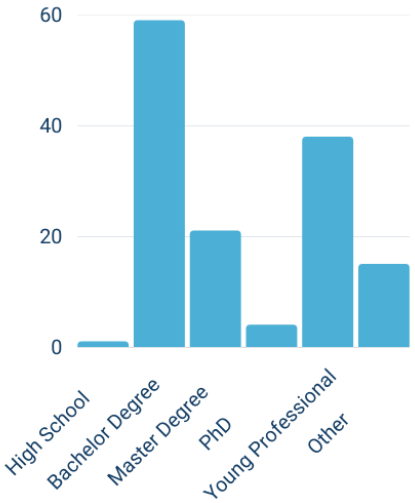


136 Delegates

27 Nationalities

5 Working Groups





Scholarships

36 sponsorships

20 sponsorships withdrawn

31 people in total

DARA Big Data - SGAC & Dara Big Data Hackathon

7

1.Andrews Dzodzomenyo
2.Blessing Osarumwense
3.Rutendo Hapiness Marandure
4.Tiwalade Aderemi
5.Raphael Arinze Okere
6.Vukile Ngubane
7.Emmanuel Ngonga

DARA

5

1.Charles Aimé Nzeussi Mbouendeu
2.Chidimma Oruche
3.Alimamy Conteh
4.Tafadzwa Banga
5.Eldridge Melo

SGAC - African Space Leader Award 2021

4

1.Ruvimbo Samanga
2.Damilola Oladeji
3.Nelly-Hellen Ebruka
4.Beza Zewdie

Sponsorship withdrawn due to COVID-19

5

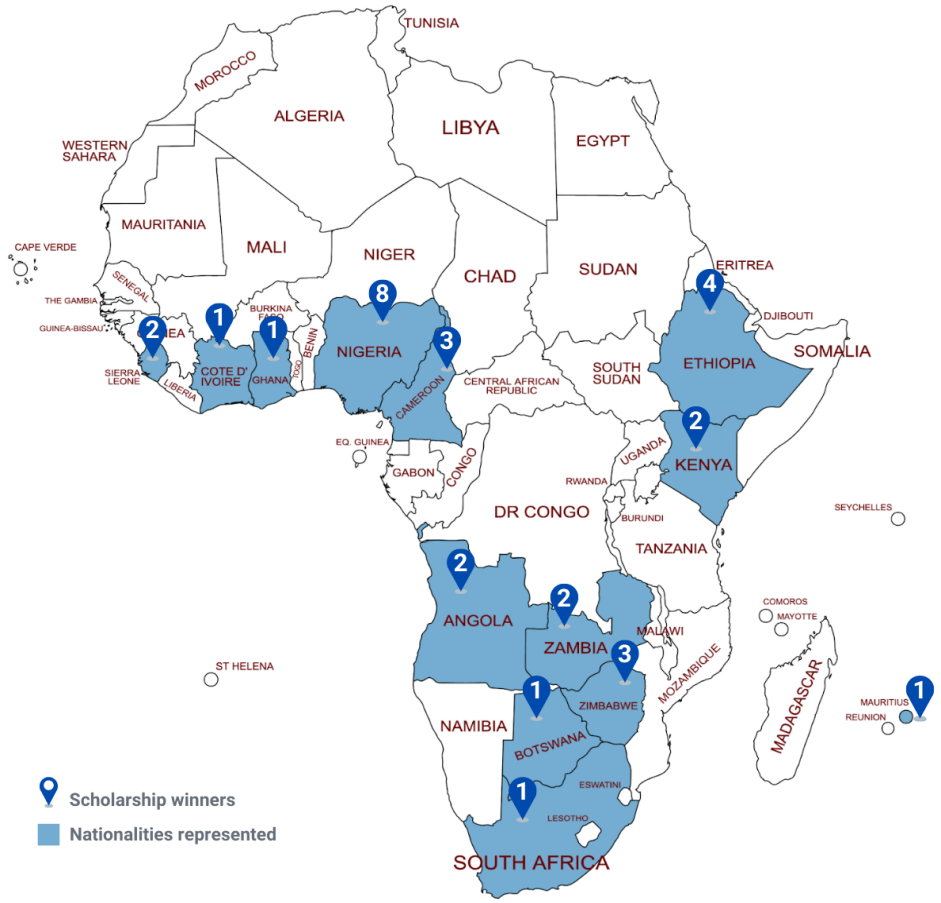
1.Tumo fortunate Kedumele
2.Seth Nyawacha
3.Paul Akumu
4.Mwiche Simpemba
5.Hansley Noruthun

