AARSE

African Association of Remote Sensing of the Environment
Association Africaine de Télédétection de l'Environnement

NEWSLETTER • FEBRUARY 2020

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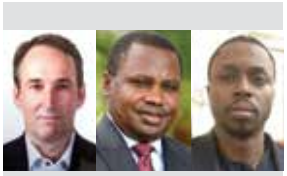

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From the Editor

While the debate is raging on whether the changing weather patterns worldwide are either caused by global warming or just part of natural cycles we here in Africa are stuck with the harsh reality of being trapped in one of the worst droughts in living memory.

The first knock-on effect of the drought affecting some 14 countries in mostly Eastern and Southern Africa is off course severe food insecurity because of failed crops and dwindling livestock so much so that the UN in 2017 already labelled the current African drought as the worst crisis in decades. It affects tens of millions of people and especially children who end up suffering from malnutrition. By 2019 the situation has worsened and if the USAID weather prediction comes true there will once again be a below-average rainfall season for the first part of this year.

This scenario can be painted even gloomier if one has a look at the big water reservoirs of Africa such as Lake Kariba which we report on in this issue. Touted as the world's biggest man-made lake it is now as a result of the drought only 10% full. This has already resulted in rolling electricity black-outs in Zimbabwe as water levels need to be at a minimum height for hydro-electricity power generation.

No-one can yet make accurate long-term weather predictions, so what can be done to alleviated the situation?

"We need to recognise the seasons are changing and we need to adapt," is how Mark Lowcock the UN's Emergency Relief Coordinator summed it up in a recent interview with The New Humanitarian (https://www.thenewhumanitarian.org/). He also added that as Southern and Eastern Africa are on the front lines of climate change, the mitigation measures must now be much more data-driven, comprehensive and innovative.

All of this point to the disciplines of remote sensing and geosciences which are in the best position to collect data on a grand scale applicable to countries or even continents. The tools of remote sensing are in place and data collection is indeed pursued on a grand scale, but perhaps we need to ratchet up our efforts to pre-empt the debilitating famines sweeping regularly across Africa.

Anthony Penderis

Editor

newsletter@africanremotesensing.org

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 see 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@africaremotesensing.org

Membership Privileges: Reasons why you should join AARSE

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;
3. Get exposure to many organizations, their publications and potential job opportunities;
4. Be part of the important voice to address Africa's remote sensing policies and research;
5. Attend biennial AARSE Conferences at a reduced rate or even get sponsored;
6. Get the AARSE-IEEE/GRSS Travel Fellowship Award to attend their conferences;
7 Join our Technical Program Committee and assist with workshops and training activities;
8. Utilize our partner resources provided on remote sensing, GIS and ICT training;
9. Join our national or regional members to sit in or collaborate with international fora;
10. Get subsidized subscription to partner journals;
11 Corporate Members get 30% reduction on advertising fees in our bimonthly newsletter.

See more 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.

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Message from the President

Dear Readers

With the editorial team, I am pleased once again to invite you to learn about some developments in the world of scientific activity and remote sensing in Africa and around the world in this February 2020 edition of the AARSE Newsletter.

At present AARSE is in the phase of rebuilding, through the revision of its statute, the purpose of which is to give a new impetus to the organization by revitalizing its structures and to give more responsibilities to the regional councillors and the technical committees of the association. It is a project that aims to improve the actions and strategies for AARSE activities, publicity, news inputs and so on.

The fact that AARSE is being restructured will of course not make us lose sight of our primary aim which in a nutshell comes down to motivating African governments, the private sector and society at large to employ space technologies and the geosciences for the betterment of all our citizens.

We therefore trust that our endeavors will bring into focus the significant efforts made towards building human, institutional and technological capabilities that will ensure that all parts of the African continent benefit from better access, understanding and use of data, products and services. From these products and services, we believe information can be derived for more informed decisions.

This year of course marks the presentation of the most important event on our calendar namely the biennial AARSE Conference set to take place from the 26th to 30th October 2020 in Kigali City, Rwanda. The theme of the AARSE2020 Conference "Space and geospatial technologies for the Africa we want" fits in very well with revitalizing AARSE in the way we envision.

This event, our 13th biennial conference, should turn out to be a major African gathering of scholars, policy makers and entrepreneurs in the arena of Earth Observation Systems and Geo-information Technology. Our previous conference AARSE2018 in Alexandria, Egypt was attended by no less than 177 representatives from 37 countries.

We wish the organizing committee of AARSE2020 at INES-Ruhengeri all the best in their efforts and confirm that all AARSE Trustees, Councillors and Africa Regional Representatives will provide support where needed.

Good reading.

