

CONTENT

Editorial • Membership

- 2 From the Editor
- 2 AARSE membership news
- 2 Editorial Contact Details

AARSE News

- 3 Message from the President
- 3 AARSE Trustees and Councillors
- 4 COVID-19 pandemic: 13th AARSE Conference moved to 2021
- 5 AARSE 2020 Travel Fellowships Call for Applications
- 5 Call for expression of interest to host AARSE conferences
- 6 AARSE produces milestone publication to commemorate 12th biennial conference

Africa Space News

- 8 Focus on an African Space Science Personality: Prof Olajide Kufoniyi
- 10 Africa needs the space industry to go forward: Overview T. Woldai article
- 12 MENA research awards open for submissions

International Space News

- 13 International & African Space Conference Diary 2020/21
- 14 Hubble celebrates 30th with stunning image
- 14 Tunisia to launch 1st satellite by Nov 2020
- 15 Nepal red pandas tracked by satellite
- 15 Mars rover ready for launch this July
- 16 A new era dawns for human spaceflight

HEADLINES

Message from the President

I must sadly concede that there are still no signs of the worldwide COVID-19 pandemic abating. Although Africa has been spared the brunt of the disaster so far it is possible that the worst is still awaiting our continent. It is therefore comforting to know that African Union Commission has rolled out a Partnership to Accelerate COVID-19 Testing (PACT)...p3

COVID-19: 13th AARSE Conference moved to 2021

The date for the 13th biennial international conference of the African Association of Remote Sensing of the Environment (AARSE) has been moved from October this year to 29 March 2021 due to the COVID-19 pandemic...p4



AARSE produces milestone publication for 12th

The African Association of Remote Sensing of the Environment (AARSE) in collaboration with Springer publications has just published a compendium of lectures delivered at its 12th biennial conference with the title *Earth Observations*...p6



African Space Science Personality: Prof Olajide Kufoniyi

Prof Olajide Kufoniyi is at present a professor of Geoinformatics with the Obafemi Awolowo University (OAU), Ile-Ife, Nigeria, a post he held since December 2008. He joined the university after completing a tenure as the Executive Director...p8



Africa needs the space industry to go forward

The African continent is bound to become increasingly more dependent on the space industry for job creation, poverty alleviation and sustainable resource management. These were some of the findings in a paper recently published...p10



MENA research awards open for submissions

The IEEE Geoscience and Remote Sensing Society (GRSS) launched three new initiatives open to all remote sensing communities in the Middle-East and North Africa (MENA) area. The Geoscience and Remote Sensing Society...p12



Nepal red pandas tracked by satellite

Conservationists are satellite tracking red pandas in the mountains of Nepal to find out more about the factors that are driving them towards extinction. The mammals are endangered with numbers down to a few thousand in the eastern Himalayas...p15



A new era dawns for human spaceflight

A new era of human spaceflight is set to begin as American astronauts once again launched on an American rocket from American soil to low-Earth orbit for the first time since the conclusion of the Space Shuttle Program in 2011...p16



From the Editor

NASA's SpaceX Demo-2 mission to the International Space Station last month with astronauts Robert Behnken and Douglas Hurley on board marked the start of a new phase in the USA's space exploration program.



Much has been made of the fact that this was the first time since the conclusion of the Space Shuttle Program in 2011 that an American rocket is now used to transport their own astronauts to the International Space Station thereby breaking their reliance on the Russian Soyuz rockets. But it sets the stage for bigger things. Private companies had to vie for this honour with SpaceX beating Boeing to the post is significant in that deep space exploration, although largely government funded, is now partly commercially driven with the big prizes a landing on the Moon and ultimately Mars.

Although Elon Musk's SpaceX Crew Dragon spacecraft on top of their Falcon 9 rocket took the limelight last month, companies such as Boeing, Blue Origin, Dynetics, Lockheed Martin, Northrop Grumman and Draper Labs are all in the mix to make NASA's Armetis program work which will see humans set foot on the Moon again by 2024.

The Armetis program will consist of a base camp on the moon for exploration trips backed up by an orbiting waystation called Gateway which will be the first port of call for visiting astronauts from Earth. While this will give humans a permanent presence on the moon it will also serve as an experiment for the long-duration space travel and systems needed for the ultimate trip to Mars.

Elon Musk has been making a lot of noises about landing humans on Mars with his own rockets but whether it would happen in his lifetime remains to be seen. The conservative estimate for humans setting foot on Mars is unfortunately not before 2030 and possibly only by 2039. That is to say if space scientists overcome a huge number of obstacles to ensure that we can bring our astronauts back alive.

The best launch window for an Earth to Mars trip happens only every 26 months when the planets are lined up for the shortest route going there. A round trip to Mars will be close to 20 months which includes 7 to 9 months inbound, a 3 to 4 months for exploration and stay to wait for a launch window back and then up to 9 months back to Earth. A crew of six needs millions of pounds of supplies for a trip such as this.

NASA is currently developing its own Space Launch System which consists of varying heavy lift rockets to take humans and cargo on deep space trips to the Moon and beyond. Before humans can be on board for a trip to Mars a test run needs to be done which will probably be a sample return mission left by the Perseverance Rover on the surface of Mars.

The Perseverance is NASA's latest Mars-bound rover to be launched towards the end of July or early August this year. Apart from collecting samples on Mars and leaving it for collection later on it will also have special instruments on board to find out if any oxygen can be extracted from the Martian atmosphere which is 96% carbon dioxide. There are also ample signs of Mars' watery past but whether that water is still locked up in usable quantities under the surface still needs to be ascertained. Scientists are keen to find usable water and oxygen on Mars which could be used for the manufacture of rocket fuel.

The human effort of reaching out to space has been compared to the endeavours of our seafaring forefathers who took on the mighty seas of the world in nothing more than flimsy wooden ships centuries ago. All in all space travel as with sea travel before takes time and it's dangerous but reaching out into the unknown regardless of the price to be paid sums up the human spirit. A precious quality that drives us forward.

Anthony Penderis - Editor

Subscribe to AARSE and help us make a difference

By subscribing to AARSE you will strengthen our hand in creating an enabling environment for the continent of Africa to derive benefits from, and contribute to international space science, technology and application programmes. We strive to improve the living conditions and future prospects of all the African continent's peoples. See the full list of our objectives at <http://africanremotesensing.org/overview/>

If you want to sign up or renew your membership follow the link <http://africanremotesensing.org/join-us/> and choose your option such as Student Member, Regular Member, Corporate Member, etc. We accept Visa and MasterCard payments through our PAYGATE portal, but also have a free Online Naira option available plus a direct EFT option.

If you experience any problems with payments or need additional information regarding membership please send a message to members@africanremotesensing.org

Membership Privileges: See the 10 reasons why you should join AARSE at <http://www.africanremotesensing.org/Why-Join-AARSE>

AARSE Editorial Contact Details

The AARSE Newsletter is an official publication of the African Association of Remote Sensing of the Environment. During the year 2020 it will be published at least six times starting February 2020 and thereafter every second month until December 2020.

Website: <http://www.africanremotesensing.org/>

General Enquiries: info@africanremotesensing.org

President

Prof. Kamal Labbassi
Chouaib Doukkali University, El Jadida, Morocco
kamal_labbassi@yahoo.fr

Communications Manager

Dr Souleye Wade
CEO African Institute of Geomatics Technical Director BEST
(Bureau d'Etudes en Sciences de la Terre & Environnement)
President ASPG (Association Sénégalaise des Professionnels de la Géomatique); www.aspg-sn.org
wadesouleye@yahoo.fr

Newsletter Editor

Anthony Penderis newsletter@africanremotesensing.org

To unsubscribe from this newsletter please send an email to newsletter@africanremotesensing.org



Dear Readers

I must sadly concede that there are still no signs of the worldwide COVID-19 pandemic abating. Although Africa has been spared the brunt of the disaster so far it is possible that the worst is still awaiting our continent.

It is therefore comforting to know that African Union Commission has rolled out a Partnership to Accelerate COVID-19 Testing (PACT) on the continent by way of its Commission for Social Affairs. This initiative which is an outflow of the African Union Joint Continental Strategy for COVID-19 has the clear objective to co-ordinate actions and build strong partnerships to the strengthen the effectiveness of response across Africa. To test, isolate and treat a substantial percentage of Africa's 1.2 billion people is a mammoth task and we therefore wish H.E. Mrs Amira Elfadil Mohammed, the Commissioner for Social Affairs, and her team all the best for a successful outcome.

We also thank the AU's Africa Centre for Disease Control for their role in mobilizing numerous role players in fighting this pandemic and especially keeping a watchful eye over the spread of the disease on our continent.