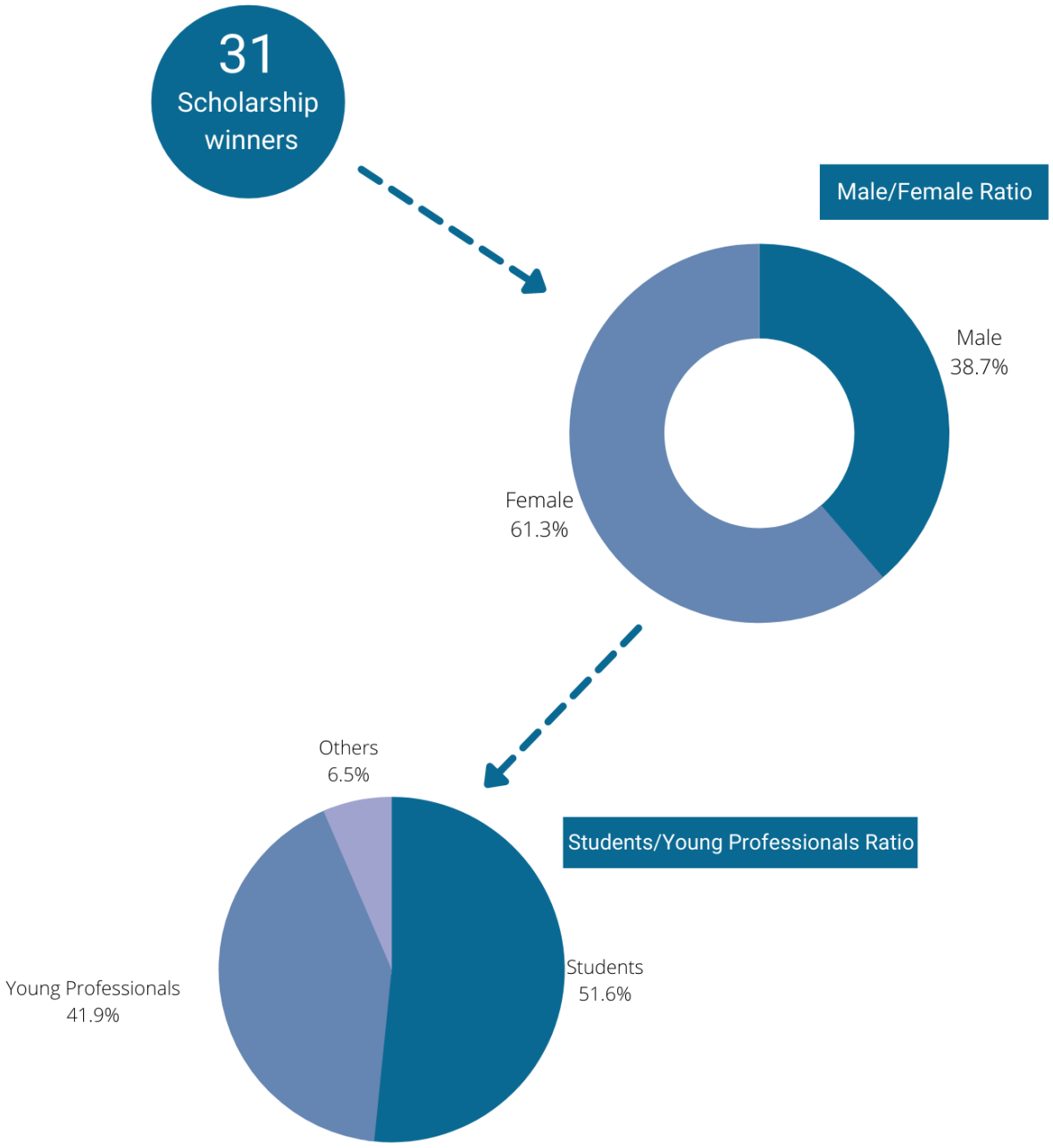
15

African Union Commission - Online Video Competition

1.Sissay Abate
2.Favour Posu
3.Charles Aimé Nzeussi Mbouendeu
4.Yves Emmanuel Nikoyo Emougou
5.Abdul Sesay
6. Abasiemediong Etuk
7. Gerard Allali
8. Asongfac Lily Rospeen
9. Derilson Gomes
10. Chidimma Oruche
11. Alimamy Conteh
12.Tafadzwa Banga
13. Eldridge Melo
14. Zemichael Gebeyehu
15. Tiwuld Zewdu

Scholorship Statistics




31
Scholarship winners
Male/Female Ratio
Male
38.7%
Female
61.3%
Others
6.5%
Students/Young Professionals Ratio
Young Professionals
41.9%
Students
51.6%

WORKING GROUPS

Working Group 1: Space Governance

Participants

Professor Timeibi Aganaba-Jeanty
Arizona State University

Julia Selman Ayetey
McGill University

Subject Matter Experts

Carolina Rego Costa
Portugal Space Agency

Helena Correia Mendonça
VdA

Moderators

Nelly-Helen Ebruka
SGAC

Rubby Aworka
SGAC

Rapporteurs

Description

Space is an arena for all. Therefore, clear guidelines are required to create a collaborative and effective use of space and its resources globally. Space governance is a broad term that defines acceptable activities in Outer Space. This working group holistically examined international best practices and treaties of space governance. Delegates discussed how these practices and guidelines should be adopted by African countries, as national and regional guidelines, to regulate space activities throughout the continent. The discussion also focused on ways of ensuring peaceful uses of space by Africa and strategies for maximising the benefits of space activities for Africans.

Using the provided case study as a premise, the following was addressed during the course of the Working Group deliberations:

1. Status of space law and policy in Africa
2. Challenges faced by African countries in contributing to this global endeavour of space governance.
3. Strategies for integrating space-faring countries in the African Space Agency, and what these countries' role will be based upon
4. The role of youths on the definition and development of Space Governance in Africa.

Main Objectives

1. Engage in discussions on the status of space governance in Africa
2. Identify the challenges of space governance in Africa in relation to the current applicable space laws and policies
3. Make recommendations towards the development of space governance in Africa

Questions

1. What is the status of space law and policy in Africa?
2. What are the challenges faced by African countries in contributing to the global endeavour of space governance?
3. Why should we integrate non-space faring countries into the African space agency?
4. Why should youths be involved in the development of space governance in Africa?
5. What are the roles of the youth in the definition and development of space governance in Africa?

