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From the Editor

The biggest satellite news from an African perspective this month is certainly that the establishment of an African Space Agency is now a certainty with Egypt selected by the African Union as the host country.

Under the spacefaring nations of Africa now count Algeria, South Africa, Egypt, Kenya, Morocco, Nigeria, Tunisia, Kenya, and Ghana. Angola and Ethiopia are soon to join the ranks. This is a small number compared to the total of 55 countries which are part of the AU. The formation of an African Space Agency will, however, make an African Space Race superfluous as it could become a powerful body to overcome the duplication of resources and efforts and truly serve the African Union Agenda 2063.

This announcement could not come at a better time as a recent report by the United Nations Convention to Combat desertification

(UNCCD) issues a stern warning that nearly three quarters of Africa’s arable land vital for agriculture and food production are estimated to be degraded. This together with added threat of global warming can be managed with Earth Observation technologies which accentuates the important role satellites are to play in the future. We cover the report in this issue.

We trust that the newly founded African Space Agency will follow in the footsteps of the European Space Agency which manages the Copernicus Program on behalf of the European Commission. Many African countries have utilized this free satellite data source for their own use, but clearly a satellite data service provider directed more towards Africa’s needs will be better suited to us. This will also release many smaller African nations from the burden of launching their own satellites.

The valuable role of satellites in many aspects of human activity such as agriculture, food security, environmental control, disaster management, national security and communications is well recognized. But satellite technology applications are especially essential for Africa’s widespread rural communities to overcome the particular problems they face.

We wish the newly-found African Space Agency all the best with their endeavors and will be keenly following their progress.

Anthony Penderis
Editor
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10 Reasons why you should become an AARSE member

- 1. You can make a bigger impact on remote sensing in Africa through the Association;
- 2. You are joining a dynamic and respectable organization founded in 1994 which has received the recognition and support of numerous international organizations;
- 3. By being a member of AARSE, you can get reduction in membership fees to many organizations and direct access to their publications;
- 4. AARSE strives to address remote sensing policies and research directions in Africa. By being a member, you can be a part of this important voice;
- 5. You can attend biennial AARSE Conferences at a reduced rate (or even sponsored in some cases) and also participate in the planning of AARSE events;
- 6. By becoming a member, you might be able to get the AARSE-IEEE/GRSS Travel Fellowship Award to attend their conferences;
- 7. If you are an expert in technical remote sensing topics you can join our Technical Program Committee and assist with workshops and training activities;
- 8. You can utilize the resources provided by AARSE (on remote sensing, GIS and ICT

education and training) offered through the courtesy of its partner organizations;

9. Quite often, AARSE suggests and promotes individual members as well as national/ regional members to sit in, or collaborate with, international fora;

10. Other benefits of AARSE Membership include subsidized subscription to the future AARSE Journal of Geoinformation and journals of its partner organisations.

See more at <http://www.africanremotesensing.org/Why-Join-AARSE>

Sign Up Now for AARSE Membership

You can select your membership level from one of the following: **Student Membership;** **Regular Membership A (residing inside Africa); Regular Membership B (residing outside Africa); SMME Membership; SMME with ARSGC; Corporate Membership; Corporate with ARSGC Membership**

See selection and payment options at the following links:

<http://www.africanremotesensing.org/page-1512797>

<http://www.africanremotesensing.org/Membership-Payment-Options>

AARSE Editorial Contact Details

The AARSE Newsletter is an official publication of the African Association of Remote Sensing of the Environment. During the year 2019 it will be published at least six times starting February 2019 and thereafter every second month until December 2019.

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Message from the President



Dear Members

Welcome to the February 2019 issue of the AARSE newsletters. The editorial team is pleased to present this edition which illustrates the scientific activities of the Earth Observation community in Africa and around the world. I take this opportunity to sincerely thank all contributors for initiating this edition rich in information.

We are privileged to be a leading publication of information dissemination in the field of space science and technology in Africa and allow me to seize this opportunity to reiterate our commitment and determination to work with new authors in various formats. Each contribution has the potential to arouse our great interest, the opportunity, I hope, to make you want to participate and propose your contributions in the future.

I may also mention that it was a great honour to represent AARSE at the 3rd Conference of Digital Belt and Road (DBAR 2018), held in Tengchong Yunnan, China between 5th and 7th December 2018. AARSE is one of the key partners of the DBAR program, a science platform utilised for sustainable development in many different fields such as environmental change, disaster mitigation, water resources, agriculture food security, natural and cultural heritage, coast and marine, urban development and infrastructure.

I was further also invited to represent AARSE in the Third African Space Stakeholder’s Dialogue to be held in Dakar, Senegal from 6 to 8 March 2019. At this conference I am expected to give an overview of the of the AARSE2018 Conference held in Alexandria, Egypt during October last year.

Good reading

Prof. Kamal Labbassi
AARSE President
2018 - 2022

Members of AARSE Council (2018 - 2022)

Name	Role	Term of office
Prof. Kamal Labbassi	President	2018 - 2022
Mahamadou Keita	Secretary General	2018 - 2020
Dr. Abel Ramoelo	Treasurer	2018 - 2022
Dr. Souleye Wade	Communications	2018 - 2022
Mahamadou Keita	Counsellor for West Africa	2016 - 2020
Prof. Islam Abou El-Magd	Counsellor for North Africa	2018 - 2022
Dr. Yazidhi Bamutaze	Counsellor for East Africa	2016 - 2020
Dr. Aboubakar Mambimba Ndjoungui	Counsellor for Central Africa	2018 - 2022
Dr. Solomon Tesfamicael	Counsellor for South Africa	2018 - 2022
Prof. Olajide Kufoniya	Immediate Past President	2018 - 2022

Board of Trustees

Prof. Olajide Kufoniya	Trustee
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Prof. Harold Annegarn	Trustee and Bank signatory
Dr. Sias Mostert	Trustee and Bank signatory
Prof. Peter Zeil	Trustee

Africa bids Erick Khamala farewell

Mr. Erick Siminyu Khamala, a well-known figure in Africa’s Earth Observation circles suddenly died on Thursday, 7 February 2019 in Mauritius, where he was carrying out a private sector survey on behalf of the African Union Commission.