The COVID-19 pandemic unfortunately also had its effect on our organization's operations in that it left us with no choice but to postpone the 13th AARSE Conference to be held in Kigali, Rwanda, from October this year to late March next year. After some delibe-

Message from the President

ration between the AARSE Executive Committee and the Local Organizing Committee at Ines-Ruhengeri in Kigali it was agreed that a postponement of the Conference is a much better option. Apart from the logistical challenges the COVID-19 would present to a Conference this year, it was clear that the mood is simply not right to present an event with a celebratory atmosphere right now.

On a more positive note I would like to congratulate each and every one involved in producing our recent publication to commemorate our 12th biennial conference in Alexandria, Egypt two years ago. The publication by Springer with the title *Earth Observations and Geospatial Science in Service of Sustainable Development Goals: 12th International Conference of the African Association of Remote Sensing and the Environment* is a compendium of our selection of the best papers presented at the conference. It is indeed a pleasure and honour to see AARSE produce such a milestone publication which puts a stamp on the quality of work we, with our co-workers, are capable of. There are too many names to mention here, so once again thanks to all those who were involved in this selfless task of which we give an overview in this newsletter.

All the best and stay safe.

Prof Kamal Labbassi

AARSE President 2018 - 2022

AARSE2020 conference postponed Announcement: June 25, 2020

AARSE officially announces that due to the coronavirus crisis, the 13th edition of the AARSE conference (AARSE2020) to be held in Kigali, Rwanda, has been postponed to March 29 - April 2, 2021. The Executive Council of AARSE (EC-AARSE) is aware that this decision has many consequences, but the very real health risks and the capacity to travel for the conference participants did not leave us with any other alternative.

All conference registrations already done will be carried forward to next year. This means that anybody who has registered and paid the registration can use that fee to participate in the conference in March 2021, and if desired, submit a new paper for the March 2021 conference.

Sponsors and exhibitors are also encouraged to maintain their involvement in the AARSE 2020 conference even though it is postponed by five months. The involvement of companies in the activities of AARSE is indeed essential.

The EC-AARSE, in close collaboration with the LOC of AARSE2020, is diligently working on developing the details of this transition and will make corresponding announcements in subsequent communications as things progress.

All the best and hoping to see you in Kigali in March 2021.

Prof. Kamal Labbassi, AARSE President
Dr. Fabian Hagenimana, Conference Director, AARSE2020

Members of AARSE Council (2018 - 2022)

Prof. Kamal Labbassi	President
Dr. Solomon Tesfamichael	Secretary General
Dr. Abel Ramoelo	Treasurer
Dr. Souleye Wade	Communications Manager
Dr. Mahamadou Keita	Councillor for West Africa
Prof. Islam Abou El-Magd	Councillor for North Africa
Dr. Yazidhi Bamutaze	Councillor for East Africa
Dr. Aboubakar Mambimba Ndjoungui	Councillor for Central Africa
Dr. Solomon Tesfamichael	Councillor for South Africa
Prof. Olajide Kufoniya	Immediate Past-President

Board of Trustees

Prof. Olajide Kufoniya	Trustee
Dr. Woldai Tsehaie	Trustee
Prof. Harold Annegarn	Trustee and bank signatory
Dr. Sias Mostert	Trustee and bank signatory
Prof. Peter Zeil	Trustee

COVID-19: 13th AARSE Conference moved to 2021



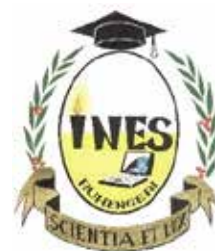
The date for the 13th biennial international conference of the African Association of Remote Sensing of the Environment (AARSE) has been moved from October this year to 29 March 2021 due to the COVID-19 pandemic.

As previously planned the Conference, co-hosted by the Ines-Ruhengeri Institute of Applied Sciences (Ines-Ruhengeri), will still be held in Kigali, Rwanda now from 29 March to 2 April 2021 at the Kigali Conference and Exhibition village (KCEV). The theme for the

AARSE 2021 Conference will be *Space and geospatial technologies for the Africa we want.*

The main objective of AARSE 2021 is to bring together scholars and professionals from the African and international community to present latest achievements, discuss challenges and share experiences in space and geospatial technologies. The conference program will feature keynote speeches delivered by leading policy makers, scholars, technical sessions with reports of the latest research outcomes, discussion sessions on operational topics such as capacity building, Spatial Data Infrastructure (SDI), space policy, programs and projects, as well as commercial exhibitions showing latest products and services in remote sensing and geospatial information technologies.

Paper selection however will still be based on abstracts and full paper peer review following the guidelines provided in the "Call for Paper" document alongside the details of the regis-



tration fees that is currently available on the conference website.

Abstracts have to include enough information on the thematic focus, methodology, contribution to knowledge, policy making, implementation, etc. to be considered for review. Papers should be submitted in Microsoft Word format, the submission deadline has been extended for both the abstracts and the full paper and a date of the deadline will be provided in the next issue of the newsletter. The deadline for abstract submissions is 20th August 2020. See www.aarse2020.org for more information.



The main building at the Kigali Conference and Exhibition village (KCEV) the venue for 13th AARSE Conference from 29 March to 2 April 2021. It is the premier gathering in Africa for leading scholars from the remote sensing, geospatial information science and related communities. The Conference is co-hosted by the Ines-Ruhengeri Institute of Applied Sciences (Ines-Ruhengeri). Image: www.visitrwanda.com.

Call for abstracts AARSE Conference 2021

The 13th AARSE Conference has been postponed from October 2020 to 29 March 2021 due to the COVID-19 pandemic. The new abstract submission deadline is now 20 August 2020. Interested parties are therefore invited to submit abstracts until the new deadline while taking the following into account.

Main Theme

Space and geospatial technologies for the Africa we want.

Sub-themes

1. Remote sensing for natural resource management
2. EO and geospatial information for sustainable human security
3. Geospatial information for smart city development
4. Space and geospatial technologies for land administration and management
5. Space technology for environmental monitoring and sustainability
6. Space technology in natural hazard and disaster management
7. Integrated geospatial technologies in agriculture and food security
8. Remote sensing climate change adaptation and mitigation strategies
9. African Space Development under the African Space Agency
 - a. Space Capacity building and utilization
 - b. Innovative space technologies
10. Big data analysis and spatial data infrastructures

Abstracts should be submitted in Microsoft Word format by 20 August 2020 at 00:00 GMT. Abstracts have to include enough information on the thematic focus, methodology, contribution to knowledge, policy making, implementation, etc. to be considered for review.

Find the abstract form and submission link [here](#).

Six travel scholarships on offer for 13th AARSE Conference to be held in March 2021

AARSE is pleased to announce that this year up to six travel scholarships will be awarded to support young African-resident remote sensing practitioners or students to attend the 13th AARSE CONFERENCE in Rwanda now postponed from October 2020 to March 2021 due to the COVID-19 pandemic. AARSE invites eligible persons to apply for a 2020 IEEE GRSS - AARSE TRAVEL FELLOWSHIP through the application form which can be downloaded at <https://africanremotesensing.org/opportunities/>



This travel fellowship is structured to support travel costs (air fare, ground transport in Rwanda and possible ground transport if living more than 50 km from an international airport), accommodation and registration fees to attend the conference. Beneficiaries of the fellowships shall be African scientists or students who have had a paper accepted for oral or poster presentation at the AARSE biennial or IGARSS annual conferences plus they should meet the following requirements:

1. An application form and all supporting documents, including an extended abstract (up to two pages), have been received by the Evaluation Committee by 31 October 2020.
2. The recipient shall have submitted a full paper for the conference for platform or poster presentation in accordance with the deadlines and the formatting style set by the conference organisers.
3. The recipient is a citizen of an African country whose current place of residence is in Africa at the time of the application.
4. The recipient must be a registered member of AARSE or IEEE-GRSS by 31 January 2021.
5. Preference will be given to young and mid-career professionals (within 10 years of award of doctoral degree). The professional status (student, lecturer, professor) shall otherwise not be basis for exclusion.