Prof. Kamal Labbassi

AARSE President 2018 - 2022

An invitation to advertise in the April 2020 edition of the AARSE Newsletter

The bimonthly newsletter of the African Association of Remote Sensing of the Environment (AARSE) offers an ideal opportunity to those who wish to expand their African footprint in the arena of Earth Observation and Geoinformatics. The newsletter is distributed electronically to a select audience of more than 5 000 recipients whom include inter alia most African national space agencies, governmental space research institutes and space technology companies. It is also published on the AARSE website (http://africanremotesensing.org/current-newsletters/) and the Facebook Page Space News Africa (https://www.facebook.com/spacenewsafrica/).

The newsletter is a minimum of 16 pages with content normally divided as follows: AARSE News (25%); Africa Space News (50%); International Space News (25%);

DISCOUNTS: 30% discount per placement for April 2020 newsletter only;
INVOICING: An invoice will be generated within a few days after a booking has been received;
PAYMENTS: Per EFT prior to placement on Materials Deadline Day;
MATERIAL: Advertising material to be supplied in high resolution jpeg or pdf format;
EDITORIAL ASSISTANCE: AARSE's editorial team can assist with writing, layout and editing of advertorials.

Deadlines April 2020 Newsletter
Booking Deadline: Friday, 27 March 2020
Materials & Payments Deadline: Friday, 3 April 2020
Publishing Deadline: Last week April 2020

See samples of previous newsletters at
http://africanremotesensing.org/current-newsletters/
See more detail on AARSE advertising at
http://africanremotesensing.org/advertising-options/
Please contact the editor at newsletter@africanremotesensing.org for costs and other information.

Expand your footprint

The African Association of Remote Sensing of the Environment's bimonthly newsletter offers an ideal advertising opportunity to specialists in the arena of Earth Observation and Geoinformatics. Make use of our introductory discounts and editorial support for your products or services.

Members of AARSE Council (2018 - 2022)

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AARSE 2020 Conference registrations now open

The 13th AARSE biennial international conference of the African Association of Remote Sensing of the Environment (AARSE) will be held in Rwanda, from 26th to 30th of October, 2020 at the Kigali Exhibition and Village Center.

This conference with the theme *Space and geospatial technologies for the Africa we want* will be a major event this year in the African and international community of Earth Observation and geo-spatial information sciences. It will be organized by AARSE and the Institut d'Enseignement Supérieur de Ruhengeri (Ines-Ruhengeri).

The main objective of AARSE 2020 Conference is to bring together scholars and professionals from the African and international community to present their 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. Commercial exhibitions will show the latest products and services in remote sensing and geospatial information technologies.

AARSE was formed in 1992 with the aim of increasing the awareness of African governments and institutions, the private sector and society at large, about the empowering and enhancing benefits of developing, applying and utilizing responsibly, the products and services of Earth Observation and Geo-information Technologies in Africa. In 2008, AARSE was registered as an international NGO under Section 21 of the South African Companies Act 61 of 1973.

As one of its objectives, AARSE conducts biennial international conferences across Africa. Up to date, AARSE, with the support of local and international organizations, has organized 12 such conferences in different parts of Africa, namely Harare (Zimbabwe) in 1996, 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, Kampala (Uganda) in 2016 and Alexandria (Egypt) in 2018.

Paper selection for the AARSE 2020 Conference will be based on abstract and full paper peer review following the guidelines provided in the "Call for Paper" document alongside the details of the registration fees that is currently available in the conference website: www.aarse2020.org. Abstracts should be submitted in Microsoft Word format before 27th March 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. Full papers for inclusion in the conference must be submitted by 31st July 2020.

Preparations are underway and online registration is still open. See the link https://aarse2020.org/register.php where information related to abstracts and paper presentation can be retrieved.

Keynote speakers

Dr. Petrus (Peter) J. van Oevelen

Dr. Van Oevelen is the Director of the International GEWEX Project Office in which capacity he supports and facilitates the science collaborative activities around the world as part of the World Climate Research Programme. He obtained his PhD from Wageningen University, The Netherlands. As scientist and director of one of the eminent global programs on water and energy exchanges (GEWEX) his main drive is to continue to maintain scientific excellence in on-going projects and establish new scientific activities in regions that are currently underrepresented.

Dr. Emmanuel Nkurunziza

Dr. Nkurunziza is the Director General of the Regional Centre for Mapping of Resources for Development (RCMRD). He joined the Rwanda Natural Resources Authority in 2011 and before that he was the Director General of the National Land Centre and Registrar of Land Titles where he initiated and facilitated roll out of a nationwide land registration program. He graduated with a M.Sc. Urban Planning degree in 1998 and a PhD degree in 2004 from the University of Birmingham.