Mr. Khamala’s sudden demise will be a big loss in Africa’s EO circles as a mentor, colleague and friend to many and for his great contribution to the development of space applications in Africa.

He has had over 22 years’ experience in the application of geospatial technologies and worked as a Remote Sensing and GIS expert in several organizations which include the Food and Agricultural Organization of the United Nations (FAO) Africover Project; the United Nations World Food Programme (WFP); and the Regional Centre for Mapping of Resources for Development (RCMRD).

He was a member of the African Union Space Working Group, a Co-Chair of the International Programme Committee of the African Leadership Conference (ALC) on Space Science and Technology, and a Board Member of EIS-Africa, the organization responsible of organizing the AfricaGIS Conference.

Mr. Khamala has been a keynote speaker in many international conferences and workshops and the Managing Director of



Mr. Erick Siminyu Khamala 1971 - 2019

LocateIT Ltd. He was also instrumental in the development of the Kenya Space Policy and one of the prominent people driving the vision of the African Space Industry.

He was the father of Yvonne Meta Khamala, the late Elsie Nasiche Khamala, Wayne Otido Khamala, Michelle Ingato Khamala and Ariane Hannah Khamala. He was the son of Mr. Crispus and Mrs. Grace Khamala. Grandson of the late Mr. and Mrs. Benjamin Otido (Chekata) and the late Mr. and Mrs. Saulo Muya (Mutsuma).

A memorial service was held in his honour at the Friends International Centre on Ngong Road, Nairobi on 20 February and he was laid to rest on 23 February in the village Cheketa in Kakamega County, Kenya.

Sources:
<https://obituarykenya.co.ke/erick-siminyu-khamala/>
<https://africanews.space/africa-pays-tribute-to-the-legacy-of-erick-khamala/>



AARSE2018 Opening

African Association of Remote Sensing of the Environment Conference Report

The 12th biennial International Conference of the African Association of Remote Sensing of the Environment (AARSE2018) was held in Alexandria, Egypt from 25 - 29 October 2018 at the Abu Quir Campus of the Arab Academy for Science, Technology and Maritime Transport.

The conference theme was 'Earth Observations and Geospatial Science in Service of Sustainable Development Goals' and was organized by the Arab Academy for Science, Technology and Maritime Transport (AASTMT) and the National Authority for Remote Sensing & Space Sciences (NARSS)

This milestone conference was attended by no less than 177 representatives from 37 countries. A total of 8 keynote speeches were delivered at the Plenary Sessions supplemented by a further 19 Technical Sessions and 5 Workshops.

The Springer Workshop was attended by 87 including 46 students, the Africa Space Community Workshop attracted 13

participants, the Cloud Computing Workshop 25 participants and the NARSS Workshop had 9 participants.

Sponsors who participated in the conference were the Arab Academy for Science, Technology and Maritime Transport (AASTMT); the National Authority for Remote Sensing & Space Sciences (NARSS); the African Union; Airbus; World Food Program (WFP); European Space Agency (ESA); and Telecom Egypt (WE)

Exhibitors who participated in the conference were Geoconsultant International; Egyptian Company for Space Applications & Remote sensing; and Mapping Solutions.

The next conference the AARSE2020 will be held in Rwanda.

Report by Prof. Dr. Alaa Abdelwahed Abdelbary Vice-President for Post Graduate studies and Scientific Research; Arab Academy for Science, Technology and Maritime Transport



AARSE 2018 Conference Papers to be published soon

The African Association of Remote Sensing of the Environment (AARSE) and the publisher Springer (www.springer.com) have just announced the final list of authors who previously presented at the AARSE 2018 Conference to be published under the series Southern Space Studies.

The Southern Space Studies series published by Springer presents space trends, market evolutions, policy, strategies and regulations and the associated social, economic and political challenges of space-related activities in the southern regions of the world such as Africa, Australia and Latin America.

The publisher regards inside information from emerging space faring countries in these regions pivotal to establish good and efficient cooperation mechanisms. The aim of the series is therefore to provide transdisciplinary information for a fruitful development of space activities in those countries, and, in cooperation with established space faring nations to become the reference compilation for space activities in these areas. Books are available in hard or electronic formats. Annette Froehlich is The Series Editor. <https://www.springer.com/series/16025>

The publication with the title *AARSE, Earth Observations and Geospatial Science in Service of Sustainable Development Goals* will have a total of nine chapters with the following authors featured in each chapter as titled below:

- 1 *Space and Geospatial science for sustainable development goals*
Authors featured: Mads O. Rasmussen; Olusola Adeyemi; Babacar NDao
- 2 *Remote Sensing and GIS for natural resources management*
Authors featured: Noha Donia; Obang Owar; Annemarie Klaasse; Mamdouh M. El-Hattab; Kevin Musungu
- 3 *Remote Sensing of the Ocean and Coastal zone management*
Authors featured: Ingrid Martha Kintu
- 4 *Applications of advanced Remote Sensing technologies (LIDAR, Hyperspectral) in Africa*
Authors featured: Basuti Gerty Bolo; Mohammed Etewa
- 5 *Climate changes implications on sustainable development in Africa*
Authors featured: Kelobogile B. Mfundisi; Evet Naturinda; Moustafa H. Aly
- 6 *Space technologies and Geospatial sciences for early warning systems*
Authors featured: Rukayyah Bahago
- 7 *Big data and data mining of Geospatial data*
Authors featured: Anifowose A.Y.B.; Guy Blanchard Ikoku; Kwatsima Brian Andala; Emad El-Sayed;
- 8 *High-performance computing for Geospatial data analysis*
Authors featured: Ferdaous Chaabane
- 9 *Alexandria Declaration*
Signed by President of AARSE, Vice President of AAST and Head of NARSS



Conference attendees at the Opening Session of the DBAR 2018 Conference held from 5 to 7 December in Tengchong, China.



AARSE President addresses DBAR 2018 Conference in China

Prof. Kamal Labassi, president of AARSE represented the association at the 3rd Conference of Digital Belt and Road (DBAR 2018), held in Tengchong Yunnan, China between 5th and 7th December 2018. He made, on behalf of AARSE, the Opening Remarks to the keynote speech by Guo Huadong, Chair of the DBAR Program.