6. The recipient has not previously received an award for one of these fellowships.
7. Applicants shall submit the online application form, supported by the following documents:
 - a. A copy of the applicant's CV
 - b. An extended abstract (up to two pages 1,000 words maximum) of the conference presentation
 - c. A letter of motivation and commitment. This letter shall include:
 - i. A declaration that the applicant has not previously been awarded an IEEE GRSS/AARSE Travel Fellowship.
 - ii. A declaration that the applicant is a member of AARSE or IEEE GRSS, and will become a member on or before 31 January 2021.
 - iii. A commitment that the applicant will submit a trip report to the Board of Trustees within one month after the conference.
 - iv. A commitment that the applicant will acknowledge sponsorship in their presentation, and in any publication resulting directly from the conference presentation, with words: "The author acknowledges financial support through an IEEE GRSS/AARSE TRAVEL FELLOWSHIP".
8. Exclusions: The support package will not include any cash disbursements on site. Meal expenses other than provided as part of the conference registration and other incidental expenses will be the applicants own account. Cost of applying for a passport will be for the applicant's account. Costs of visa applications may be considered depending on funding availability and employment/student status of applicant

To allow adequate time for evaluation, visa applications and travel arrangements, the Evaluation Committee will make provisional awards by 31 January 2021. Please complete the online application form and send it (together with the attachments mentioned above) not later than 31 October 2020 by email to all three addresses below:
 Prof Mike Inggs: mikings@gmail.com
 Prof Harold Annegarn: hannegarn@gmail.com
 Prof Peter Zeil: peter.zeil@sbg.ac.at

Call for expression of interest to host AARSE conferences

AARSE invites expressions of interest from national institutional members and other organizations or agencies in Africa for the hosting of the 14th Conference of the Association in 2022. Bids can also be received for the 15th edition (2024) and the 16th edition (2026). Although the 2020 conference has been postponed to March 2021 due to the COVID-19 pandemic, it is usually held in the last week of October of every even-number year.

For the 2022 edition, first preference will be given to applicants from the West Africa sub-region followed by southern Africa sub-region in line with the AARSE principle of rotational hosting. It should be noted that AARSE does not provide funds for the hosting organization but the Association can and will solicit for international funding on behalf of the organization towards a successful hosting of the conference, and provide guidance to the Local Organizing Committee on soliciting sponsorships and commercial exhibitors within the host country.

Interested organizations are encouraged to address any further

inquiries to either Prof. Kamal Labbassi or Dr. Mahamadou Keita (see contact details below) regarding a possible bid. This solicitation of a conference host is an open process and may be discussed with any of the AARSE Council members.

We plan to reach a decision on a host country and organization at the AARSE 2020 conference taking place in Kigali City, Rwanda now postponed to March 2021 where each applicant will be expected to attend and make a presentation to the AARSE Executive Council during the conference. However, discussions will be ongoing until suitable hosting arrangements have been finalized.

The format and all the details of the expression of interest needed can be obtained from Dr. Keita below and the final presentation should be emailed at the latest by 31 January 2021 to:

Dr. Mahamadou Keita; Secretary General: AARSE; councillor_wa@africanremotesensing.org; ormskeita2002@gmail.com
 With copy to: Prof. Kamal Labbassi; President: AARSE
kamal.labbassi@africanremotesensing.org;
labbassi@ucd.ac.ma; or kamal_labbassi@yahoo.fr

AARSE produces milestone publication to commemorate 12th biennial conference

The African Association of Remote Sensing of the Environment (AARSE) in collaboration with Springer publications has just published a compendium of lectures delivered at its 12th biennial conference with the title *Earth Observations and Geospatial Science in Service of Sustainable Development Goals: 12th International Conference of the African Association of Remote Sensing and the Environment*.

The 12th International Conference was held in Alexandria, Egypt from 25 to 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.

A total of 16 papers were selected for this publication to be published by Springer under their Southern Space Studies Series which 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 publication was overseen by Annette Froehlich as Series Editor assisted by Dirk Heinzmann and André Siebrits as Associate Editors with Souleye Wade as Managing Editor assisted by a further 19 Advisory Editors. See full list on page 7.

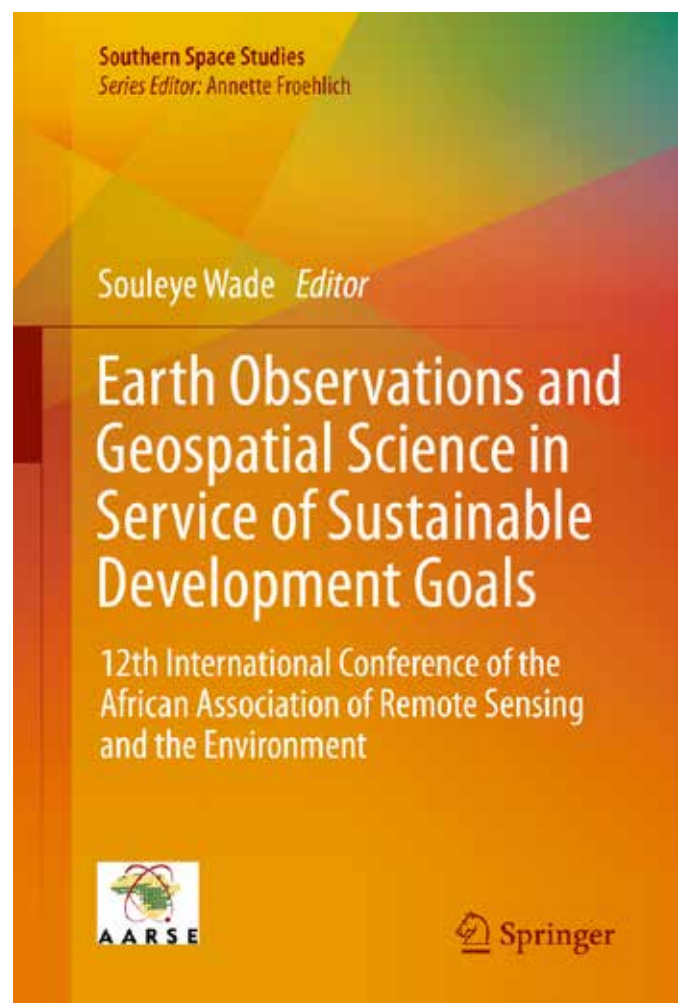
Synopsis

This book provides a unique insight into the research and recent developments undertaken among the African Remote Sensing community in regard to the environment. It includes reports of the latest research outcomes in the field of remote sensing and geospatial information technologies, analyses discussions around operational topics such as capacity building, Spatial Data Infrastructure (SDI), applications of advanced remote sensing technologies (LiDAR, Hyperspectral) in Africa, big data, space policy, and topics of high actuality in the field of climate changes, ocean and coastal zone management, early warning systems, natural resources management or geospatial science for sustainable development goals.

The book comprises the contributions of the 12th AARSE (African Association of Remote Sensing of the Environment) International Conference which is conducted biennially across Africa, alternately with the AfricaGIS conference. It is the premier forum in Africa for research on remote sensing technologies and geospatial information science, gathering leading scholars from the remote sensing and related communities. The 12th AARSE Conference held in Alexandria, Egypt was co-organised by the Arab Academy of Science and Technology, in partnership with the National Authority for Remote Sensing & Space Sciences (NARSS) of Egypt. It was a continuation of a long series of successful AARSE conferences which started in 1996, in Harare (Zimbabwe) and has been held in Abidjan (Cote D'Ivoire) in 1998, Cape Town (South Africa) in 2000, Abuja (Nigeria) in 2002, Nairobi (Kenya) in 2004, Cairo (Egypt) in 2006, Accra (Ghana) in 2008, Addis Ababa (Ethiopia) in 2010, El Jadida (Morocco) in 2012, Johannesburg (South Africa) in 2014, and in Kampala (Uganda) in 2016. The book is mainly addressed to practitioners and experts from academia, politics and industry.

This book or chapters thereof in various formats can be ordered online at the following link:

<https://www.springer.com/gp/book/9783030160159>



Continued on page 7 ...

...continued from page 6

Earth Observations and Geospatial Science in Service of Sustainable Development Goals

Table of contents with 16 chapter titles and authors below.