Conclusions

Status of space law and policy in Africa

1. Africa is still in the early stages of instituting space law, since most African nations have yet to sign various space treaties and to create national space regulations. However, the few that have national space laws/regulations are Egypt, Nigeria and South Africa. These countries are important for leading

the implementation of an African Space Strategy and Policy. With regards to international space law, 53% of countries in Africa have either signed or ratified the Outer Space Treaty.

Challenges faced by African countries in contributing to the global endeavour of space governance

1. Lack of space industries, agencies or programs hence the seeming disinterest in issues of Space Governance
2. Inadequate institutional and capacity building frameworks in space
3. Inadequate funding for space research and technology
4. Lack of political will

Integrating non-space faring countries into the African Space Agency

1. The principle of common heritage is imperative (See Article 1 of the Outer Space treaty). The exploration and use of Outer Space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind. Countries may not have the upstream capability in terms of space but they are in one way or the other involved in space activities e.g. meteorology and climate, agriculture, health, earth observations etc.

Youths in the development of space governance in Africa

1. Representation - All parts of society must be included; part of youth empowerment.
2. Sustainability - To make a difference in the longer term, it is essential that young people are engaged in a formal space governance system.
3. A fresh perspective - Young people are more interested in issues like climate change, involving them in space governance can be beneficial.

Roles of the youth in the definition and development of space governance in Africa

1. Youths can amplify the voice to hold national governments accountable for space activities and spending on science, technology and innovation, for example, the African Youth Charter.
2. Youths can raise awareness and inspire the young generation to pursue a political space career, thereby building a strong space policy sector.

Recommendations

Recommendations to the Space Generation Advisory Council

1. The Space Governance Working Group of the 4th AF-SGW recommends that the Space Generation Advisory Council initiate a capacity building program for space governance under its space law and policy project group for both African and non-African youths interested in this sector to get involved.
2. The Working Group recognises the commendable work done by the Council in engaging African youths in the space industry by collaborating with the African Union and other entities. The Working

Group, therefore, encourages the council to continue to create platforms such as the AF-SGW to get more African youths involved in SGAC activities both virtually and physically, taking into consideration the peculiarities of the continent with regards to space.

Recommendations to the United Nations Office for Outer Space Affairs

1. The Working Group encourages the Member States of the committee from Africa and other continents to intensify support in encouraging both non-space-faring and space-faring African countries to develop a regulation to govern space affairs and to consider ratifying the fundamental space treaties recognised by nations of the world.
2. The Working Group recommends that the committee should through deliberations reach resolutions that will ensure the peaceful use of space within the boundaries of the current international law regime in the interest of member states with low space capabilities and the interest of humanity at large.

Recommendation to the Sponsor(s)/Partner(s) and/or the Industry at large

1. The Working Group urges all sponsors and partners of the 4th AF-SGW 2021, including stakeholders in the space industry, to continue to engage young people to enhance discussions bordering on space governance, regulations and policy, to help shape and secure the peaceful and beneficial use of space in posterity.
2. The Working Group commends all sponsors and partners for supporting the AF-SGW and thus encourages them to consider promoting space governance and its role in Africa by organising awareness programs relating to space governance topics.

Working Group 2: Space Business and Entrepreneurship in Africa

Participants

Description

Space business and entrepreneurship in Africa is a vital aspect of the growth of the economic sector in the continent which has a positive impact on socio-economic development across all sectors. The expert panel in the working group highlighted how important it is for the youth in Africa to take up the opportunities that space has to offer and use them to solve the problems in our communities. The global space industry is worth USD 385 billion, of which the African Industry is worth USD 7.37 billion and is expected to grow. So, it is imperative that youths in Africa play a role in taking up space activities that their impact can aid in the implementation of the sustainable development goals and, through that, establish sustainable businesses.

Main Objectives

1. Outline the requirements in establishing a space-related business
2. Identify the opportunities that are within the space industry in the African community
3. Identify the business aspect of any idea which can be transformed into a business

Questions

1. What is space business?
    a. The experts emphasised the need to understand space business. It is important for an entrepreneur to understand the nature of the business they are getting involved in. Space business is considered the application of downstream and upstream activities related to Research, Manufacturing, Operations and Applications and Services. The upstream focuses on space technologies such as space vehicles, satellites, etc. The downstream involves the use of information or resources that are derived from the upstream.
2. What is it to be an entrepreneur in the space industry?
    a. It is difficult for one to venture into the space business because understanding the first steps toward becoming an entrepreneur in the space industry is not readily apparent. Being an entrepreneur in the space industry is defined as such: firstly, by the problem, one is trying to solve through a business; secondly, through subject matter knowledge of the material; and lastly, by understanding the policies in one's country that govern these activities.
3. What are the available opportunities for entrepreneurs in the space business?
    a. There are a lot of opportunities available for venturing into a space business. The seventeen Sustainable Development Goals (SDGs) mean that seventeen opportunities have presented themselves - and more opportunities unveil themselves as we scrutinise each and every problem that is presented in the SDGs. Some of these opportunities include the use of satellites to provide solutions such as precision agriculture, disaster management, and resource management (minerals, water bodies, vegetation, etc.).
4. What is the business aspect in space?
    a. Space is not all about having fun exploring different planets or enjoying doing complex missions. Further dimensions in the space sector start with employment creation, and many secondary outcomes arise through the use of the technology developed, which has made an

impact in the communication sector and the medical field. Overall, the business aspect comes from successfully implementing an idea that provides a stream of revenue to the company and value to the end-user.