Ing. Dr. Amos T. Kabo-bah

Dr. Kabo-bah is currently a senior lecturer and Head of the Department of Civil and Environmental Engineering at the University of Energy and Natural Resources (UENR) in Sunyani, Ghana. Formerly, he was the Head of Department for Energy and Environmental Engineering at the Earth Observation Research and Innovation Centre. At UENR, he is the Coordinator of the Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC-2) Program and Advanced Fire Information System (AFIS) for West Africa and the Ghana Carbon Program.

Six travel scholarships on offer for AARSE 2020 Conference

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 AARSE CONFERENCE 2020 in Rwanda from 26 to 30 October 2020. AARSE invites eligible persons to apply for a 2020 IEEE GRSS - AARSE TRAVEL FELLOWSHIP through the application form which can be downloaded at http://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 May 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 August 2020.
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 or 1000 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, or will become a member on or before 31 August 2020.
      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 for 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 July 2020. The Evaluation Committee will determine from the Conference Technical Committee whether the applicant's paper has been accepted by the reviewers. Therefore, applicants should not wait to hear if their paper has been accepted before submitting their application. The deadline for submission of the application is 31 May 2020. Should the applicant fail to submit a full manuscript by the specified deadline, the Evaluation Committee reserves the right to withdraw the provisional award and shall not be liable for any expense incurred by the applicant.

Please complete the online application form and send it (together with the attachments mentioned above) not later than 31 May 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 abstracts

Interested parties are invited to submit abstracts for the AARSE 2020 Conference and should take 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 before 27th March 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.

Call for expression of interest to host AARSE conferences

The African Association of Remote Sensing of the Environment (AARSE) invites expression of interest from national institutional members and/or other organizations/agencies in Africa for the hosting/organization of the 14th Conference of the Association in 2022. Bids can also be received for the 15th edition (2024) and the 16th edition (2026). The conference is usually held in the last week of October of every even-number year.

The expression of interest should clearly indicate the following points:

- Name of championing organization including history of the organization and statement of previous hosting of international conference(s) of similar magnitude;
- Names, affiliations and contact details of the lead person and members of team making the proposal;
- Names of supporting government organizations, universities, national geospatial associations, UN agencies, NGO/Civil society organizations and other organizations in the country supported by letters of intent from such organizations;
- Suggested main theme of the conference;
- Indication of city and proposed venue(s) for the conference, including capacities of main hall, breakout rooms and exhibition space and internet access capability. Where available, academic institutions are the preferred venues;
- Name(s) of nearest airport and airlines plying the route;
- Availability and types of hotels and tourism locations;
- Indication of ease of visa processing (presence of embassies in most African countries);
- Indication of the strength of AARSE membership and potential for membership growth, as well as geo-information activities in the country;
- Other useful information, such as strength of the commercial geospatial sector, number of universities offering geospatial training, national geospatial infrastructure such as satellite receiving stations.

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 from 26th to 30th October 2020, therefore 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 expression of interest should be sent at latest by 1st September 2020 to:

Dr. Mahamadou Keita
Secretary General: AARSE
Email:
councillor_wa@africanremotesensing.org
mskeita2002@gmail.com

With a copy to:
Prof. Kamal Labbassi
President: AARSE
Email:
kamal.labbassi@africanremotesensing.org
labbassi@ucd.ac.ma
kamal_labbassi@yahoo.fr

The opening of the 12th biennial International Conference of the African Association of Remote Sensing of the Environment (AARSE 2018) held in Alexandria, Egypt from 25 - 29 October 2018 at the Abu Quir Campus of the Arab Academy for Science, Technology and Maritime Transport. 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 13th AARSE Conference will be held in Kigali City, Rwanda from 26th to 30th October 2020. See more at www.aarse2020.org

AARSE Conference Record 1996 - 2018

To achieve its objectives, AARSE conducts a biennial (once every two years) international conference in Africa in addition to other awareness, research and capacity building activities.

Up to 2018, AARSE, with the support of local and international organizations, has organized twelve such conferences respectively in Harare (Zimbabwe) in 1996, Abidjan (Côte 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, Kampala (Uganda) in 2016 and Alexandria (Egypt) in 2018.

The conference usually takes place during the last week of October. The 13th conference will take place from 26th to 30th October 2020 in Kigali, Rwanda (see www.aarse2020.org) on the theme "Space and geospatial technologies for the Africa we want". The attendance at each of these conferences is in the order of 500 local and international participants and exhibitors.

For further information on AARSE, including the benefits of membership and how to become a member, please visit www.africanremotesensing.org.
The themes for the previous conferences can be found at http://africanremotesensing.org/aarse-conferences/

International Space Conference Diary

We have assembled the details of the most important international and African conferences in the arena of remote sensing, satellites and geotechnical applications scheduled for the next few months. Please visit their individual websites for more information on submission criteria for papers, deadlines for registration, etc.