Part 1: Space and Geospatial Science for Sustainable Development Goals

1.1 *Earth Observation for Water Resource Management and Sustainable Development*
Mads O. Rasmussen, Radoslaw Guzinski, Christian Tøttrup, Michael Riffler, Marc Paginini, Benjamin Koetz

1.2 *River Long Profiles of Selected Third-Order Basins in Basement Complexes*
Adeyemi Olusola, Olutoyin Fashae

1.3 *A Remote Sensing Based Approach for Optimizing the Sampling Strategies in Crop Monitoring and Crop Yield Estimation Studies*

Babacar Ndao, Louise Leroux, Abdoul Aziz Diouf, Valerie Soti, Bienvenu Sambou

Part 2: Remote Sensing and GIS for Natural Resources Management

2.1 *GIS Based Analysis of the Extent and Dynamic of Forest Cover Changes Between 1990–2017 Using Geospatial Techniques: In Case of Gog District, Gambella Regional State, Western Ethiopia*

Obang Owar, Sintayehu Legesse, Dessalegn Obsi

2.2 *Conflict and Agricultural Production: Using Earth Observation to Assess Productivity and Support Rehabilitation in Syria*

Annemarie Klaasse, Eva Haas, Remco Dost, Michael Riffler, Bekzod Shamsiev

2.3 *Morphometric Analyses of Tarhuna Drainage Basins to Accesses Groundwater Potential Using GIS Techniques*
Mamdouh M. El-Hattab, Abdulaati Ahmed, Mohamed El-Raey

2.4 *Change Detection in the Horticultural Region of Cape Town Using Landsat Imagery*
Kevin Musungu, Zamambo Thobeko Mkhize

Part 3: Remote Sensing of the Ocean and Coastal Zone Management

3.1 *Assessment of Lake Victoria's Trophic Status Using Satellite-Derived Secchi Disk Depth*

Ingrid Martha Kintu, Anthony Gidudu, Lydia Letaru

Part 4: Applications of Advanced Remote Sensing Technologies (LIDAR, Hyperspectral) in Africa

4.1 *Application of Unmanned Aerial Vehicle (UAV) for Small Scale Precision Farming in Botswana*

Basuti Gerty Bolo, Dimane Mpoeleng, Irina Zlotnikova

Part 5: Climate Changes Implications on Sustainable Development in Africa

5.1 *Spatiotemporal Analysis of Sitatunga (Tragelaphus Spekei) Population's Response to Flood Variability in Northern Botswana Wetlands: Implications for Climate Change Mitigation*

Kelebogile B. Mfundisi

5.2 *Assessment of the Impact of Deforestation on Forest Carbon Storage. A Case Study of Mabira Forest, Uganda*

Evet Naturinda, John Richard Otukey, Allan Mazimwe

Part 6: Space Technologies and Geospatial Sciences for Early Warning Systems

6.1 *Analysis of the 2012 Flooding Events Downstream of Shiroro Reservoir, A Case of Gurmana Niger State, Nigeria*

Rukayyah Abubakar Bahago, Aishetu Abdulkadir, Halilu Ahmed Shaba, Abubakar Alhassan

Part 7: Big Data and Data Mining of Geospatial Data

7.1 *Remote Sensing Analysis of the Evolution and Retreat Dynamics of the Auchli Gully, Southwestern Nigeria*

Adeleye Yekini Biodun Anifowose

7.2 *Optimizing the Selection of Spatial and Non-spatial Data for Higher Accuracy Multi-scale Classification of Urban Environments*

Guy Blanchard Ikokou, Julian Lloyd Smit

7.3 *Investigating the Potential of Common Earth Observation Satellite Imagery for Automated Multi-criteria Mapping of Urban Landscape at Municipal Level in South Africa*

Guy Blanchard Ikokou, Julian Smit

7.4 *Integrating GIS and Remote Sensing for Suitability Assessment of Dams in Solai Nakuru: Kenya*

Kwatsima Brian Andala, Ruth Khatioli Sirengo

Part 8: AARSE Alexandria Declaration 29th October 2018

Series Editor

Annette Froehlich: University of Cape Town, Rondebosch, South Africa

Associate Editors

Dirk Heinzmann: Bundeswehr Command and Staff College, Hamburg, Germany

André Siebrits: University of Cape Town, Rondebosch, South Africa

Managing Editor

Souleye Wade: African Institute of Geomatics/BEST

Advisory Editors

Josef Aschbacher: European Space Agency, Frascati, Italy

Rigobert Bayala: National Observatory of Sustainable Development, Ouagadougou, Burkina Faso

Carlos Caballero: León, Peruvian Space Agency, Lima, Peru

Guy Consolmagno: Vatican Observatory, Castel Gandolfo, Vatican City State

Juan de Dalmau: International Space University, Illkirch-Graffenstaden,

France Driss El Hadani: Royal Center for Remote Sensing of Morocco, Rabat, Morocco

El Hadi Gashut: Regional Center For Remote Sensing of North Africa States, Tunis, Tunisia

Peter Martinez: University of Cape Town, Rondebosch, South Africa

Francisco Javier: Mendieta-Jiménez, Mexican Space Agency, Mexico City, Mexico

Félix Clementino: Menicocci, Argentinean Ministry of Foreign Affairs, Buenos Aires, Argentina

Sias Mostert: African Association of Remote Sensing of the Environment, Muizenberg, South Africa

Val Munsami: South African National Space Agency, Silverton, South Africa

Greg Olsen: Entrepreneur-Astronaut, Princeton, New Jersey, USA

Azzedine Oussedik: Algerian Space Agency, Alger, Algeria

Xavier Pasco: Foundation pour la Recherche Stratégique, Paris, France

Alejandro J. Román M: Paraguayan Space Agency, Asunción, Paraguay

Kai-Uwe Schrogl: International Institute of Space Law, Paris, France

Dominique Tilmans: YouSpace, Wellin, Belgium

Jean-Jacques Tortora: European Space Policy Institute, Vienna, Austria

Focus on an African Personality in Space Science and Technology

Prof Olajide Kufoniyi

An accomplished academic who made significant impact in higher institutions of learning in Africa as well as driving human capacity building at institutional, organizational and international levels in the fields of geoscience and earth observation is but one way to describe Prof Olajide Kufoniyi, our choice for this month's African Personality in Space Science and Technology. In this article we cover only some of his background and achievements thus far - Editor

Prof Olajide Kufoniyi is at present a professor of Geoinformatics with the Obafemi Awolowo University (OAU), Ile-Ife, Nigeria, a post he held since December 2008. He joined the university after completing a tenure as the Executive Director of the Regional Centre for Training in Aerospace Surveys (RECTAS), Ile-Ife, now called African Regional Institute for Geospatial Information Science and Technology (AFRIGIST). Currently most of his time is occupied with academic activities such as teaching, research and supervision of student dissertations and theses. Sometimes he also renders consultancy services in his field.

Prof Kufoniyi completed his secondary school education at the Baptist Boys' High School in Abeokuta, Ogun State, Nigeria and went on to qualify with a B.Sc. (Hons) in Geography at the University of Ife (now Obafemi Awolowo University) and then a Postgraduate Diploma PGD) in Surveying at the University of Lagos in Nigeria. He then attended the International Institute for Geoinformation Science and Earth Observation (ITC), Enschede, The Netherlands for PGD and M.Sc. in Photogrammetry and Ph.D. in Geoinformatics in affiliation with Wageningen University in May 1995.

As a working academic he taught at numerous Nigerian institutions either as lecturer (Federal School of Surveying), senior lecturer (University of Lagos), Rector (Federal School of Surveying), Executive Director (RECTAS), Visiting Professor (Federal University of Technology) or Professor (Obafemi Awolowo University).

The number of advisory and editorial boards, councils, associations, technical commissions he served on amount to some 30 in total so far including inter alia:



1. President of the African Association of Remote Sensing of the Environment (AARSE) (2010 to 2018);
2. Member, Regional Committee of Experts on the UN Global Geospatial Information Management (UN-GGIM) in Africa, UN-ECA, Addis Ababa (2015 to 2019);
3. African Board member, Bill and Melinda Gates Foundation on the Application of GIS in Agricultural Production in sub-Saharan Africa (2008 to 2009);
4. Member, Policy Coordination and Advisory Committee (PCAC), GMES & Africa, African Union Commission (2016 till 2019);
5. Chairman, Working Group on Research, International network on Capacity Building in Geoinformation Science and Earth Observation (GI-NET), International Institute for Geoinformation Science and Earth Observation (ITC), Enschede, The Netherlands (2004/2005); and

6. Member of the International Policy Advisory Committee of the International Society for Photogrammetry and Remote Sensing (ISPRS) (2019 till date).

His published works in journals, contributions to books, conference proceedings and papers, seminars, technical reports and workshops add up to more than 100 in total.

Among his distinctions and awards count inter alia the following:

1. Honorary Fellowship Award, Federal School of Surveying, Oyo, Nigeria, December 2019;
2. Merit Award, Baptist Boys' High School, Abeokuta Old Boys' Association, January 2012;
3. Presidential Award of the Nigerian Institution of Surveyors (NIS) 2009;
4. Special recognition of positive contributions to Geo-information activities in Africa by the United Nations Economic Commission for Africa (UN-ECA) during CODIST-1 Session in Addis Ababa, Ethiopia, May 2009;
5. International Society for Photogrammetry and Remote Sensing (ISPRS) Samuel Gamble Award for significant contribution to professional development of photogrammetry, remote sensing and spatial information sciences at national and international levels, 2008;
6. International Institute for Geo-Information Sciences and Earth Observation (ITC) Fellowship for PhD studies in the Netherlands, 1992 – 1995;
7. European Commission Fellowship for PGD/MSc Studies in the Netherlands, 1986 – 1989;
8. MSc in Photogrammetry awarded with distinction, 1989;
9. Postgraduate Diploma in Photogrammetry awarded with distinction; and
10. Various awards by the Nigerian Institution of Surveyors

Continued on page 9 ...