DBAR is an international science program for the sustainable development using Big Earth Data. It pursues outstanding research efforts and development questions relevant to attaining Sustainable Development Goals (SDGs). It is done through a system of nine Foci that are categorized into two parts, one centralized on Big Earth Data, while the other eight Foci encompass the social, environmental and technological aspects of different SDGs.

The 3rd Conference of Digital Belt and Road (DBAR 2018) was an opportunity to provide a platform, for the DBAR community, international science organizations, inter-governmental bodies and international stakeholders to share expertise on Big Earth Data applications and review results from baseline data collection efforts for SDG indicators.

Several specialized sessions were held to examine the applications of Big Earth Data for sustainable development in different fields such as environmental change, disaster mitigation, water resources, agriculture food security, natural and cultural heritage, coast and marine, urban and infrastructure, High Mountain and Arctic, and the need for Big Earth Data in solving large-scale regional and global problems.

AARSE is one of the key partners of the DBAR program. Both organizations are committed to a MoU signed during the AARSE2016 Conference.

Remote Sensing the answer to the African continent's food security in peril?



The African continent's food security is in peril. Increased desertification brought on by constant droughts and heat waves, degradation of land accelerated by relative poverty and now the added complication of global warming, are but some of the dangers the continent faces already struggling to feed its poor.

Fortunately many moves are afoot to counter these effects, notably the United Nations Convention to Combat Desertification (UNCCD) and the intergovernmental Group on Earth Observations and the Land Degradation Neutrality Initiative (GEO LDN).

The UNCCD reports that two-thirds of the African continent is desert or drylands. These areas are vital for agriculture and food production, but nearly three-fourths of it is estimated to be degraded. All African countries are parties to the UNCCD, and significant steps have been made to improve regional cooperation and develop action plans to tackle the causes and impacts of land degradation.

While frequent droughts make the African continent particularly susceptible to the impacts of land degradation it is relative poverty which changes once productive fields and pastures into little more than wasteland or results in forests stripped bare for fuel.

If this is not enough bad news the UN has recently issued a stern warning on the

Two-thirds of the African continent is desert or drylands. Accelerated degradation of arable land combined with increased temperatures brought on by global warming may result in serious threats to the continent's food security. Images www.birmingham.ac.uk; app.etapestry.com.

challenges global warming awaiting Africa by way of its Intergovernmental Panel on Climate Change (IPCC) Working Group III. According to their latest report issued in January 2019: "the ramifications of a world warming by more than 1.5° C would be profound for sub-Saharan Africa."

According to the IPCC, projections show that should this rise in temperature happen the western Sahel region will experience the strongest drying, with a significant increase in the maximum length of dry spells. Central Africa is expected to see a decrease in the length of wet spells; and a slight increase in heavy rainfall.

West Africa will be a climate-change hotspot, with less crop yields and production, with resultant impacts on food security. The western part of Southern Africa is set to become drier, with increasing drought frequency and number of heat waves.

According to the GEO LDN a key technology for measuring and monitoring the extent and severity of land degradation is Earth Observation (EO). These methods can reveal the extent of degraded lands and help countries take action to reverse the human and ecological costs.

The GEO LDN Initiative therefore extends an open invitation to interested parties to join their initiative to give decision-makers the right tools for achieving LDN and SDGs by 2030. Visit the GEO LDN page or contact the GEO Secretariat LDN focal point through Douglas Cripe at dcripe@geosec.org Also see the Intergovernmental Panel on Climate Change (IPCC) Working Group III at <https://www.ipcc.ch> for more information.

Anthony Penderis compiled this report from information provided by the intergovernmental Group on Earth Observations (www.geosec.org) and Dan Shepard, UN Public Information Officer (www.ipcc.ch).



Focus on an African Personality in Space Science and Technology

H.E. Governor Wilber Ottichilo



H.E. Dr. Ottichilo is currently the Governor of Vihiga County in Kenya and an immediate former Member of Parliament for the Emuhaya Constituency in the 11th Parliament (2013-2017) of the Kenya National Assembly.

Dr. Ottichilo has over 30 years of working experience in natural resources mapping, assessment and management, environmental conservation, land-use mapping and planning and environmental impact assessment. He also has wide experience in the application of Remote Sensing (RS) and Geographic Information Systems (GIS) in mapping, natural resource assessment and monitoring, and database development. He has MSc. in Biology of Conservation and Ecology from the University of Nairobi (1983) and thereafter obtained a PhD in Natural Resources Planning, Assessment and Management from the Wageningen University and the International Institute for Aerospace and Earth Sciences (ITC) in The Netherlands (2000).

Prior to his election as a Member of Parliament, he was the Director General for the Regional Centre for Mapping of Resources for Development (RCMRD) from June 2000 to April 2008. The Centre is the leading UN affiliated organization in Eastern and Southern Africa in the provision of consultancy/advisory services and training in geo-information (RS, GIS & GPS) applications. These include applications in natural resource assessment and mapping, land use, food security, and early warning, environmental monitoring,

disaster management and urban database development.

Apart from the RCMRD, Dr. Ottichilo has also worked as Deputy Director Research and Planning for the Kenya Wildlife Service; Project Manager/Remote Sensing Expert for the UN-FAO Project on Food Security and Early Warning for the Greater Horn of Africa; Project Coordinator, UNEP Desertification Research Project; Deputy Director, Department of Resource Surveys and Remote Sensing (DRSRS) formerly known as KREMU in the Ministry of Planning and National Development and a Research Officer with National Agricultural laboratories. He has also consulted with numerous organizations including UN agencies and the World Bank.

During his professional career he has published and presented numerous articles and papers and also acted as Technical Expert Reviewer for many publications in a variety of countries such as The Netherlands, Belgium, USA, Canada, Sweden, Kenya, Egypt, Senegal, Algeria and Ethiopia.

His current mission as the Governor of Vihiga County is to promote good governance, eradicate corruption and develop an educated, skilled and knowledgeable society. He also strives to create opportunities for youth employment, wealth creation through

agribusiness, entrepreneurship, technology and innovation. Furthermore to promote primary healthcare, develop local industry, strategic partnerships and a reliable transport and communication infrastructure network to spur growth in the County.