5. How to implement an idea as an entrepreneur in the space industry?
    a. Implementation of business ideas starts with clear research on the area of application and problem to be solved. This can be aided by outlying the benefit of space in various economic sectors to the policymakers (stakeholders' involvement). Above all, it is important to have a good support structure so that a team can successfully execute the idea.

Conclusions

1. For the past couple of years, there has been a boom in space businesses globally. The actual global context and increased interest in space technology to tackle not only pressing issues such as security, agriculture, environment and industries but also research and leisure have fostered the possibilities for entrepreneurs to venture in this industry that for most of the half of its existence has been deemed as restricted for government agencies and national security matters.
2. The last decade has witnessed the paradigm shift from government-dominated activities to the full commercialization and democratization of space. The commercialization and democratization of space have allowed for the rise of mega-constellations, a variety of rocket launch companies ranging from traditional product design approaches to more innovative such as the additive rocket manufacturing by Relativity Space.
3. The innovation of space policies and agreements has also proved to be a major driving factor for this commercialization and democratization of space.
4. Lastly, funding is the Achilles hills of any entrepreneur starting a business regardless of the industry, the industry has seen a boom in funding from governments and private sources such as venture capitals.

Recommendations

Recommendations to the Space Generation Advisory Council

1. Delegates for each breakout session need an overview of the likely topics and areas that will be discussed, as well as a set of expectations for delegates during and after the session. There was a lack of clarity with respect to expectations from delegates.
2. Organisers need to have a backup plan for resource persons for each breakout session, for the purpose of unforeseeable circumstances that may prevent the main resource person from showing up.
3. It is important to have experts who are quite versed with the specific topic in the working group.
4. There is a need to ensure gender balance amongst the delegates.

Recommendations to the United Nations Office for Outer Space Affairs

1. The inclusion of young professionals and students in UNOOSA will help nurture the next leaders in the space industry.
2. There is a need to have a panel of young professionals to discuss the success and challenges they encounter in the quest of contributing meaningfully to the global space sector.

Recommendation to the Sponsor(s)/Partner(s) and/or the Industry at large

1. Opportunities offered by sponsors should not come as an expense to delegates considering students
2. Engagement with academic institutions with SGAC members is important as it helps improve the engagement of students and young professionals in the space sector

Working Group 3: Big Data and Astronomy

Participants

Description

Since 3114 BC, when Mayan Astronomers first began creating almanacs, the astronomy sector has faced the challenge of managing an ever increasingly large amount of data. As telescope technology has evolved, so has the amount of data it produces, because wide-area and aperture telescope instruments led to ever more ambitious surveys of outer space. This has led us into the era of Big-Data and is now leading us into an era of Super-Massive Data. In order for Africa to prepare for this new era, have all the conditions for sustainable development of astronomy in Africa been met? Is Africa prepared to meet the global challenges imposed by big and super-massive data in astronomy? These are the questions this workshop aims to answer.

Main Objectives

1. Draft the road map for the development of the African Astronomy sector in the next 5 years, making sure it is aligned with African Space Strategy and worldwide astronomy stakeholders
2. Structure an Astronomy Dashboard platform and map the largest number of African astronomy institutions, infrastructure, and initiatives there so that it can be developed after the workshop, in order to give every African astronomical institution the possibility of tracking and interacting
3. Create a database that centralises all African astronomy activities, projects, infrastructure, articles and other related resources to foster collaboration of all the stakeholders, make this data easily available to everyone, and use the available data provided during the 4th AF-SGW to develop solutions for a specific African problem

Questions

1. Have all the conditions for sustainable development of astronomy in Africa been met?
2. Is Africa prepared to meet the global challenges presented by big and super-massive data in astronomy?

Conclusions

1. All the conditions for the sustainable development of astronomy in Africa have not been fully met. However, Africa has significantly grown over the past few years with more scientists and individuals becoming interested in astronomy, ensuring the inclusiveness of all genders in the field of astronomy. There have been many collaborations amongst scientists, organisations, and schools among others to help broaden the knowledge of astronomy in Africa. Despite this progress, a lot of development is still needed.
2. Africa is not yet fully prepared for the challenges posed by big and super-massive data in astronomy because of the lack of human resources in the field of astronomy, data processing and analysis, and a lack of collaboration amongst astronomers, statisticians, computer scientists, data scientists and information scientists. Collaboration amongst scientists will be a breakthrough for Africa in the big data era. African students and young professionals need to see the need for their skills in astronomy,

and there have to be more programs, conferences, workshops, schools, organisations to support and train young Africans in astronomical data processing with software tools and skills for data mining.

Recommendations

Recommendations to the Space Generation Advisory Council

1. Do more astronomy outreach to even the remotest parts of Africa
2. Encourage more women to participate in space field events
3. Encourage African countries and African space agencies to have a school or a university like the International Space University (ISU). If this happens, each country will send in students and contribute money towards the purpose of training human capacity for developing and sustaining astronomy in Africa.