...continued from page 8

To catch up with Prof Kufoniya's current situation the AARSE Newsletter put the following questions to him:

Q: What changes have you observed during your career regarding the number of students taking up the profession and why?

A: Without doubt, the number of students taking up the profession has grown significantly. I attribute that to increased awareness of the importance of geospatial information and especially the modernization of our curricula at various levels whether it be for a technician, technologist, Bachelor of Science or technology degree and at postgraduate level. We have also seen the diversification and running of the courses in different departments in order to pay adequate attention to specializations.

To give but a few examples: there are now Surveying and Geoinformatics or Geomatics Engineering programs subsuming disciplines such as Geodesy, Land Surveying, Photogrammetry, Remote Sensing, Cartography and GIS. We also have Remote Sensing and GIS programs in many geography departments; Environmental Management programs with specialization in RS and GIS; Geological Remote Sensing Programs; and Space Science and Technology Programs. These have undoubtedly contributed to the increased number of students that are taking up the profession.

Q: Have you during your career observed a growth in the awareness of the importance of EO/RS amongst the general public and decision makers?

A: The awareness of the importance of earth observation and geospatial science & technology is definitely growing though not as fast as one would wish amongst the general public and decision makers. A number of programs and activities which have contributed to this are amongst others:

(i) The consistent advocacy of geospatial institutions and professional bodies at sub-national, national, sub-regional, regional and international levels such as AARSE, ISPRS, FIG, ICA, IAG, etc. This was done mainly through their newsletters and organization of regional workshops, seminars and conferences with special sessions for decision makers and private sector organizations.

- (ii) Contribution of regional programs such as the biennial meeting of the UN-GGIM: Africa (formerly known as Committee on Development Information – CODI, and later Committee on Development Information, Science and Technology – CODIST) organized by the UN Economic Commission for Africa (ECA). Also regional programs of the African Union Commission (AUC) on the African Space Policy and Strategy with its on-going first flagship program on GMES & Africa with its 12 consortia and the global inter-governmental organizations such as the Group on Earth Observations (GEO) and UN Committee on Peaceful Uses of Space (UN-COPOUS).
- (iii) The need to improve the ease of doing business in African countries which led to the implementation of land reform programs in many countries using a general boundary concept for systematic land titling and registration as opposed to the conventional fixed boundary concept.
- (iv) Moreover, the deployment and popularity of volunteered geographic information platforms such as Google Earth/Google Maps and OpenStreetMap have greatly exposed the potentials of EO and geospatial information in socio-economic development.

Q: Are there any tangible results of these applications in Africa yet?

A: The tangible results include the increasing number of African countries that have either launched or are launching their own EO and communication satellites. These countries include Algeria, Angola, Egypt, Ethiopia, Ghana, Kenya, Morocco, Nigeria, Rwanda, South Africa and Sudan with more countries planning to join the fray. This has helped in providing geospatial data for Geographic Information Systems for the planning, implementation and monitoring of various sustainable development programs in various sectors of the national economy including agriculture, water resources, infrastructure development, land administration, etc.

The number of continuously operating reference stations (CORS) is also increasing rapidly, thereby increasing the density of geodetic controls for georeferencing and mapping at sub-national, national and regional levels. For example, one station was established in Nigeria when the African (Geodetic) Reference Frame (AFREF) program started fully in 2006, but the country had up to 30 stations as at 2019.

Moreover, the spin-off of the applications and programs is the building on human and organizational capacities of the countries.

Q: What is your advice for African decision makers in this field?

A: My advice to decision makers is to accept EO and geospatial data as an essential infrastructure for sustainable development just as roads, electricity, water and telecommunications are. Without the availability of and access to fit-for-purpose geospatial data when needed, other infrastructures and development programs cannot be implemented or achieved. This is clearly evident from a study by the Group on Earth Observations (GEO) that EO and geospatial information will be required for the successful achievement of 16 of the 17 goals of the global Sustainable Development Agenda 2030.

It is therefore also necessary that the African Space Agency starts full operation as planned to ensure efficient coordination of space programs in Africa including the realization of the African Resource Management Satellite (ARMS) constellation.

Q: What career advice do you have for Africans who want to take up the profession?

A: My advice to them is to focus more on what and how they can contribute to national and international development through their professional practice after graduation rather than how they can become rich materially.

Q: What do you regard as your biggest achievements in or contributions to your profession?

It is difficult for me as a person to access my contributions and achievements. However, I believe that God has used me to make significant impact in institutional, organizational and human capacity building at national, sub-regional, regional and international levels. I have helped in the modernization of numerous education curricula and introduction of new programs at higher institutions of learning. I have also contributed in my own modest way to the implementation of spatial data infrastructure and continuously operating reference station at sub-national, national and regional levels. My modest contributions have actually led to my winning various awards at the national, regional and international levels.

Report by Anthony Penderis

Africa needs the space industry to go forward

The African continent is bound to become increasingly more dependent on the space industry for job creation, poverty alleviation and sustainable resource management. These were some of the findings in a paper recently published by an expert in the field of Earth Observation and Geo-Information Sciences.

The paper titled "The status of Earth Observation (EO) & Geo-Information Sciences in Africa – trends and challenges" was published in the journal of Geospatial Information Science, by Prof Tsehaie Woldai* in February this year. Woldai is a Visiting Professor at the School of Geosciences, University of the Witwatersrand, Johannesburg, South Africa.

In his research, he found that up to end of last year 28 of the 54 African countries were

already engaged in the Earth Observation and Geo-Information Sciences through 90 academic institutions, 17 national scientific associations, 53 national space agencies, 10 satellite receiving and tracking stations and a few regional technical laboratories. While the industry currently provides employment to some 15 000 people on the African continent, Woldai expects this number to exceed 100 000 by the year 2025.

The growing dependence of the continent on the satellite industry is also clear from the fact that by the end of last year 11 African countries have already launched 36 satellites together into orbit while another five are expected by the first quarter of 2021 plus another five by 2025 thus amounting to 46 satellites, a total not foreseen ten years ago.

The reason for Prof Woldai's optimism is that this industry can without being trapped by the continent's poor infrastructure address some of its most pressing problems cost-effectively. Africa faces huge challenges in the domain of environmental protection and management, water resources, food security, mining and forest management, marine protection, urban and regional planning, transportation and disaster risk reduction.

Africa's agricultural sector unquestionably has vast potential for growth if taken into account that the continent harbours 60% of the world's available arable land but generates only 10% of global agricultural output. At present, its agriculture provides a livelihood to 70% of the African population. A well-managed agricultural sector would clearly be of great benefit to this continent.

Being an academic Woldai believes that harnessing the power of the academic institutions to reduce poverty is not an ideological aspiration but an empirically demonstrable fact. In his opinion universities have proved to be the only sustainable institutions in Africa and being the national pride of every country they have time and again withstood upheavals across the continent. Applied research is also one of their core businesses, at least in Africa.

He, therefore, is optimistic about the future of the growth and application of Earth Observation and Geo-Information Sciences across the continent provided there is good co-operation between the public sector (government ministries and departments); academic institutions (universities/colleges/national or regional

centres); space agencies; and private sector companies. His success recipe for this sector are based on the following:

1. A well-informed public sector to develop a strategy and architecture for space exploration and space data thus creating an empowering environment so that the benefits of public-private partnership can be appreciated;
2. Highly developed academic institutions to support capacity development in EO and Geo-Information Sciences, space engineering and technology; and
3. A thriving private sector to serve as an engine for economic growth.

His optimism is further bolstered by the fact that space-based technology is now an essential tool for decision making in many African countries. Also, the technology is extensively used by Government Ministries/Departments in monitoring climate-related changes, agriculture, desertification, flood hazards, and soil erosion, as well as, risk assessment, groundwater exploration and transportation services. Using freely available or own space-based data (optical, radar and hyperspectral), they have managed to save time and costs to acquire valuable baseline information and update their resource maps. Besides, the increased affordability of personal computers, micro-electronic equipment and ever-improving telecommunication services give greater access to the internet in many parts of Africa.