INTERNATIONAL PROFESSIONAL AWARDS

- In recognition of his work, the International Society for Photogrammetry and Remote Sensing (ISPRS) in collaboration with Canadian Institute of Geomatics (CIG) awarded him the Samuel Gamble Award in April 2008. The award is presented to an individual who has contributed significantly to the development and organization of professional activities in Photogrammetry and Remote Sensing (Geomatics) at both national and international levels.
- In April 2009, he received UN Economic Commission for Africa (UNECA) Award for his work in the promotion of the use of Geo-information in sustainable development in Africa.
- In October 2009 he received the AFRICAGIS AWARD for his tremendous technical contribution and promotion of Geographic Information System (GIS) and Remote Sensing for sustainable development in Africa



The Gabonese Agency for Space Studies and Observations
Agence Gabonaise d'Etudes et d'Observations Spatiale

Discovery of an African Space Institution

The Gabonese Agency for Space Studies and Observations (AGEOS) was founded on 25 February 2010 and inaugurated its own satellite data acquisition centre in August 2015 in the village Ntoun about 30kms from the Gabon capital Libreville.

This centre, built for some nine million euros at the time with the aid of French funding, features a giant 7.3m multi-mission and multi-sensor antenna plus data acquisition, processing and archiving infrastructures for the use by remote sensing experts.

The mission of AGEOS is to contribute to the implementation of the government's policy on the collection, analysis and provision of data from space observation of the country for the sustainable management of the environment, natural resources (land and sea), land use and planning. Its additional objectives are also to develop a national strategy for space observation activities; set up space infrastructures; monitor and evaluate the implementation of public policies for roads, housing, energy, natural resources, etc.; provide data on climate change; and promote training, research and development activities for land and sea use.

The 7.3m X-band antenna enables the center to directly access satellite data from satellites such as Landsat 7 & 8 and CSK which covers 24 surrounding countries in a radius of 2800 kilometers. This includes inter alia the forested countries of the Congo Basin which after the Amazon is regarded as the second-biggest 'green lung' of planet Earth. Gabon's forest cover, which makes up about 88 percent of the country is regarded as an important heritage to the country as it is rich in waterways and populated by a wealth of fauna such as elephants, buffalos, antelopes and apes.

Apart from managing the forests satellite data collected at the centre finds useful application in the management of water resources, urban planning, coastline monitoring to curb illegal fishing, pollution such as oil spill, maritime surveillance and climate change monitoring.

On 15 March 2018 AGEOS had discussions with technical and financial evaluation experts of the African Union to manage a fund estimated at 655 million CFA francs, allocated by the global Monitoring for Environment and Security (GMES) over the next three years. According to Tidiane Ouattara the



The 7.3m X-band antenna enables the AGEOS centre to directly access satellite data from satellites which covers 24 surrounding countries in a radius of 2800 kilometres.

coordinator of the program: "the project is for the AGEOS to manage these funds for three years, in the observation of the land for the management of natural resources and water. This should lead the AGEOS to make available to all Africans, in the coming years, the data, applications and services that will result."

Aboubakar Mambimba Ndjoungui, the Director General of AGEOS welcomed the evaluation and noted: "the main themes of the preservation and knowledge of water and natural resources are important and defined in the Convergence Plan of the Community of Central African States."

The African Union and GMES program aim to strengthen the technical and institutional capacities in Africa to use Earth observation data in Africa policy development.

For more information contact
Aboubakar Ndjoungui Mambimba at
aboubakar.mambimba@ageos.ga

AGEOS observations cover countries in a radius of 2800 kilometres including the forested countries of the Congo Basin which after the Amazon is regarded as the second biggest 'green lung' of planet Earth.



Three Africans on space industry's latest movers and shakers list

Three Africans made the latest Newspacepeople Global Ranking Report of the space industry's top 200 movers and shakers. They were Duncan Stanton, CEO, Space Advisory Company (Ranked 144), James Barrington-Brown, CEO and Co-Founder, NewSpace Systems (Ranked 171) and Temidayo Isaiah Oniosun, Founder, Ideal Space Technologies (Ranked 178).

The Global Ranking Report is an annual survey of the space industry's movers and shakers first published in 2016 by Newspacepeople. The latest report of 2018/19 data includes 20,207 unique votes for 1,617 companies and 389 of the leading decision makers in the space industry, which were taken from a survey of Leadership Monthly's subscribers.

The top 5 were Niels Buus, CEO of Gomspace, in first position, followed by Meir Moalem, CEO of Sky and Space Global, Belladonna Stofiel, head intern of Stofiel Aerospace, Troy McCann, founder of Moonshot and David Henri, co-founder and CEO of Exotrail in 5th position.

Source: <https://www.newspacepeople.com/view/leader-rankings>

Duncan Stanton - CEO, Space Advisory Company (Ranked 144)

Duncan Stanton was educated in Pretoria, South Africa. He holds an MBA from Heriot-Watt University in Edinburgh and an engineering degree from the University of Pretoria, South Africa. He has worked at the South African national research council (CSIR), and joined Space Advisory Company in 2014. He is currently the CEO of Space Advisory Company, one of the largest privately-owned spacecraft engineering firms in South Africa, located near Cape Town.

His technical area of expertise stems from a background in Radar and Electronic Defence Modelling and Simulation, and has applied this in developing innovative Satellite Synthetic Aperture Radar missions and system concepts. He is proud to lead the more than 50 specialist personnel of Space Advisory Company, focussed on facilitating, designing and managing satellite programmes, from sub-systems and payloads through to the utilisation and commercialisation of the relevant sustainable space technologies.



James Barrington-Brown - CEO & Co-Founder, NewSpace Systems (Ranked 171)

James Barrington-Brown has more than twenty-five years in the commercial satellite industry, strongly in the areas of leadership and business development. James was also the founder of the UK SSBV subsidiary where the space component product-line was initially developed and manufactured prior to relocating to South Africa.

He is currently the CEO of NewSpace Systems. NewSpace Systems is a South African Joint Venture between the largest commercial space company in South Africa, Space Commercial Services (SCSH) and UK private investors. In March 2015 NewSpace acquired the assets of SSBV Space & Ground Systems Ltd. and became the sole supplier of their space product line. NewSpace is developing and manufacturing spacecraft components, sub-systems and optical payloads from their cleanroom facility in Somerset West in the Western Cape Province of South Africa.