Recommendations to the United Nations Office for Outer Space Affairs

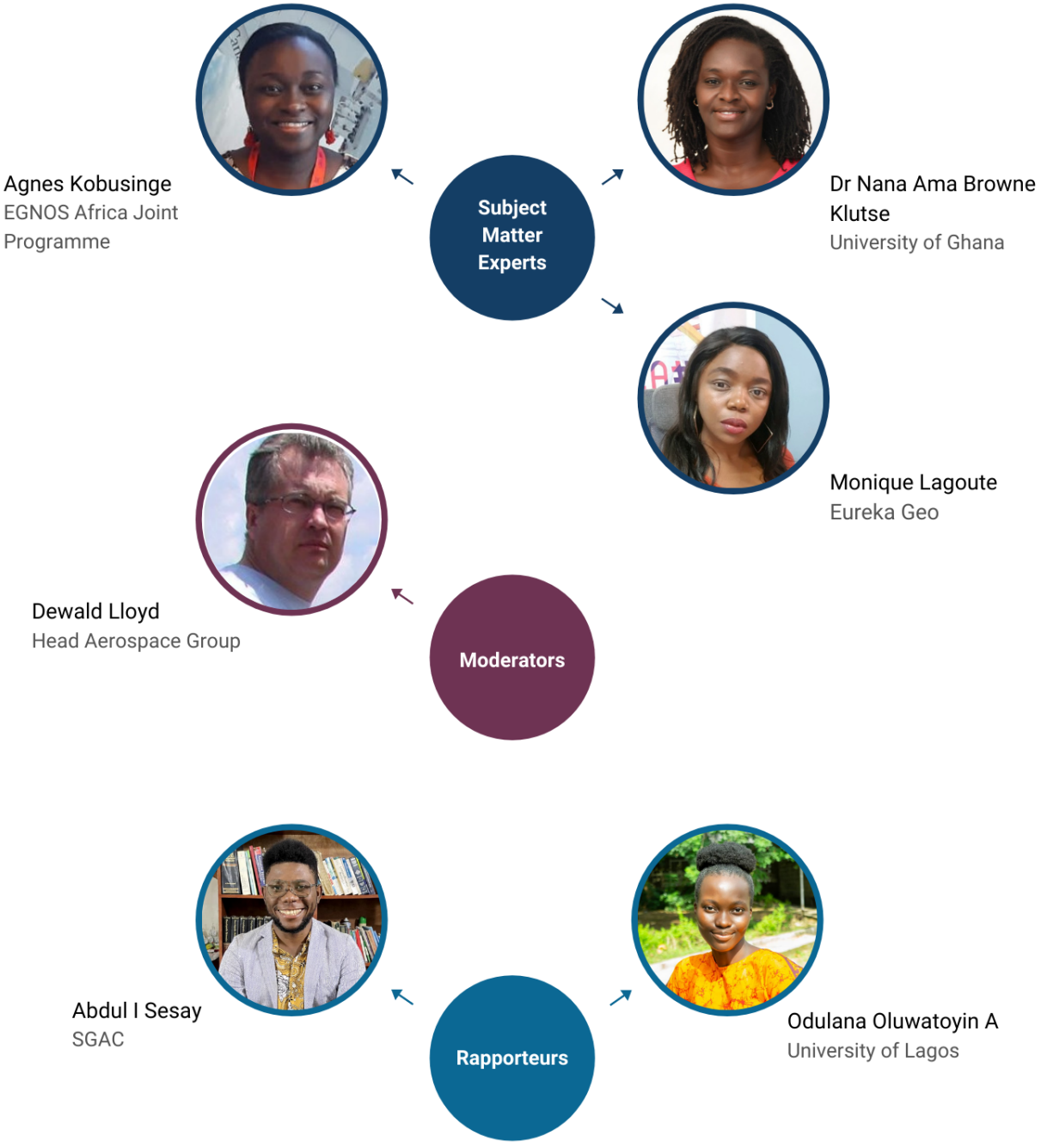
1. The UN should continue to promote the interest for space sciences, through STEM in primary schools, allowing children to associate what they learn in schools to their social environment.
2. The benefits of space technology, astronomy and big data should be inculcated into UN programmes for countries to appreciate the same.
3. Member countries where astronomy is least developed should be encouraged to include astronomy and space science as a university degree or school subject into their education curriculum.

Recommendation to the Sponsor(s)/Partner(s) and/or the Industry at large

1. The most pressing challenges in Africa and the wider world such as food security, health, illegal mining and timber trade, flooding, poaching and unauthorised settlement amongst others can be addressed by the tools and techniques of big data, astronomy and space technology, hence DARA BIG-DATA and industries with the same focus should build leverages between industry and young talents.
2. African space history is rich and currently contains a large number of assets, sufficient for the creation of the African Aerospace Museum, which would make education, research, and cultural activities more attractive, increasing enthusiasm for space technology amongst children and the youth.

Working Group 4: Space Applications & Technologies to support the SDGs

Participants



Description

1. Many of the Sustainable Development Goals for Africa can be supported using applications of space technologies.
2. The Working Group 4 session aims to see how space applications can be utilised to support the SDGs in providing solutions to global challenges, and hence, the need to provide an overview of the status of SDG 1 and 3 in Africa. Also, the Group aims to provide an overview of the harmonisation of the 2030 Agenda and African Union 2063 agenda by proposing a solution for tracking one specific SDG indicator to support the Sustainable Development Goals for Africa.
3. Since the 2030 Agenda was made official three years ago, nearly half of the SDG targets are not quantified and only 40% of those indicators have data. Only 19 out of the 54 African Member States have undertaken Voluntary National Reviews of the SDG. There are common challenges across institutions, relating to technical capacity, data collection and processing, and the adoption and application of international statistical standards and new technologies.
4. The recommendations were: the designing of easy to use agro-space and other space applications, collaborations, monitoring progress rate by using data comparison, gender equality, sensitisation, data accessibility and use.