Efforts to build capacities for managing EO/RS and geo-information in Africa span more than three decades. Traditionally, much of the capacity building had been at regional centres (such as AFRIGIST formerly RECTAS in Nigeria, the defunct Regional Remote Sensing Center in Ouagadougou, Burkina Faso and RCMRD in Kenya) or abroad, by way of training few professionals, mainly from the surveyor-general departments or universities and equipping these organizations in map-making and related activities. Today African Universities contribute to societal capacity by functioning as nodes in a global network of knowledge. The majority of them provide dedicated geomatic, remote sensing and geoinformation science education and training. While 11% of the universities and colleges are known to offer three to seven day GIS courses to undergraduates; around 23% have degrees and research programs leading to BSc, MSc, and PhDs.

continued on page 12...

Country	Satellite	Launch date	A	B	C	D	E
ALGERIA	ALSAT-1	2002	X				
	ALSAT-2A	2010	X				
	ALSAT-1b	2016	X				
	ALSAT-2B	2016	X				
	ALSAT-1N	2016		X			
ANGOLA	ALCOMSAT-1	2017			X		
	AngoSat-1	2017			X		
EGYPT	NILESAT-101	1998			X		
	NILESAT-102	2000			X		
	EGYPTSAT-1	2007	X	X			
	NILESAT-201	2010			X		
	EGYPTSAT-2	2014	X				
ETHIOPIA	EGYPTSAT-A	2019	X				
	NARSSCube-1	2019		X			
	ETRSS-1	2019					X
GHANA	GhanaSat-1	2017		X			
KENYA	1 KUNSPF	2018	X	X			
MOROCCO	Maroc-TUBSAT	2001	X	X?			
	MOHAMMED VI-A	2017				X	
	MOHAMMED VI-B	2018				X	
NIGERIA	NigeriaSat-1	2003	X				
	NIGCOMSAT-1	2007			X		
	NigeriaSat-2	2011	X				
	NigeriaSat-X	2011	X	X			
RWANDA	NIGCOMSAT-1R	2011			X		
	Icyerekezo	2019			X		
	RWASAT-1	2019		X			
S. AFRICA	Greensat	pre-1990?	-/X		X		
	SUNSAT	1999	-/X				
	ZACUBE-1	2013		X			
	SUMBANDILA	2009	-/X				
	KONDOR-E	2014	X			X	
SUDAN	rSight-1	2017		X			X
	ZA-AeroSat	2017		X			X
	ZACUBE-2	2018		X			
	SRSS1	2019		X			X

The list of African satellites launched from 1998 to 2020. The satellites were launched for Earth Observation (Designated as A); science technology demonstration and education/scientific experiments (B); Communication (C); Reconnaissance/Military (radar) (D) and for climate change and weather monitoring (E).

...continued from page 11

The creation of new companies over the last few years and their development clearly shows that the African private sector companies are steadily growing in 28 of the 54 countries of Africa. Encouraged by the moderate success booked in the 2016 African Private Sector Survey questionnaires another one was conducted in 2019. The number of people employed by 2019 increased by 66% (from 2719 in 2016 to 4109). In terms of revenues, all responding companies performed in a range from \$500k – \$ 5 million/year. Some companies from Ethiopia, Ghana, Kenya, Nigeria, and South Africa have taken the opportunity created since the 2016 report to open subsidiary companies in other East and West African countries.

Numerous networks which facilitate the exchange of information and promotion of excellence in the field have also come into being all over Africa. Some with a Pan-African character include the African Association of Remote Sensing of the Environment (AARSE); AfriGEOSS (part of the Global Earth Observation System of Systems - GEOSS); the Environmental Information Systems Africa (EIS-AFRICA); and the University Network for Disaster Risk Reduction in Africa (UNEDRA).

The African continent, with over a billion people, has been one of the rapidly growing economies in the world in the last eight years. It is no wonder, therefore, that the continent is awakening to look into space-based EO and Geo-Information Sciences technologies and investment to proliferate, harness and use the benefits that this technology offers. The sudden increase in the deployment of satellites by the African States might appear irrational to some, especially that the continent has numerous pressing issues affecting the livelihood of its population. These problems, however, can be tackled using space-based EO and Geospatial techniques to a certain extent.

Prof Woldai concludes that if Africa is to 'leapfrog' its obstacles effectively, the continent needs to invest in science and maths education at schools and develop an indigenous critical mass of trained space scientists, engineers and programmers at universities. The continent must build its capabilities in ICT infrastructure, satellite communication, navigation and positioning, and space sciences. Internet connectivity is another barrier to development that should be tackled.

**Note about the author:*

Tsehaie Woldai is currently a Visiting Professor of Geological Remote Sensing at the School of Geosciences, University of the Witwatersrand, Johannesburg, South Africa. He has worked for many years at the Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente, Enschede, The Netherlands. Woldai's expertise is in structural geology, environmental geology, remote sensing (optical, radar and hyperspectral) and mineral exploration. He has taught in over 40 universities in Africa, Asia, Europe, North and South America. Woldai is the Founder, President and Past President of the African Association of

Remote Sensing of the Environment (AARSE), a fellow of the African Academy of Sciences, a Fellow of the African Geological Society, coordinator of the University Network for Disaster Risk Reduction in Africa (UNEDRA), and a winner of over 20 prestigious awards. For many years, he was involved in many of the ISPRS Commissions and Working Group (as Chairman/Vice Chairman/Secretary); and a track record in his engagement in over 40 national/international Advisory Programmes and over 20 international research as Principle or co-investigator.

Report by Anthony Penderis

The status of Earth Observation (EO) & Geo-Information Sciences in Africa – trends and challenges

Author: Tsehaie Woldai
School of Geosciences, University of Witwatersrand, Johannesburg, South Africa
Email: tsehaie.woldai@wits.ac.za
<https://orcid.org/0000-0003-3236-2594>

Published in the **The status of Earth Observation (EO) & Geo-Information Sciences in Africa – trends and challenges**

Volume 23, 2020 - Issue 1: *Challenges and Trends of Geo-spatial Information Science*.
Guest Editors: Prof. Jianya Gong and Prof. Zhenfeng Shao.
Received 14 Oct 2019, Accepted 04 Feb 2020, Published online 27 Feb 2020

Abstract

Over the last 20 years, Africa has witnessed a slow but steady advancement in space-based technologies as they are increasingly recognized as an essential tool for decision-making that can leapfrog African development. A critical review on the outcome of a survey questionnaire focused on African private sector industries and universities, services and education/training in EO and Geo-Information Sciences, combined with literature review, and personal contacts reveal optimism for success in four sectors. These include the public sector (Government ministries and departments); Academic institutions (universities/colleges/national or regional centers); and space agencies and private sector companies. These sectors are intertwined and fundamental for creating an enabling environment for solutions to a broad spectrum of pressing priorities: job



Prof. Tsehaie Woldai

creation, poverty alleviation, and sustainable resource management. The result shows that there is an uptake in the number of institutions and market segments created. To date, there are more than 90 academic institutions and over 53 national space agencies in 28 countries. Within the 53 national space agencies, 11 African countries have already launched a total of 36 satellites into orbit, and additional five are expected by the first quarter of 2021; another five by 2025; thus, amounting to 46 satellites not foreseen ten years ago. In addition, there are now ten receiving and tracking stations in six African countries and 17 scientific National Associations or Societies with specialized expertise in Geo-Information technologies. The updated survey on the private sector in 2019 ascertained that around 4,110 people are working in 130 of the 229 EO and Geo-Information Science companies identified in Africa. Ongoing investigations reiterate that companies dealing with space-based datasets and Geo-Information Sciences together with the private spin-off companies today absorb more than 15,000 people and the assumption is that this number is going to exceed 100,000 by the year 2025.

See full article at :
<https://www.tandfonline.com/doi/full/10.1080/10095020.2020.1730711>

MENA research awards open for submissions

The IEEE Geoscience and Remote Sensing Society (GRSS)



launched three new initiatives open to all remote sensing communities in the Middle-East and North Africa (MENA) area.

The Geoscience and Remote Sensing Society (GRSS) is a professional and learned society of the Institute of Electrical and Electronics

Engineers (IEEE), the world's largest association of technical professionals with more than 423,000 members in over 160 countries around the world. The GRSS itself is an international society with 3500 members worldwide. It is active in the fields of geoscience and remote sensing and deals with the theory, concepts, and techniques of science and engineering as they apply to the remote sensing of the earth, oceans, atmosphere, and space, as well as the processing, interpretation and dissemination of this information.

The GRSS organizes many significant activities year in and year out. The IGARSS very successful annual flagship conference is held on different continents and attended by approximately 2000 participants. The Society also sponsors several more specialized symposia every year. It also publishes three high quality technical journals either monthly or bimonthly as well as a quarterly newsletter.