Temidayo Isaiah Oniosun - Founder, Ideal Space Technologies (Ranked 178)

Temidayo Isaiah Oniosun was listed as one of the 24 World Under 24 Leaders and Innovators in Space and Steam by The Mars Generation, one of the recipients of 35 Under 35 space industry recognition award by the International Institute of Space Commerce and by BellaNaija as one of the 25 Under 25 Nigerians who are influencing and disrupting the Entrepreneurship, Leadership, Governance and Corporate World.

He has a Bachelor of Technology Degree in Meteorology from the Federal University of Technology Akure. He is the Founder of Ideal Space Technologies operating Space in Africa and RadikalHUB with over 5 years' experience in the industry.

Temidayo is highly interested in the commercial space ecosystem in Africa. He has been featured on Forbes Africa, Guardian, BellaNaija, SATNEWS, ROOM, USAID, NewSpace People, etc. for his work in the African Space Industry.



Remote sensing at its best for practical use in African agriculture and rural development

South Africa's Western Cape Department of Agriculture has developed an excellent online tool with numerous Geographic Information System (GIS) applications in agriculture and rural development. Since its launch on 1 January 2012 the site has proved to be very popular with a total of 93, 637 users until 31 December 2018. This tool called CapeFarmMapper can truly serve as model to the rest of Africa and the following is a quick guide on how the user can easily create a map for various purposes. And, what's more, it is all for free.

- 1 Access CapeFarmMapper through <https://gis.elsenburg.com/apps/cfm> - you will be greeted by a welcome dialog - and click the "Close" button to continue.

2 Familiarize yourself with the application interface: the icons toolbar in the top right represents the different panels, while the content and tools of each panel are displayed in the strip on the right-hand side of the interface.

3 The next step is to use the mouse to navigate the area of interest. The map can be panned with a simple click-hold-and-drag action, while the zoom level can be set with the mouse wheel. The functions in the search panel can

also be used to locate a farm by the farm name or farm number.

4 To change the background map, activate the layers panel and click the Basemap dropdown list. Then select one of the many available options to display a different background map.

5 Next you want to display some spatial data on the map, e.g. the farm boundaries and the crops on the farm. For this you need to activate the layers panel and expand the category for the data you want to add, The layers under the 'Resource Layers' section include agricultural, climatic and environmental layers such as crop types, soil types and long-term climate variables. (Note: In most cases it would be advised to add only a single resource layer at a time, along with the farm boundaries, to avoid cluttering and confusion of colors).

6 The drawing tools can be used if you need to add your own data or drawings onto the map, e.g. camps or infrastructure. With the drawing tools a user can create points, lines and polygons, add labels and set custom styling of each graphic feature.

7 Once you have added all the required content to the map, proceed to the Map Export panel, where you can create a digital map of the visible content in JPEG or PDF format. A user can also set various options, such as page size, orientation, map title and the visible scale or extent. Click the 'Export Map' button and wait for the map download link to be displayed in the resulting dialog box.

8 Click the 'Download Map Document' link to open and view the resulting map.

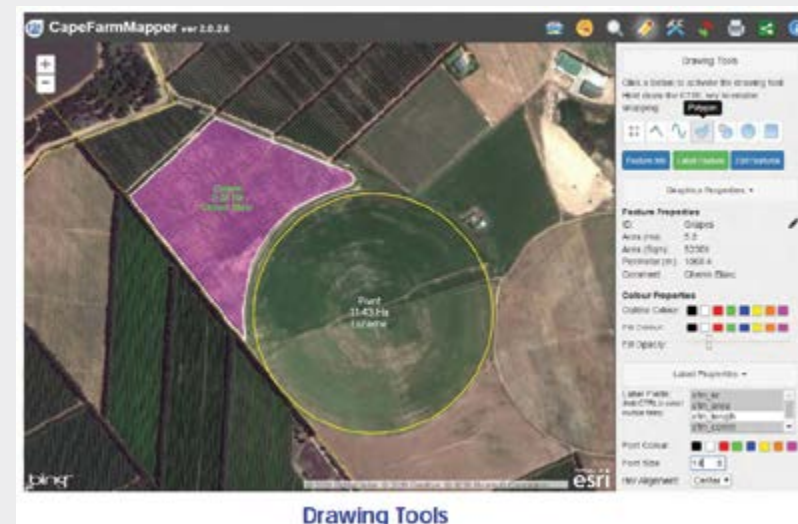
By following and repeating these steps, a user can generate many maps with any of the available layers to create an extensive spatial overview of the activities and resources on a farm or in a specific area of interest. There is no limit on the number of maps a user is allowed to produce and the maps can be used for reporting purposes. It is however the responsibility of the user to take note of the source of the data sets (layers) and give recognition where due.

The department also provides support for CapeFarmMapper and any queries can be sent via email to info@elsenburg.com or contact us on +27 (0)21 808 5111.

Sources: Article by F.C. Basson in *Agriprobe* Vol 15, No. 1, 2018 and Cape Farm Mapper Manual by Dr. Mike Wallace. See <https://gis.elsenburg.com/apps/cfm>



These screenshots of CapeFarmMapper shows the various tools at work highlighted in the top right-hand corner.



Africa Remote Sensing Conference Diary 2019

We have compiled the details of the most important African conferences in the arena of remote sensing, satellites and geotechnical applications scheduled to take place later this year. Please visit their individual websites for more information on submission criteria for papers, deadlines for registration, etc.



Global Conference on Space for Emerging Countries

Marrakech, Morocco; 24 – 26 April 2019

The International Astronautical Federation (IAF) and the Centre Royal de Télédétection Spatiale (CRTS), with the support of the Centre National d’Études Spatiales (CNES) will stage for the first time ever the Global Conference on Space for Emerging Countries (GLEC 2019). As a first conference of its kind, #GLEC2019 aims at actively engaging emerging countries in the space scene by highlighting the socio-economic benefits of space applications. These would include inter alia understanding the various financial models for the optimal resourcing of national space programs and the essential legislative and policy elements that must be considered in establishing the foundation for national space programs.