Main Objectives

1. Provide an overview of the status of SDG1 and 3 in Africa
2. Provide an overview of space applications that can support these two Sustainable Development Goals
3. Provide an overview of the harmonisation of the 2030 Agenda and the African Union 2063 agenda, and propose a solution for tracking one specific SDG indicator to solve one of the problems

Questions

1. Is Africa on track towards alleviating poverty, improving its health care, and building its resilience?
    a. No, Africa is not on track to end poverty. From the Africa SDG2020 report, only Algeria has SDG 1 achieved, Libya and Somalia have significant data gaps, while most countries have major challenges remaining.
2. How can the African Space Agency AfSA collaborate with the private sector to fill its capacity deficit and how do we make a case for investment?
    a. To support in developing a vibrant and indigenous space market that promotes and responds to the needs of the African continent, the AfSA can demonstrate the attractiveness of investment in space through economic market assessment studies: market studies, CBAs, business cases, etc. with the private sector entities will help to understand the markets and the benefits for implementing space technologies. The AfSA can involve the private sector in building the critical infrastructure to be developed by States/RECs
    b. The AfSA can encourage collaboration/partnership with other stakeholders so that existing

infrastructure is leveraged, and so that best practices and lessons learned are used to avoid making the same mistakes

3. Do the ongoing projects for the harmonisation of the 2030 Agenda and the African union 2063 take into account space contribution?
    a. From the outset, the Global Agenda 2030 and its SDGs were heavily influenced by the African Union's Common African Position on Post 2015 Development Agenda (CAP). The scope of the SDGs is confined to social, economic and environmental dimensions, while Agenda 2063 is broader in scope, covering social, economic and sustainability considerations in the broad context, political, cultural, and other African priorities.

Conclusions

1. Space applications play an extremely important role in all areas today. The number and uses of space applications are growing and are relevant to all the 17 SDGs, including the Pan-African vision goal of uniting the efforts of African states. In view of the challenges that the continent has to face in order to boost its economy, provide a competitive environment and create wealth and employment, participants were able to highlight the following areas that should be the priority of leaders in the exploitation of space applications in the various sectors covered by the SDGs. These are a) Meteorology, b) agriculture and forestry, c) Environmental monitoring, natural hazards (fire, floods, drought) d) cartography (mapping), topography, and geographic information systems, e) geology and resource mapping f) telecommunication g) Geodesy, land use, and planning, h) military, government, and intelligence, i) Ocean currents and temperature, j) Atmospheric chemistry and physics, etc. Therefore, an effort must be made by stakeholders to improve awareness at the horizontal and vertical levels. Capacity building, training and capitalization of existing resources to improve the capacity to analyze and exploit existing data must be effective.

2. National and international experts including young professionals must work to define a futuristic vision and a spatial education program that converges towards building the Africa we want. A tripartite dynamic including civil society, industry and government must improve the funding and implementation of high impact projects and create an ecosystem that is conducive to innovation and efficient exploitation of the new space for people.

Recommendations

Recommendations to the Space Generation Advisory Council

1. Increase awareness of the benefits of space technology and its applications for the SDGs in Africa
2. Get more students and young professionals involved in space programs
3. Improve space education programs within SGAC Africa

Recommendations to the United Nations Office for Outer Space Affairs

1. COPUOS, UNOOSA and UN should monitor the progress of the implementation of the SDGs in Africa
2. Create more scholarship schemes for students and young professionals in Africa

Recommendation to the Sponsor(s)/Partner(s) and/or the Industry at large

1. Ensure agreements are followed to the latter
2. Support more SGAC programs within the African continent

Working Group 5: The Role of Space Tech in a post-COVID 19 Africa

Participants

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Hindustan Institute of Technology and Science

Danielle Wood
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Subject Matter Experts

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Square Kilometre Array

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Rapporteurs

Description

As of 30 July 2020, Africa has recorded 754,390 COVID-19 cases. The pandemic has exposed the deteriorating state of Africa's healthcare facilities, plunged millions of members of the informal sector labour force into severe challenges, and has reversed the development of milestones achieved in recent years by African states.

Recovering from this global catastrophe will take years, and a V-shaped economic recovery is not envisioned for most African countries in the absence of a clear post-COVID strategy for Africa. How can space technology be used for fostering economic recovery in Africa after the pandemic?

Main Objectives

1. Outline avenues of collaboration already established, to foster African cohesion in space and considerations for new collaborative avenues to promote African Space Development.
2. Present a developed case study with lessons learnt and recommendations for the future with respect to the African space industry.
3. Present on the point of view and considerations about the role of space technology in a post-COVID-19 Africa.

Questions

1. What is the role of the African Regional Data Cube (ARDC)?
2. What are the tenets of the African Continental Free Trade Area (AfCFTA) agreement?
3. How will the African Regional Data Cube (ARDC) for Tracking and Monitoring Covid-19 Hotspots foster collaboration and also affect the tenets of the African Continental Free Trade Area (AfCFTA) agreement?
4. What sort of commitments will nations have to make to realise regional integration in Africa through space technology?
5. How can space technology be used to foster economic recovery in Africa after the pandemic?