The detail of each MENA application follows below. See more at www.grss-ieee.org

1 Best 2015-2019 MENA Research Award

Objective: To recognize the achievement performed by the best MENA research teams in one of the fields of interest of the IEEE GRSS which are the theory, concepts, and techniques of science and engineering as they apply to the remote sensing of the earth, oceans, atmosphere, and space, as well as the processing, interpretation, and dissemination of this information. The evaluation will be performed by a team of five international experts. The achievements which can be admitted for evaluation are:

- any GRSS journal or magazine publication (TGRS, JSTARS, GRSL, GRSM) published between 2015-2019
- any publication in a conference technically, financially (co-)sponsored, or supported by GRSS, and organized between 2015-2019
- any research project aiming at developing activities and products in MENA, and funded by a governmental or private entity. The final project deliverables had to be finalized in the period 2015-2019.

In the above three cases, at least 50% of the research team should be affiliated to a MENA institution. Each research team can submit only one achievement. Please send the following documentation with the application:

- pdf copy of the achievement (paper, or in case of a project: description of the project and its deliverables)
- accompanying letter in pdf format motivating why it is believed the submitted achievement deserves to be awarded
- at least 2 letters of endorsement

Submission deadline: August 31, 2020

Evaluation outcome: September 30, 2020

Prizes: 1st ranked (\$1000), 2nd ranked (\$750), 3rd ranked (\$500)

Contact person: Farid Melgani
(melgani@disi.unitn.it)

2 Best MENA Phd 3MT Award

Objective: 3MT®, founded by the University of Queensland in 2008, is an academic competition that cultivates students' presentation and research communication skills and challenges them to describe their research within three minutes to a general audience with one static slide. It is an amazing experience for students to show their presentation skills and be rewarded for their research idea and their motivation in a simple and interesting way. The competition is open to all PhD students affiliated to a MENA institution.

There will be two stages in the competition. Submission of a 5-minute video describing the thesis/research topic by uploading it to a video platform (YouTube, Vimeo, etc.) or to a site accessible only by the evaluation committee with a private URL by August 31, 2020.

The top 10 applicants will be selected by September 15, 2020 and then invited for a final remote presentation of the three minutes to an international evaluation committee on Zoom platform.

The topic of the thesis/research should be closely linked to one of the fields of interest of the IEEE GRSS which are the theory, concepts, and techniques of science and engineering as they apply to the remote sensing of the earth, oceans, atmosphere, and space, as well as the processing, interpretation and dissemination of this information.

Submission deadline: August 31, 2020

First-stage outcome: September 15, 2020

Second-stage outcome: September 30, 2020

Prizes: 1st ranked (\$1000), 2nd ranked (\$750), 3rd ranked (\$500)

Contact person: Fairouz Stambouli
(Fairouz.Stambouli@dlr.de)

3 Best MENA Master 3MT Award

Objective: 3MT®, founded by the University of Queensland in 2008, is an academic competition that cultivates students' presentation and research communication skills and challenges them to describe their research within three minutes to a general audience with one static slide. It is an amazing experience for students to show their presentation skills and be rewarded for their research idea and their motivation in a simple and interesting way. The competition is open to all Master students affiliated to a MENA institution.

There will be two stages in the competition. Submission of a 5-minute video describing the thesis topic by uploading it to a video platform (YouTube, Vimeo, etc.) or to a site accessible only by the evaluation committee with a private URL by August 31, 2020.

The top 10 applicants will be selected by September 15, 2020 and then invited for a final remote presentation of the three minutes to an international evaluation committee on Zoom platform.

The topic of the thesis should be closely linked to one of the fields of interest of the IEEE GRSS which are the theory, concepts, and techniques of science and engineering as they apply to the remote sensing of the earth, oceans, atmosphere, and space, as well as the processing, interpretation and dissemination of this information.

Submission deadline: August 31, 2020

First-stage outcome: September 15, 2020

Second-stage outcome: September 30, 2020

Prizes: 1st ranked (\$1000), 2nd ranked (\$750), 3rd ranked (\$500)

Contact person: Fairouz Stambouli
(Fairouz.Stambouli@dlr.de)

International Space Conference Diary

We have assembled the details of some of the most important international and African conferences scheduled to take place within the next few months in the arena of remote sensing, satellites and geotechnical applications. Please visit their individual websites for more information on submission criteria for papers, deadlines for registration, etc. and also note that some of these events have been rescheduled due to the COVID-19 crisis.

71st International Astronautical Congress

Oct 12 - 14, 2020
The Cyberspace Edition
<http://www.iafaastro.org/>



Due to the COVID-19 pandemic the 71st International Astronautical Congress, IAC 2020, will be a Cyberspace Edition offered without registration fee, free of charge for a global community. The theme will be about the IAF Motto: "IAF Connecting @II Space People". The two and half days of the IAC 2020 will be revolving around the Global Space Governance, the Global Space Economy, and the Global Space Advocacy, including 3G Diversity.

AARSE Conference 2020

Postponed to
Mar 29 - Apr 2, 2021
Kigali, Rwanda
www.aarse2020.org



The 13th AARSE International Conference, AARSE 2020 will be held in Kigali, Rwanda, organized by the Institut d'Enseignement Supérieur de Ruhengeri (Ines-Ruhengeri). It is the premier forum in Africa for research on remote sensing technologies and geospatial information science, gathering leading scholars from the remote sensing and related communities to discuss challenges in space and geospatial technologies.



GIS Congress 2020

November 23 - 24, 2020
Barcelona, Spain
<https://gis-remotesensing>

This 6th International Conference with the theme "Application of GIS and Remote Sensing Techniques" will feature valuable keynote presentations, talks, poster presentations and exhibitions. Researchers, scientists, academic fellows, exhibitors and contributors in the field of Remote Sensing, Geographic Information Systems (GIS), Techniques and Technology, Renewable Energy Sources, etc. are invited.



COSPAR 2020

Jan 28 - Feb 4, 2021
Sydney, Australia
<https://www.cospar2020.org/>

The theme of the 2021 assembly is "Connecting Space Research for Global Impact" where Australian space activities will be showcased to the world of space research. It will strengthen existing and growing new ties between Australia and international partners, resulting in collaborations and partnerships to assist both the innovation and industry parts of the sector. It also aims to stimulate and inspire the next generation of science talent.

International Conference on Satellite Technology and Services

April 8 - 9, 2021
Rome, Italy
<https://waset.org/satellite-technology-and-services-conference-in-april-2021-in-rome>



The ICSTS 2021: 15 organized by the World Academy of Science, Engineering and Technology aims to bring together leading academic scientists, researchers and scholars to share their experiences and research results on all aspects of satellite technology and services. It also provides a premier interdisciplinary platform to discuss innovations, trends, and concerns as well as practical challenges in the field.



SPACEOPS 2021

MAY 3 - 7, 2021
Cape Town, South Africa
<https://spaceops2021.org/welcome/>

Hosted by SANSA the conference will provide the opportunity to share experiences, challenges and innovative solutions with colleagues from around the world. It aims to bring together the global space operations community to address state-of-the-art operations principles, methods and tools. Held biennially since 1990, it attracts technologists, scientists, and managers from space agencies, industry and academia.

1st IAA Symposium on Small Satellites

May 10 - 13, 2021
Stellenbosch, South Africa
<https://www.iaa-africa2020.co.za/>



The conference will bring together delegates from across the African region and their international peers for an interesting three-day technical programme which will also include poster sessions, daily thought-provoking panel sessions, a student mission competition, an exhibition, an optional technical facility tour, and social networking opportunities which will be an immersive cultural experience. The conference was postponed due to COVID-19.

The Brijuni Conference 2021

May 12 - 14, 2021
Brijuni, Croatia
<http://www.brijuni-conference.irb.hr/>



The conference organized by the Adriatic Aerospace Association is about scientific and technical aspects of deep space communication, navigation and propulsion with the emphasis on novel ideas. It also serves as a platform and meeting place of science, technology and business related to space. It targets scientist and engineers developing cutting edge technology and importantly students and young scientists and engineers.

72nd International Astronautical Congress 2021

Oct 25 - 29, 2021
Dubai, UAE
<http://www.iafaastro.org>



With the theme "Inspire, Innovate & Discover for the Benefit of Humankind", the IAC 2021 looks forward to making a contribution to humanity and to science by strengthening and enhancing cooperation between all countries in the space sector. The UAE will be the first Arab country to host the IAC since its establishment in 1950 and will be an opportunity to shed light on how space science and technology can contribute to a nation's progress.

Hubble celebrates its 30th anniversary with stunning 'Cosmic Reef' image

To commemorate three decades of scientific discoveries, The Hubble Space Telescope a project of international cooperation between ESA and NASA has released this image, one of the most photogenic examples of the many turbulent stellar nurseries the telescope has observed during its 30-year lifetime.