Satellite 2020
March 9 - 12, 2020
Washinton DC, USA
https://2020.satshow.com

Touted as the most important annual satellite and space event in the world the Conference and Exhibition features more than 15,000 attendees from 100+ countries, along with the latest products and newest innovations from more than 340 companies and 300 experts speaking at the event. A wide spectrum of satellite application possibilities are covered.

Laureates Aviation Week
March 12, 2020
Washington DC, USA
https://laureates.aviationweek.com/

Aviation Week Network's 63rd Annual Laureate Awards recognize the extraordinary achievements of individuals and teams in the industry whose accomplishments embody the spirit of exploration, innovation and vision that inspire others to strive for progress, change and leadership in aviation and aerospace. The Laureates categories are Business Aviation, Commercial Aviation, Space and Defence.

5G -Next digital revolution in Africa
April 15 - 16, 2020
Johannesburg, South Africa
https://mjdvent.com

The next generation 5G wireless will allow virtually every industry to deliver advanced connectivity and increased intelligence across the rapidly evolving wireless edge at speeds projected to be five times faster than the current 4G. Industry stakeholders will come together to discuss the challenges of this next digital revolution to hit Africa from this year onwards.

Space Tech Expo
May 18 - 20, 2020
Long Beach, California, USA
http://www.spacetechexpo.com/

A showcase of space-related technologies and innovations from systems and sub-systems, components, testing and manufacturing technologies for civil, military and commercial space applications. For the first time in its history, the conference will be free for all attendees. More than 250 exhibitors are expected. A masterclass on manufacturing and implementing industry 4.0 technologies will be offered.

Satellite & Space Missions 2020
July 15 - 16, 2020
London, UK
https://satellite.insightconferences.com

The conference is an amalgamation of research professionals from universities, space centres, research labs, spacecraft industries and other space research organizations creating an atmosphere conducive for information exchange between academia and industries. It provides a platform for researcher scholars, scientists and academicians to share while business sectors can promote their products.

71st International Astronautical Congress
October 16 – 20, 2020
Dubai, UAE
http://iac2020.org/

The IAC draws in over 4000 participants from around the world each year. This includes top space agency officials and delegations, astronauts, industry stalwarts, scientists and engineers, researchers and academics, young professionals and students, the press and members of the public. It provides an opportunity for participating organisations to share their innovations in the space sector.

AARSE 2020
October 26 - 30, 2020
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.

GEO Week 2020
November 2 - 6, 2020
Port Elizabeth, South Africa
http://www.earthobservations.org

The Group on Earth Observations (GEO) provides a unique forum where governments, businesses, the research community, non-profits and all other groups come together to create solutions for better research, policy making, decisions and action across many disciplines. The GEO is an intergovernmental partnership of 105 member governments and 127 participating organizations.

GIS Congress 2020
November 23 - 24, 2020
Barcelona, Spain
https://gis-remotesensing.environmental-conferences.org

This 6th International Conference with the theme "Application of GIS and Remote Sensing Techniques" will feature valuable keynote presentations, talks, poster presentations and exhibitions. Rearchers, 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.

In our series Discovery of an African Space Institution, in this issue, we focus on the Ethiopian Space Science and Technology Institute (ESSTI) in Addis Ababa, Ethiopia. See more at http://etssti.org/

Discovery of an African Space Institution

The launch of Ethiopia's first satellite the ETRSS-1 last year on 20 December was an historical event which made the entire nation proud and excited with reason as Ethiopia has now become only the 11th African country which can claim to have their own satellite in space.

The organization which can take credit for this feat is certainly the Ethiopian Space Science and Technology Institute (ESSTI) the country's own independent space agency. Sanctioned on November 2, 2016 by the Ethiopian Council of Ministers the ESSTI powered on with its main objectives namely to enable the country to fully exploit the multidimensional uses of space science and technologies.

To launch their own satellites three years after the founding of the organization was indeed a big leap for a fledgling organization, but when speaking to Prof Solomon Tessema Director General of ESSTI we not only discovered that he has the right type of qualifications and experience for the position but that his Institute has some more exciting projects up its sleeve.

After qualifying with a B.Sc In Physics at Asmara University in Ethiopia he went on for further education until finally obtaining a PhD in Astrophysics at Addis Ababa in collaboration with the Swedish University of Gothenburg. Since 2014 he served as associate professor in Astrophysics at the Kotebe University. Prof Tessema at the same time cut his teeth in the space business first as a founding member of Ethiopia Space Science Society in 2004, then as project leader, founder and scientific director of Entoto Observatory and Research Center (EORC) from 2011 until 2016.

Prof Tessema is clear on his vision for ESSTI. "To ensure Ethiopia's home-based competence in space science and technology that is capable of responding to national development demand. We want to make Ethiopia a leading African country in the space industry within the next 15 years and in the process create more jobs and health for our people through the space business," he says.