Conclusions

1. Role of the African Regional Data Cube (ARDC)

Currently transitioning into a Digital Earth Africa (DE-Africa), the Africa Regional Data Cube (ARDC) is a tool that harnesses the latest Earth Observation (EO) data from different reliable sources and satellite technology, including data on Covid-19 hotspots. This serves as a robust decision-making information pool, supporting both developmental agendas and the Sustainable Development Goals (SDGs) in Ghana, Kenya, Sierra Leone, Senegal and Tanzania. Upon its complete integration into

DE-Africa, it will experience an increase in scale, sustainability and functionality through a continental-wide operational service on EO data.

2. *Tenets of the AfCFTA agreement*

Constituting 54 of the 55 states of the African Union (AU), the African Continental Free Trade Area (AfCFTA) is the largest free trade area of its kind in the world, covering a market of over 1.2 billion people. The United Nations Economic Commission for Africa (UNECA) estimates that AfCFTA has the potential to boost Intra-African Trade by 52.3% year-ending 2022, and double this trade in the case that non-tariff barriers are reduced.

The objective of the AfCFTA is to create a single market of goods and services in Africa. The anticipated impacts of this include: deepening the continent's economic integration through the movement of people and capital; resolving the challenges of overlapping memberships in regional economic arrangements; promoting and sustaining inclusive economic development; boosting industrial development and finally; enhancing competitiveness among member states.

Intra-African trade has historically been low. Hence, by removing trade barriers and allowing free movement and trade across Africa, it is estimated that AfCFTA may help increase the combined consumer and business spending on the continent to $6.7 trillion by 2030. It is also expected to enhance global competitiveness for African companies.

3. *Impacts of the ARDC for tracking COVID hotspots in the context of the AfCFTA*

As nations across the globe grapple with how best to respond to the Covid-19 pandemic, many low-income countries in Africa face the added impact of the economic challenges posed by the crisis. The tenets of the AfCFTA are dually affected, as an increased number of trade restrictions have been implemented in the last year to manage the spread of the virus. The African economy was projected to increase by 3.9% in 2020, but the pandemic had a negative effect on this projection. Lower growth than initially projected can be attributed to a subdued level of export activity in Africa, owing to the fact that over 53% of Africa's exports go to countries that are suffering from the pandemic. As a result, the original deadline for trading under AfCFTA was pushed from 1st July 2020 to January 2021.

The ARDC for Tracking and Monitoring Covid-19 Hotspots is just one of the ways that shared data is being used with satellite technology to respond to various developmental changes across the continent. With this tool, the necessary interventions are made regarding food security and disease management to ensure economic recovery and growth. When economies successfully get back on track, trade restrictions can then be lifted and the business sector revamped.
The ARDC is an illustration of what is possible when African Countries leverage partnerships, data science and innovation towards the African Business Sector.

4. *Necessary national commitments for space technology integration*

African nations should consider the role and inclusion of space policies as a fundamental pillar for regional integration. Each country must include a central space governance structure such as the African Space Agency embedded within the policy structure of their domestic space sector. As the main legislative body for space in Africa, the African Space Agency presents an exciting opportunity to develop a uniform and concerted effort towards the advancement of continental space science and technology, through means such as implementing policies to equally distribute the cost of setting up space industries between African governments and enabling the international sharing of space capability. These policies should also aim at merging optical and radar imageries from satellites to maximise growth potentials in Earth data, which can then be effectively used for monitoring activities such as gold mining, mineral exploration, oil spills, land motion, coastal changes and flood responses. A data-sharing framework that aims at open data access for sustainable development through space products in the African region should be provided.
African economies must exhibit a commitment to maximising investments in space programmes with tangible, sustainable development benefits.

5. *Space technology for post-COVID economic recovery in Africa*

As part of the digitalisation of economies, satellite signals and data play an increasingly pivotal role in the functioning of societies and their economic development. However, with the advent of the Covid-19 pandemic, a significant part of the space sector firms are struggling, especially small and medium-sized enterprises in Africa. Hopefully, the same space sector could play a vital role in the recovery of African economies. The pandemic normalised collaboration across distances and also promoted a smooth flow of commerce until lockdowns and travel restrictions began to ease.

Post Covid-19, the economic importance of the space sector is expected to increase as new commercial actors within the space industry develop innovative products and services, responding to market needs with essential localisation, navigation and telecommunication applications in Africa. The benefits of these products and services will transcend into strengthening communications among African countries, ensure disaster and disease management, estimate national and global crop productions to tackle the issues of food security, detect deforestation and other illegal activities (Environmental Protection and Monitoring), estimate national and urban poverty, promote education through new modules of E-learning among others.

Recommendations

Recommendations to the Space Generation Advisory Council

1. The SGAC should encourage nations to designate space as a National Strategic Asset to ensure that

countries focus on the importance of space and its technologies to economic and social growth.
2. The organisation should also encourage nations to adopt a whole governmental role as well as a private sector role to contribute to the development and management of National Space Programmes.
3. The SGAC must engage all space stakeholders in the development, implementation and evaluation of space policies as well as in the development of space technologies.
4. They should maximise awareness of the peaceful use of space technology and its applications.
5. Broaden the geographical scope of outreach and space education programs to inspire and prepare more students and young professionals to take up more space sector roles in Africa.