Tel: Tel: +33 1 45 67 42 60

Email: glec2019@iafastro.org

Website: <http://glec2019.org>



SA GeoTech Conference


Ekurhuleni, South Africa; 22 – 23 July 2019

The SA GeoTech 2019 conference and exhibition will bring together leading thinkers and doers around the theme ‘Geo-tech to drive new business opportunities and economic growth’ and will incorporate DesignTech, ArchiTech, MeasureTech, PositionTech, MineTech and ConstrucTech. Given South Africa’s current economic climate and the powerful role of geo-tech to advance economic, social and sustainable development, SA GeoTech 2019 will look at putting geo-tech to work to benefit business, people, and for the country as a whole. The conference seeks to promote geospatial solutions and professionals, serve as a networking platform, and grow the sector and business alongside the South African economy.

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Email: charmaine.manicom@ee.co.za

Website: www.ee.co.za



RCMRD International Conference

Nairobi, Kenya; 14 – 16 August 2019

The Regional Centre for Mapping of Resources for Development (RCMRD) was established in Nairobi, Kenya in 1975 under the auspices of the United Nations Economic Commission for Africa (UNECA) and the then Organization of African Unity (OAU), today African Union (AU). RCMRD is an inter-governmental organization and currently has 20 contracting member states in the Eastern and Southern Africa Regions. The missions of RCMRD is to promote sustainable development in the member states through generation, application and dissemination of geo-information and allied ICT technologies, products and services. The 3rd RCMRD International Conference will have the theme ‘Earth Observation for Evidence-Based Decision Making’.

Tel +245 020 2680748 / 2680722

+254 723 786161 / +254 735 981098

Email: rcmrd@rcmrd.org

Website: <https://rcmrd.org/ric2019>



Africa Geospatial Data and Internet Conference

Accra, Ghana; 22 – 24 October 2019

Africa Geospatial Data and Internet Conference (AGDIC) serves to bring people together from various stakeholder groups as equals, in discussions on public policy issues relating to geospatial and Internet in Africa. While there is no negotiated outcome, AGDIC informs and inspires those with policy-making powers across all sectors. At the conference, delegates discuss, exchange information and share good practices with each other. AGDIC aims to facilitate a common understanding of how to maximize geospatial and Internet opportunities in Africa and address risks and challenges that arise.

Tel: +233 208128851

Email: info@afrigeocon.org or wisdom.dk@gmail.com

Website: www.afrigeocon.org

Africa joins in World Wetlands Day celebrations

The 2nd of February each year is celebrated as World Wetlands Day as adopted at the Convention on Wetlands on 2 February 1971, in the Iranian city of Ramsar. Each year since 1997, the Ramsar Secretariat has provided materials to help raise public awareness about the importance and value of wetlands.

This year a total of 1368 events celebrating World Wetlands Day world-wide were officially registered of which 75 were in African countries alone. This year’s theme was ‘wetlands and climate change’.

African countries which hosted events this year were inter alia: Algeria, Benin, Burkina Faso, Burundi, Cameroon, Cape Verde Island, Central African Republic, Comoros, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Libya, Madagascar, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Tanzania, Togo, Tunisia, Uganda, Western Sahara, Zambia and Zimbabwe.

Wetlands play a vital role by removing toxic substances and sediment from water, while they also improve downstream water quality and the overall health of communities. They are able to reduce the severity of droughts and floods by regulating stream flow and also help to purify water and provide habitat for many different plants and animals.

Besides these indirect benefits to society, wetlands provide many direct benefits in the form of resources such as fibre for making crafts as well as recreational opportunities. Wetland are threatened by lack of community awareness on their value and which often leads to their transformation by humans.

Sources <https://www.worldwetlandsday.org/>; <https://www.gov.za/WorldWetlandsDay2019>



The official Ramsar Secretariat poster for World Wetlands Day 2019

START opportunities for African Scholars

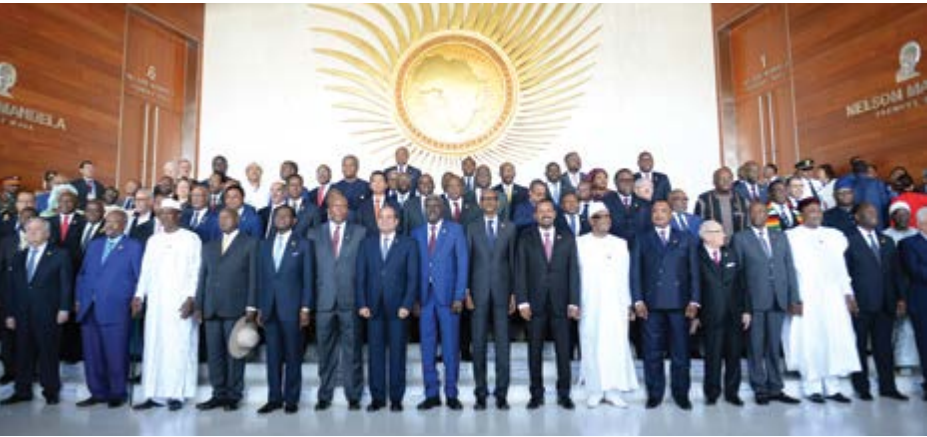
A number of jobs, scholarships and fellowships are offered by the START organization which provides opportunities for training, research, education and networking that strengthen scientific skills and inspire leadership for advancing solutions to critical sustainability challenges. For the past 25 years, they have provided scientists in Africa and Asia with skills, resources and networking opportunities. Because of START's efforts, thousands of program alumni are now creating innovative solutions for a more sustainable world.

See <https://start.org/about-us/> for more information.

Contract awarded for four Ethiopian satellites and ground station

China HEAD Aerospace Technology Co. and its subsidiary HEAD Technology France (“HEAD”), have been awarded a multi-million Euro contract through a consortium led by HEAD and its partner China Centre for Resources Satellite Data and Applications (CRESDA). The consortium won the international open tender issued by Ethiopian Space Science and Technology Institute (ESSTI) to procure a commercial Earth Observation (EO) satellite ground receiving station. Nine bidders participated in the tender. The contract includes operating the ground station to receive the data from four on-orbit optical satellites at 50cm resolution.