Prof Solomon Tessema Director General of the Ethiopian Space Science and Technology Institute (ESSTI) based in Addis Ababa.

He is indeed very pleased about the successful launch and operation of their satellite ETRSS-1 and clear on the advantages it will bring to Ethiopia. "Apart from helping us to build our national image it will also transfer knowledge to Ethiopia especially in the field of monitoring the environment and weather patterns of Ethiopia; better agricultural planning; early warnings for droughts and flooding; water, forestry and environmental management and mining activities," he says.

Their plans for a new receiver station are also going according to plan: "The building of receiver station is going well and expected

This test photo of Dahlak Island in the Red Sea of the Eritrea's coast was taken by the ETRSS-1 satellite as part of its orbit calibration on 16 February 2020 at a resolution of 13,75m. The satellite was launched on the 20th of December, 2019 at 11:22:29 (GMT+8) at Tiayuan Satellite Launch Centre in China as a secondary payload on board Long March 4B (LM-4B) rocket. Only 11 African countries now have their own satellites in space. They are, in alphabetical order: Algeria, Angola, Egypt, Ethiopia, Ghana, Kenya, Morocco, Nigeria, Rwanda, South African and Sudan.

A large media gathering at the historic launch of ETRSS-1 Ethiopia's first satellite on 20 December, 2019. In the background is the ground receiving and control station for the newly launched ETRSS-1 satellite also known as the Entoto Observatory and Space Science Research Center (EORC) situated on top of Mount Entoto at the western edge of Ethopia's capital Addis Ababa.

to finish around May 2020 which will then be used to access more satellite data and business."

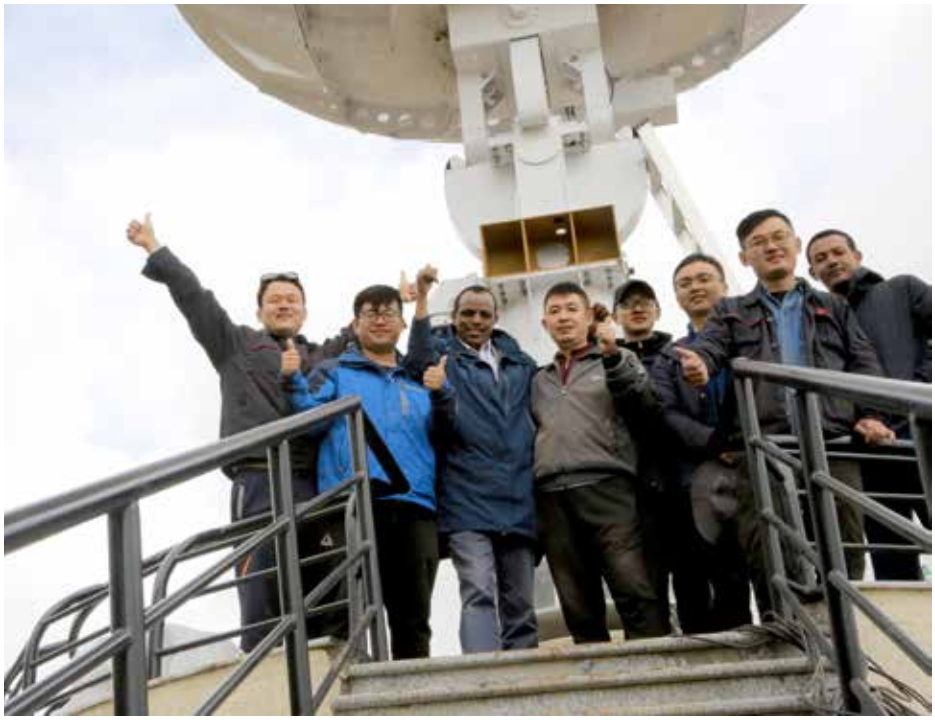
And there is even more: "We are planning the establishment of an Assembly, Integration and Testing Center (AIT), the launch of a second remote sensing satellite and establishment of Ethiopia's own launch center," says Prof Tessema.

The ESSTI now employing some 140 full-time staff is fully funded by the Ethiopian government from which it received the following mandate:

1. Undertake research in areas of aerospace science and technology;
2. Formulate space policy and strategy consistent with the present and future needs of the country and implement same upon approval by the government;
3. Prepare aerospace development plans of the country and implement same upon approval by the government;
4. Support aerospace science and related activities carried out at national level and regulate their alignment with the national development needs;
5. Design, produce and launch aerospace developmental activities;
6. Design strategies that ensure the fulfillment of manpower with requisite quantity and quality of the sector in an expeditious manner and following-up its implementation;
7. Establish research centers supporting capacity development of the country's space science and technology;
8. Support local manufacturing industries in order to produce various equipment to be utilized in space development service;
9. Gather and compile information supporting aerospace development and carry on fact-finding missions;
10. Issue permit to persons who desire to engage in space activities, control their operation, register space objects and regulate in collaboration with other relevant organs overall aerospace activities that emanate within and outside the country and operated within the country's jurisdiction;
11. Works in cooperation with other concerned organs on space flight and activities that are related with the country's peace and security matters;
12. Establish and strengthen cooperation with institutions of the countries having similar objectives and may provide support to the sector;
13. Sign international and regional agreements consistent with the national interest and implement same upon ratification;
14. Carryout other related activities necessary for the attainment of its objectives.