The image features the giant nebula NGC 2014 and its neighbour NGC 2020 which together form part of a vast star-forming region in the Large Magellanic Cloud, a satellite galaxy of the Milky Way, approximately 163 000 light-years away. The image is nicknamed the 'Cosmic Reef' because it resembles an undersea world.

Although NGC 2014 and NGC 2020 appear to be separate in this visible-light image, they are actually part of one giant star formation complex. The star-forming regions seen here are dominated by the glow of stars at least 10 times more massive than our Sun. These stars have short lives of only a few million years, compared to the 10-billion-year lifetime of our Sun.

Stars, both big and small, are born when clouds of dust and gas collapse because of gravity. As more material falls onto the forming star, it finally becomes hot and dense enough at its centre to trigger the nuclear fusion reactions that make stars, including our Sun, shine. Massive stars make up



only a few percent of the billions of stars in our Universe. Yet they play a crucial role in shaping our Universe, through stellar winds, supernova explosions, and the production of heavy elements.

The Hubble Space Telescope was launched 24 April 1990 on the Space Shuttle Discovery, along with a five-astronaut crew and deployed into low Earth orbit a day later. To date the

mission has yielded 1.4 million observations and provided data that astronomers around the world have used to write more than 17 000 peer-reviewed scientific publications, making it one of the most prolific space observatories in history.

Source: EAS Media Release

(<https://www.esa.int/Newsroom/>)

Tunisia's first satellite to launch by November 2020

Tunisia on its first venture into outer space aims to launch a home-made satellite by the end of this year called Challenge One. The force behind it is the Tunisian tech company Telnet which plans to roll out a constellation of 30 additional satellites over the next decade

Challenge One will be a small low-orbit nano-satellite just a foot long and made of light, stainless steel with the important task of employing internet technology to assist in the country's agricultural production, health and maritime sectors, tracing the effects of pollution and monitoring the weather. It will be launched by a Russian Soyuz spacecraft from Baikonur, Kazakhstan by November this year.

"Today there are satellites for geo-location and navigation, communications and television. We decided to work with internet technology -- the Internet of Things -- because it's the future," said Telnet CEO Mohammed Frikha in an inter-view with Associated Press.

"This satellite can give Tunisians confidence that we are capable of being leaders in technology. With a strong democracy and technology we can have a respected place in the world, even if we only have a population of 10 million and few natural resources," he said.

Source: Associated Press

(<https://apnews.com/>)



Mohammed Frikha, CEO of Tunisia's Telnet Group (AP Photo/Hassene Dridi)

Nepal red pandas tracked by satellite

Conservationists are satellite tracking red pandas in the mountains of Nepal to find out more about the factors that are driving them towards extinction.

The mammals are endangered with numbers down to a few thousand in the eastern Himalayas and southwestern China, the BBC said in a report. The red panda was initially considered a relative of the raccoon because of its ringed tail, and was later thought to be related to bears.

Ten red pandas have been fitted with GPS collars to monitor their range in the forests near Mount Kangchenjunga. The GPS collars are said to be working well and yielding "exciting data".

The six females and four males are being tracked and photographed using camera

traps in a conservation effort involving scientists, vets, government officials in Nepal and conservation group Red Panda Network.

"This is a great milestone in red panda conservation", said Man Bahadur Khadka, director general of Nepal's department of forests and soil conservation.

Conservationists in Nepal hope the study over the course of a year will give valuable data about how to better protect one of the last remaining populations.

Source: BBC News/India TV
(<https://www.indiatvnews.com/news/world/>)

The red panda an endangered species with numbers down to a few thousand are found in the eastern Himalayas and southwestern China. Image: [amazing-creature.blogspot.com](https://www.amazing-creature.blogspot.com)



Mars rover ready for launch this July

Perseverance, NASA next rover destined for Mars will launch on a United Launch Alliance Atlas V 541 rocket from Space Launch Complex 41 at Cape Canaveral Air Force Station in Florida possibly on July 22, 2020 if there are no delays.

Perseverance, effectively a robotic scientist, weighs just over 1000 kg (2,300 lbs) and is the size of a small car. The mission is to better understand the geology of Mars and seek signs of ancient life on the Red Planet.

It will collect and store a set of rock and soil samples that could be returned to Earth by future Mars Sample Return Missions. It will also test new technology to benefit future robotic and human exploration of Mars.

The Mars Perseverance rover has a drill on board that can collect core samples of the most promising rocks and soils and set them aside in a "cache" on the surface of Mars which could be collected on future Mars Sample Return Missions.

The mission also provides opportunities to gather knowledge and demonstrate technologies that address the challenges of future human expeditions to Mars. These include testing a method for producing oxygen from the Martian atmosphere, identifying other resources (such as subsurface water), improving landing techniques, and characterizing weather, dust, and other potential environmental conditions that could affect future astronauts living and working on Mars.



The mission is timed for a launch opportunity in July/August 2020 when Earth and Mars are in good positions relative to each other for landing on Mars. Up to date NASA has conducted several successful rover missions to Mars namely the Spirit (2004 – 2009), Opportunity (2004 – 2018) and Curiosity which landed in 2012 and is still active extending its two year lifetime indefinitely.

Source: NASA media release
(<https://www.nasa.gov/perseverance/overview>)

In a clean room at NASA's Jet Propulsion Laboratory in Southern California, engineers observed the first driving test for NASA's Mars 2020 rover on Dec. 17, 2019. Image Credit: NASA/JPL-Caltech

A new era dawns for human spaceflight

A new era of human spaceflight is set to begin as American astronauts once again launched on an American rocket from American soil to low-Earth orbit for the first time since the conclusion of the Space Shuttle Program in 2011. For the first time in history, NASA astronauts have launched in a commercially built and operated American crew spacecraft on its way to the International Space Station.

Astronauts Bob Behnken and Doug Hurley lifted off in a SpaceX Crew Dragon spacecraft at 3:22 p.m. EDT Saturday, 30 May 2020 on the company's Falcon 9 rocket from Launch Complex 39A at NASA's Kennedy Space Centre in Florida. They reached the International Space Station some 18 hours later where they safely docked to join the existing crew of three already at the Space Station.

"Today a new era in human spaceflight begins as we once again launched American astronauts on American rockets from American soil on their way to the International Space Station, our national lab orbiting Earth," said NASA Administrator Jim Bridenstine at the launch. "I thank and congratulate Bob Behnken, Doug Hurley, and the SpaceX and NASA teams for this significant achievement for the United States. The launch of this commercial space system designed for humans is a phenomenal demonstration of American excellence and is an important step on our path to expand human exploration to the Moon and Mars."

Known as NASA's SpaceX Demo-2, the mission is an end-to-end test flight to validate the SpaceX crew transportation system, including launch, in-orbit, docking and landing operations. This is SpaceX's second spaceflight test of its Crew Dragon and its first test with astronauts aboard, which will pave the way for its certification for regular crew flights to the station as part of NASA's Commercial Crew Program.

"This is a dream come true for me and everyone at SpaceX," said Elon Musk, chief engineer at SpaceX. "It is the culmination of an incredible amount of work by the SpaceX team, by NASA and by a number of other partners in the process of making this happen. You can look at this as the results of a hundred thousand people roughly when you



*A SpaceX Falcon 9 rocket carrying the company's Crew Dragon spacecraft lifts off from Launch Complex 39A on NASA's SpaceX Demo-2 mission to the International Space Station with NASA astronauts Robert Behnken and Douglas Hurley on board, Saturday, May 30, 2020, at NASA's Kennedy Space Center in Florida.
Photo Credit: NASA/Bill Ingalls.*

add up all the suppliers and everyone working incredibly hard to make this day happen."

The program demonstrates NASA's commitment to investing in commercial companies through public-private partnerships and builds on the success of American companies, including SpaceX, already delivering cargo to the space station.

Source: NASA press release (<https://www.nasa.gov/press-release/>)



Above: NASA astronauts Douglas Hurley (left) and Robert Behnken (right) participate in a dress rehearsal for launch at the agency's Kennedy Space Centre in Florida on May 23, 2020, ahead of NASA's SpaceX Demo-2 mission to the International Space Station. Photo credit: NASA/Kim Shiflett

Left: The newly-expanded Expedition 63 crew with NASA astronauts (front row, from left) Bob Behnken and Doug Hurley having just entered the International Space Station shortly after arriving aboard the SpaceX Crew Dragon spacecraft. In the centre, in the back row, is NASA Commander Chris Cassidy flanked by Roscosmos Flight Engineers (from left) Anatoly Ivanishin and Ivan Vagner. Photo Credit: NASA.