Source <https://africanews.space>



Heads of state and government, the AU leadership and officials of the AU Commission and AU organs, representatives of partner organisations, the diplomatic corps and invited guests at the 32nd Ordinary Session of the Assembly of the African Union where the appointment of Egypt as host to the new African Space Agency was ratified. Image: 2019 African Union Commission

Egypt to host African Space Agency

Egypt will host the new African Space Agency ahead of bids by Ethiopia, Namibia, Nigeria and Ghana. Namibia has withdrawn and Ghana’s bid was rejected as it was received after the 30 October, 2018 deadline.

The Egyptian bid has just been endorsed at the 32nd Ordinary Session of the Assembly of the African Union held at their headquarters in Addis Ababa, Ethiopia from 10 – 11 February 2019. The bid comes with a financial donation of \$10 million to the African Union.

See more about the African Space Policy at <https://au.int>.

World's premier gathering of space professionals this April in Colorado Springs

The 35th Space Symposium organized by the Space Foundation is not called the 'premier event for global space professionals' for nothing. The list of speakers for the event reads like the Who's-who of the space business. Leading the pack of some 100 speakers lined up are the likes of The Honorable, Heather Wilson, Secretary of the US Air Force, James Bridenstein, NASA Administrator, Gen. David L. Goldfein, US Air Force Chief of Staff, Gen. John E. Hyten, Commander of U.S. Strategic Command, and of course Thomas E. Zelibor, Space Foundation's Chief Executive Officer.

This will be in the company of the CEO's of practically every major space equipment manufacturer counting firms such as Lockheed Martin, Northrop Grumman, Nanoracks, Boeing, Arianespace, Iridium, Mitsubishi Heavy Industries, Made in Space, United Launch Alliance, Virgin Orbit, BAE Systems, Aerojet Rocketdyne and SES.

Not to be left out are the representatives of just about all the major national space agencies world-wide. These include inter alia Europe (ESA), the UAE, Italy, France, Japan, Canada, Poland, Germany, Australia, Mexico, North Korea, Greece, Luxembourg, the Netherlands and Ethiopia.

All these industry leaders will engage over 4 days from Monday, 8 April to Thursday, 11 April in Colorado Springs with some 9 000 attendees to discuss critical issues impacting all global space sectors and gain insights into the newest global space technology.



Thomas E. Zelibor, Space Foundation's Chief Executive Officer.



Some Space Symposium attendees in The Lockheed Martin Exhibit Centre. Images by spacesymposium.org.

Main items on the agenda are

- **The Space Generation Fusion Forum:** 6 April – 8 April
- **Yuri's Night:** Sunday, 7 April
- **Opening Ceremony:** Monday, 8 April
- **Grand Opening of The Lockheed Martin Exhibit Center and Pavilion:** Monday, 8 April
- **Space Technology Hall of Fame Luncheon:** Tuesday, 9 April
- **Corporate Member Appreciation Reception:** Tuesday, 9 April
- **Corporate Partnership Dinner:** Tuesday, 9 April
- **New Generation Space Leaders Events:** Tuesday, 9 April
- **Government Affairs Breakfast:** Tuesday, 9 April
- **General James E. Hill Lifetime Space Achievement Award Luncheon:** Tuesday, 9 April
- **Women's Global Gathering Luncheon:** Thursday, 11 April
- **Symposium Closing Cocktail Reception:** Thursday, 11 April
- **Symposium Closing Dinner:** Thursday, 11 April

Registration for certain events are still accepted until Thursday, 11 April.

See <https://www.spacesymposium.org> for more information.



A handout photo released on April 25, 2018 by the European Space Agency shows Gaia's all-sky view of our Milky Way Galaxy and neighboring galaxies, based on measurements of nearly 1.7 billion stars. (AFP/European Space Agency)

Patrick Galey © Agence France-Presse

The Hubble Telescope has produced images that lead scientists to believe there are more than 100 billion galaxies in the Universe, although many are too old and distant to be observed using traditional detection techniques.

A new map of the night sky now published charts hundreds of thousands of previously unknown galaxies discovered using a telescope that can detect light sources optical instruments cannot see.

The international team behind the unprecedented space survey said their

discovery literally shed new light on some of the Universe's deepest secrets, including the physics of black holes and how clusters of galaxies evolve.

"This is a new window on the universe," Cyril Tasse, an astronomer at the Paris Observatory who was involved in the project said. "When we saw the first images we were like: 'What is this?!' It didn't look anything at all like what we are used to seeing."

More than 200 astronomers from 18 countries were involved in the study, which used radio astronomy to look at a segment of sky over the northern hemisphere, and found 300 000

previously unseen light sources thought to be distant galaxies. Radio astronomy allows scientists to detect radiation produced when massive celestial objects interact.

The team used the Low Frequency Array (LOFAR) telescope in the Netherlands to pick up traces — or "jets" — of ancient radiation produced when galaxies merge. These jets, previously undetected, can extend over millions of light years.

"With radio observations we can detect radiation from the tenuous medium that exists between galaxies," said Amanda Wilber, of the University of Hamburg.

"LOFAR allows us to detect many more of these sources and understand what is powering them."

The discovery of the new light sources may also help scientists better understand the behaviour of one of space's most enigmatic phenomena.

Read more at <https://mg.co.za/article/2019-02-19-new-universe-map-unearths-300-000-more-galaxies>

Stunning "Earth" book by NASA available for free online

Swirling white clouds, deep blue oceans and multi-colored landscapes bring to life the pages of NASA's new 168-page book "Earth," a collection of dramatic images captured by Earth-observing satellites. The book is available now in hardcover and ebook, and online with interactive features.

From a lava field in Iceland to the icy Patagonian landscape of South America, the 69 images in "Earth" present our home planet's atmosphere, water, land, and ice and snow with short explanations of the science behind each image.

"The spectacular images in this book remind us of the majestic beauty of our world," said Lawrence Friedl, program director for the Applied Sciences Program in NASA's Science Mission Directorate, Earth Science Division in Washington. "We hope these images inspire everyone to explore, understand, and appreciate the planet we call home."