The founding of the ESSTI is indeed a big step forward towards the development of Ethiopian Space Science activities that will give Ethiopia the advantage to be an effective and extensive user of space science and technology for its sustainable developments.

Report by Anthony Penderis



Prof Solomon Tessema Director General of the Ethiopian Space Science and Technology Institute (ESSTI) show some visitors around at their ground receiving station atop Mount Entoto at the western edge of Ethopia's capital Addis Ababa.

Lake Kariba at lowest level in 20 years

Lake Kariba one of the world's largest reservoirs in December 2019 reached its lowest level since 1996 dropping down to a level of 8,36% of useable storage. Due to increased rainfall in its catchment area recently the level increased to 10,08% useable storage on 13 February 2020 compared to 43.15% a year ago.

Kariba Lake is designed to operate between levels of 475.50m and 488.50m (with 0.70m freeboard) for hydropower generation. On 13 February 2020 this level was at 476.96m which is barely within this margin. Although it is one of the most reliable sources of electricity to Zimbabwe and Zambia the recent drought has resulted in rolling blackouts of up to 18 hours at a time in these countries.

Kariba receives about 20% of it waters from Zimbabwe through the Sanyati and Gwaai Rivers while 80% flows from Angola, DRC and Zambia.

Southern Africa is suffering through its worst drought in several decades and perhaps a century. Diminished and late rainfall across the region—roughly 55 to 85 percent of normal for October through December 2019—combined with long-term increases in temperatures, have jeopardized food security and electric power for millions of people in the region.

According to the International Federation of Red Cross and Red Crescent (IFRC), at least 11 million people are facing food shortages due to drought. Grain production is down 30 percent across the region. In Zimbabwe, where they are close to running out of their staple crop of maize, it is down 53 percent. Livestock farmers in southern Africa have suffered losses due to starvation and to early culling of herds forced by shortages of water and feed.

"This year's drought is unprecedented, causing food shortages on a scale we have never seen here before," said Michael Charles, head of IFRC's Southern Africa group. "We are seeing people going two to three days without food, entire herds of livestock wiped out by drought, and small-scale farmers with no means to earn money to tide them over a lean season."

Source

http://www.zambezira.org/hydrology/lake-levels
https://earthobservatory.nasa.gov with extracts from articles by Lauren Dauphin & Phillimon Mhlanga Business Times Zimbabwe.
https://earthobservatory.nasa.gov/images

The Operational Land Imager (OLI) on Landsat 8 acquired this natural-color image from the shores of Lake Kariba on 23 December 2019 when the dam level was at 8,36% of useable storage, the lowest since 1996. As a major supplier of electricity to Zimbabwe and Zambia the low levels have resulted in electricity blackouts lasting up to 18 hours in these countries. The reservoir's semi-circular dam wall can be seen in the middle of the picture.
Image: https://earthobservatory.nasa.gov

Two African countries to launch big satellites

Two big satellite launches by African countries have been announced this past month. They are the NileSat-301 by Egypt and AngoSat-2 by Angola.

AngoSat-2

The AngoSat-2 satellite, which is being built to replace the lost AngoSat-1, will be ready by the end of 2021, Roscosmos deputy director general Sergei Dubik said.

As the Angosat-1 satellite was pronounced a total loss on April 28, 2019 the Minister of Telecommunication and Information Technologies of Angola José Carvalho de Rocha told the Journal de Angola newspaper that his government had accepted a proposal from Roscosmos to build a replacement spacecraft for Angosat-1. The cost for Angosat-2 would be covered with a $121-million insurance payment for the loss of Angosat-1 and the rest would be paid by the Russian government who also promised to support operations of the ground control center in Funda, Angola.

NileSat-301

Egypt's commercial satellite communications operator NileSat has selected U.S. commercial space launch company SpaceX to launch its NileSat-301 communications satellite in 2022. European satellite manufacturer Thales Alenia Space won the contract in December 2019 to build the NileSat-301 communications satellite with a design-life exceeding 15 years, which is expected to be completed by 2022.

Positioned at 7° West, Nilesat-301 will work with Nilesat-201 to provide Ku-band services for the Middle East and North Africa. Nilesat-301 will also help extend the company's provision of Ku-band communications and direct digital broadcasting services in two new large regions of Africa, while also providing broadband Ka-band connectivity over all of Egypt.