Recommendations to the United Nations Office for Outer Space Affairs

1. The Committee must consider the vulnerable small actors/nations in the space industry and how to fund and expand them.
2. They should simplify procedures for the support granted to actors of the space industry.
3. The Committee should adopt realistic and flexible eligibility criteria to provide support to the African Space industry, so as to facilitate access to private and public funding to back operations.
4. There should be a liaison with and monitoring of local and regional space authorities to help keep such facilities open and active, in addition to initiatives to reach the youth about the potential of space technologies in Africa previously not so explored pre-Covid.
5. There should be assistance for both existing and new government long-term space programmes to increase their viability and funding scheme.

Recommendations to the African Union

1. The African Union must within its tenet create awareness amongst its member states of the civil use of space technology, thus considering the inclusion of space policies as an essential tool for regional integration and developmental solutions in tackling some of the problems facing the continent; seeing space technology not as an option, but as a necessity for the survival of the African continent.
2. Having seen the effectiveness and the importance of data availability, processing, analysis and interpretation especially from Earth Imageries, Remote Sensing, Geospatial Data and Weather Forecast in the handling of Pandemic Outbreaks, Forest Fire Outbreaks, Pest Outbreaks, Oil Spills, Floods and other natural disasters across the globe, the AU must through its parastatals consider the acquisition of space technologies as an essential tool in the disaster management and mitigation.
3. In the tackling of the insecurity of lives and properties across the continent, which has become a major menace threatening the peaceful coexistence of humans and leading to the extinction of rare animals, the AU must tap into the powerful advantage of the Global Position System technologies and the High-Resolution Imagery offered by satellite technologies to track the movement of warmongers, poachers and terrorists, this policy will have a ripple effect on the economic development on the continent.
4. While it is not enough to utilise space technology, the African Union must through its members create

an avenue for Africans to start creating their own space technology either through collaboration with space agencies in the frontier of space sciences; offering of grants, scholarships, internships or fellowship to Africans who are willing and enthusiastic to start or have a career in the Sector. The AU should look into creating policies that reduce Africa's consumption of space technology and increase the production of the technology within the continent and by Africans thus encouraging commitments by African economies to maximise investments in space programs.

5. The AU should create policies that will enable a continental integration through a well-concerted effort to bring all members to the table, ensuring equity amongst its members, and so maintaining and sustaining the longevity of the program. In the world we are in, the wealth creation potential of a people is driven by their opportunities for economical scientific exploitation. In this way, the space industry has the potential to be a vehicle for huge economic development, if approached with the right policies and motivation.

Recommendations to the Sponsor(s)/Partner(s) and/or the Industry at large

1. Enable space firms to solely take major decisions within their area of specialisation without an unnecessary partner or sponsor interruptions.
2. There should be reduced or no access fee to access testing facilities.
3. Place emphasis on high-quality data and other space products rather than just profit maximisation.
4. Support young professionals and students financially to study and take up more space sector roles in order to broaden the scope of the sector, and encourage outreach activities to create a sense of interest among upcoming students and young professionals.
5. The space industry should aim to ease and cut down the exaggerated eligibility criteria used to recruit more people into the industry.

REPORT CONCLUSION

Conclusively, the 4th AF-SGW which was held in Accra-Ghana 2021 with the theme "A united Africa for Space innovation: A Step Towards our Common Future" provided feasible and practical strategies to enhance the utilization of space in Africa. At the close of the event, thematic areas of Africa's interest in space were analysed and discussed from different viewpoints through the five working groups.

"The Space governance" working group primarily examined the status of space law and policy in Africa, identified the challenges of the concept in the continent, proffered ways through which young people, the government and industry stakeholders can contribute to improving the status quo in order to match global realities.

"The Space business and entrepreneurship" working group focused on the necessary requirements in establishing a space-related business, what it entails to be an entrepreneur in the space sector and particularly the opportunities available in that regard in Africa. The working group also provided effective recommendations that will aid the growth of space business in the continent which is characterized by the challenges they identified.

"The Big Data and Astronomy working group" utilized the available data provided during the 4th AF-SGW to evaluate and study the status and impact of Astronomy in Africa. Their findings revealed that the necessary and suitable conditions for sustainable development of astronomy in Africa are not yet actualized. They pointed out challenges bordering on collaboration in the field of data analysis and astronomy and provided effective strategies to address these challenges.

"The Space application and technologies to support the SDGs" working group provided a holistic overview of the status of SDG1 and 3 in Africa and the ways through which space applications can support these Goals alongside the aspirations of Africa's Union Agenda 2063. The working group examined the crucial role of the African Space Agency to ensure that sufficient collaborations and partnerships are concluded. Recommendations were also made on how the socio-economic, cultural, political and environmental conditions of Africa could be improved in the near future.

"The Role of Space technologies in a post-Covid-19 Africa" working group focused on the avenues of collaborations already established, to foster African cohesion in space and provide considerations for new ways to promote African Space Development. A case study was developed with lessons learnt and recommendations for the future with respect to the African space industry and the role of space-related technologies in the post-Covid-19.

ORGANISING TEAM

A team of dedicated volunteers make up the organising team of the 4th African Space Generation Workshop. These passionate young professionals and students have worked tirelessly to ensure 4th AF-SGW delegates enjoyed the best possible experiences and opportunities while in attendance.

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Zemichael Gebeyehu
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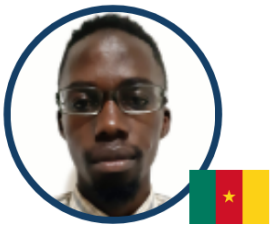

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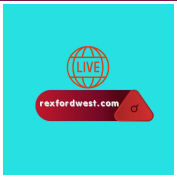

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