Images of Africa with their respective titles and page numbers include inter alia:

- 38 Madagascar Lofted Over Land
- 16 Mauritania Riding the Waves
- 74 Namibia Plankton and Sulfur
- 114 Namibia Linear Dunes Caprivi Strip
- 124 Namibia Tsauchab River Bed
- 82 Tanzania Scarlet Lake Natron
- 108 Tanzania The Zones of Kilimanjaro

"Earth" is available for purchase in hardcover from the U.S. Government Publishing Office at: <https://bookstore.gpo.gov/products/earth-book>

A free ebook version of "Earth" can be downloaded at: https://www.nasa.gov/connect/ebooks/earth_detail.html

For more information about NASA's Earth science programs, visit: <https://www.nasa.gov/earth>



This image titled the 'The Zones of Kilimanjaro Tanzania' on page 108 in "Earth" depicts the diverse vegetation zones surrounding the mountain which rises from the hot, dry savanna, through rainforest and hardy scrublands to a rocky icy summit.

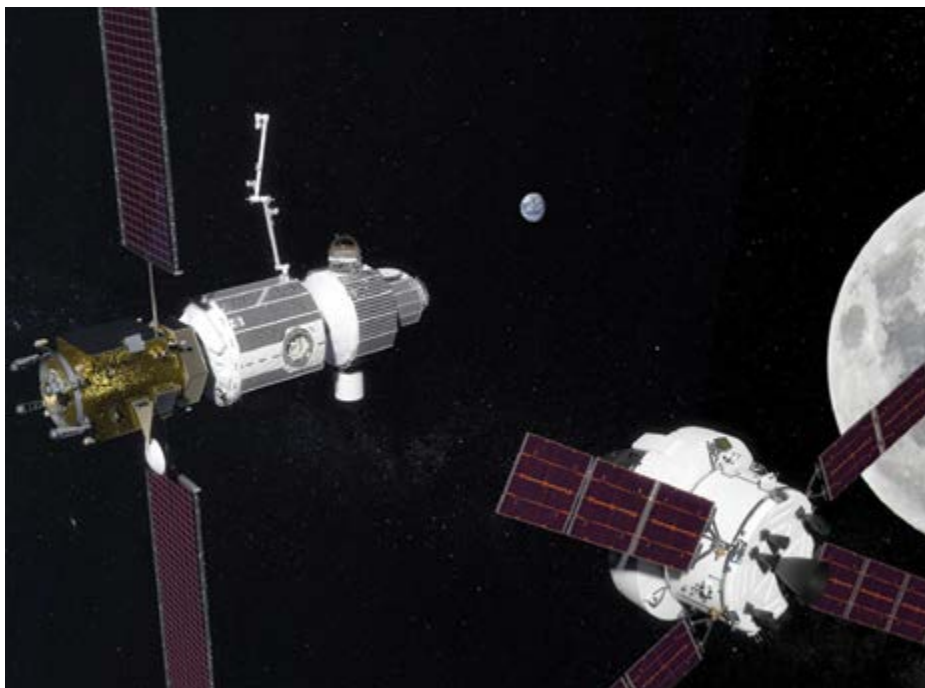
NASA plans Moon stopover for trip to Mars

NASA recently announced that for human astronauts, the path to Mars will include a stop at the moon, where the agency may build a facility currently being called the Deep Space Gateway. That structure could serve as a kind of way station between the Earth and the Red Planet.

Those objectives call for a sustainable human return to the moon, rather than the transient, flags-and-footprints approach of Apollo. Establishing a permanent presence on and around the moon is an aim in itself, but it will also teach NASA and its partners the technologies and skills required to push out even farther into the solar system, to Mars and beyond, NASA Administrator Jim Bridenstine and other agency officials have said.

For example, water ice mined from permanently shadowed craters near the lunar poles could be split into its constituent hydrogen and oxygen — prime components of rocket fuel. This propellant could then be hauled up to off-Earth depots, which could fill the tanks of spaceships bound for Mars or other distant destinations. This strategy could spur a new era of exploration, freeing humanity from the need to launch huge amounts of fuel out of Earth's substantial gravity well, space-mining advocates have stressed.

The centerpiece of NASA's crewed moon plans, at least in the short term, is the Lunar Orbital Platform-Gateway. This small, moon-orbiting space station will be assembled and visited with the aid of NASA's Space Launch System



*An artist rendition of NASA's Lunar Orbital Platform-Gateway due to be completed by 2024.
Image: www.nasa.gov*

mega rocket and Orion capsule, both of which are in development. The Gateway will house up to four astronauts for a month or two at a time and serve as a hub for robotic and crewed exploration of the lunar surface.

The first element of the Gateway — its power and propulsion module — is scheduled to launch in 2022. Other key pieces will be lofted shortly thereafter. If all goes according to plan, astronauts could visit the outpost as early

as 2024 and start making trips to the lunar surface a few years later, before the end of the 2020s, NASA officials have said.

Sources:

<https://www.space.com/41691-nasa-astronauts-return-moon-budget.html>

<https://www.space.com/39050-trump-directs-nasa-humans-to-moon.html>

The human body's reaction to space travel under scrutiny

NASA is conducting a unique study to test the human body's reaction to long periods in space exposed to the rigors of microgravity, radiation and high levels of carbon at the International Space Station.

Astronauts normally do a six months stint at the space station before they return home. In this study the astronaut Scott Kelly spent 340 days in space while his identical twin brother Mark Kelly stayed on earth as a control. This allows for a comparison at molecular level as identical twins have exactly the same genes. Geneticists at New York's Weill Cornell Medicine report that Kelly's immune system showed signs of hyperactivity as if his body is reacting to a foreign organism but there is no reason for concern at this stage.

Normally astronauts experience headaches and difficulties with digestion but recover soon when they are back on earth. The Russian astronaut Valeri Polyakov holds the record for 437 days in space and researchers who studied him afterwards came to the conclusion that it is possible to maintain a stable mood and function normally during long spaceflights. Astronauts traveling to Mars one day will spend a minimum of 30 months in space. The effects of the rigors of space on the human body for such an extended period is still unknown, hence the study by NASA.

Sources: <https://www.revolvy.com/page/Valeri-Polyakov>
<https://www.sfchronicle.com/nation/article/Twins-in-NASA-research-offer-clues-to-rigors-of-13622633.php>



Mark Kelly and his identical twin brother Scott Kelly who are subjects of a NASA study on the effects of extended space travel.

Image: www.nasa.gov