Sources: https://spacewatch.global
http://www.russianspaceweb.com

More support offered for African wetlands management

GlobWetland Africa has announced an extension of its activities to support African governments in the wake of celebrating World Wetlands Day (WWD) on 2 February 2020 which marks the date of date of the adoption of the Convention on Wetlands in the Iranian city of Ramsar on the same day in 1971.

GlobWetland Africa is a large Earth Observation application project funded by the European Space Agency (ESA) in partnership with the African Team of the Ramsar convention on wetlands. The project is initiated to facilitate the exploitation of satellite observations for the conservation, wise-use and effective management of wetlands in Africa and to provide African stakeholders with the necessary Earth Observation (EO) methods and tools to better fulfil their commitments and obligations towards the Ramsar Convention on Wetlands.

In a nutshell the organization provides the following support to African countries:

- Exploit the increasing capabiities of satellite observations for wetlands inventory, assessment and monitoring;
- Develop a free of charge and open source software toolbox to better assess the state and change in wetlands;
- Access "freely available" satellite observations from the Sentinel missions of the European Copernicus initiative;
- Enhance the capacity of African stakeholders to develop national and regional wetland observatories.

Their new extended activities aim to provide countries with a guideline and practical tool to perform EO-based national wetland inventorying to meet their reporting requirements towards Ramsar and the SDGs.

The majority of current GW-A toolbox users operate in countries and regions where access to computing resources is limited and internet bandwidths are low. This has constrained the use of the toolbox to localized cases in which a small number of Sentinel-1 or Sentinel-2 observations are processed at a given time.

Under the new GlobWetland Africa extension, they propose to remove this barrier by extending the toolbox functionality into the cloud; i.e. the raw satellite imagery is accessed via the internet and processing performed through a shared online computing infrastructure. As a result, users only need bandwidth to transfer megabytes of results rather than several terabytes of raw data.

Countries who have already listed one or more of their wetlands with GlobWetland Africa are Algeria, Burundi, Congo, Egypt, Gabon, Ghana, Kenya, Madagascar, Mali, Mozambique, Senegal, Togo, Tunisia, and Uganda.

Please contact the author or visit www.globwetland-africa.org to learn more on how Earth Observation can be used to take stock of wetlands in your country.

Source
http://globwetland-africa.org with extracts from article by Christian Tøttrup

Drones help to fight one of Africa's dreaded diseases

Researchers fighting the dreaded schistosomiasis also known as bilharzia at the world's largest epidemic site the Lower Senegal River Basin in Senegal, West Africa has come up with a novel idea employing remote sensing via drones to fight the disease.

The researchers from the University of Washington's School of Aquatic and Fishery Sciences who have been at this since 2014 started off by mapping the sites where snails the carrier of the disease occurred the most. Senegalese public health officials would then destroy them by physically removing the snails or using chemical molluscicides. Snails unfortunately do not stay put and it was necessary to limit the size of the targeted area to reduce the expense and environmental and health impacts of the application.

When the team started using drones to get an aerial image of the aquatic habitat at each water-access site they noticed that snails tend to associate with certain kinds of aquatic vegetation that were visible in their drone imagery. Upon this followed an important discovery: human schistosomiasis infections were more common at sites where this suitable snail habitat was present.

The outcome is two-fold: Firstly public health agencies in Senegal might now be able to prioritize their drug distribution strategy with the help of drone imagery. Secondly it is more efficient to target the vegetation that serves as snail habitat rather than snail clusters themselves. Molluscicide can be applied to patches of this vegetation or the vegetation physically removed.

Source: https://theconversation.com/
https://fish.uw.edu/faculty/chelsea-wood

NASA Pandora Project expands African footprint

Report by Robert Swap and Alexander Kotsakis

Since our presentation at the 12th Annual Meeting of the AARSE entitled "Ground Based Passive UV-Visible Remote Sensing of Air Quality: Setting the Stage for Satellite Validation and Enhanced Environmental Monitoring in Africa", the NASA Pandora Project as part of the Pandonia Global Network have slowly been expanding their observational footprint across the African continent where the lack of air quality measurements makes it difficult to address air quality issues.

Decades of remotely sensed air quality measurements have provided both spatial and temporal perspectives over the continent. These measurements are however limited by the less than once a day snapshots and the apriori retrieval profiles which can significantly underestimate the amount of air pollution close to the surface. This lack of understanding between what is observed at lowest height of where satellites are sensitive and what is inhaled below this height, presents significant challenges to both scientists and decision makers.

Pandora, a ground based Ultraviolet-Visible spectrometer system, can measure health pertinent trace gases such as O3, NO2, HCHO, and SO2 in addition to numerous other species. The primary utilization of Pandora is to support ground-based validation activities of both polar orbiting (TROPOMI, OMI, OMPS, GOME-2) and soon to be launched geostationary (GEMS TEMPO, Sentinel-4) air quality satellites. In addition to providing total column trace gases measurements to compare to satellite observations, Pandora can utilize Multi-AXis Differential Optical Absorption Spectroscopy (MAX-DOAS) techniques to derive tropospheric and surface concentrations of NO2 and HCHO.

Building upon the legacy of large regional scale field campaigns such as SAFARI 2000, NASA Pandora Project (https://pandora.gsfc.nasa.gov and @GsfcPandora) continues with its engagement of African institutions with Pandora spectrometer systems deployed in Senegal, Sao Tome and in Gauteng, South Africa in support of satellite validation, long term air quality monitoring, environmental research and model verification. Additional European and South African instruments are also deployed at Gobabeb, Namibia and in Mpumalanga, South Africa.

As part of increasing public awareness both home and abroad on issues related to air quality and atmospheric composition, the NASA Pandora Project is focused on involving African institutions of higher learning so as to contribute to the development of local expertise related to passive remote sensing of trace gases and aerosols.

See https://pandora.gsfc.nasa.gov and @GsfcPandora for more information on this project.

Left: The spatial distribution of Pandora instruments on the African continent. Right: NASA Pandora project collaborators from University of Virginia setting up a Pandora in Dakar, Senegal.

AJ-CORE Call for Proposals 2020

The Africa-Japan Collaborative Research (AJ-Core) on Environmental Research is a partnership between the National Research Foundation (NRF) of South Africa and the Japan Science and Technology Agency (JST). It aims to support joint research and innovation projects in designated fields of science between researchers from Japan, South Africa and the 15 African countries which are participating members in the Science Granting Councils Initiative (SGCI).

The call operates on a co-funding model financed by the NRF and the JST. Consortia composed of at least three research organisations and/or private and public practitioners from three different countries (i.e. South Africa, Japan and a SGCI African country) may submit project proposals. The proposal development and execution should be driven by local demand with an approach to enhance impact. The application deadline 30 March 2020. Contact Michael Inggs at +27 21 786 1723; +27 83 776 7304; Skype: mikings; or mikings@gmail.com for more detail.

NASA Biodiversity Course registration now open

Registration is now open for an online series called: Using the UN Biodiversity Lab to Support National Conservation and Sustainable Development Goals. This 3-part series, offered in English, Spanish and French, will introduce participants to the UN Biodiversity Lab and how it can be used to access and analyse global data in order to provide key information on the Convention on Biological Diversity's (CBD) Aichi Biodiversity Targets and on the nature-based Sustainable Development Goals.

It will teach participants about global biodiversity-based uses of remote sensing with real-time satellite data with drones and mobile apps to enable communities to map their knowledge of their local ecosystems.

Course Dates: March 24, 31, and April 7, 2020 with times (EDT/UCT- 4) and registration Information:

- English Session 9:00-10:30: https://go.nasa.gov/39epJgi
- French Session 11:00-12:30: https://go.nasa.gov/377aHay
- Spanish Session 14:00-15:30: https://go.nasa.gov/2OyG6w4

Space Snippets

The space industry is not called "burgeoning" for nothing. There is so much happening that it's difficult to keep track of all the new developments all the time. In this issue we bring you once again a number of the most interesting announcements we could find.

OneWeb launches second batch of internet satellites

OneWeb a company which aims to provide internet services via small satellites to the whole world launched a batch of 34 satellites on 6 February from Baikonur in Kazakhstan as precursor to a constellation that will grow to some 650 in its first phase.

This follows their first launch of six test satellites on 27 February last year which are performing well. Founded by US entrepreneur Greg Wyler and headquartered in the UK, OneWeb aims to make high-speed internet also available to 4 billion people who have no access to the web.

Catherine Mealing-Jones, Director of Growth at the UK Space Agency in a statement said: "There is huge commercial potential for a cost-effective worldwide telecoms satellite system, and the UK space sector is playing a leading role in delivering it, building on our world-leading capabilities in satellite telecommunications, connectivity and data. Satellite telecoms are central to bringing fast responsive services to people and communities right across the UK and around the world.

Greg Wyler OneWeb Founder and CEO. Image: OneWeb. Source: https://www.oneweb.world/

"Responsible growth means that we recognise the importance of protecting the space environment and are the leading investor in ESA's space safety and security programme, which includes a new mission to help remove space debris.

"OneWeb, which has its Global Operations Centre in White City, London, plans to provide its first customer demonstrations by the end of 2020 and full commercial global services for sectors such as maritime, aviation, government and enterprise in 2021.

"The UK Space Agency licensed the 34 satellites for launch and regulates the use of space by UK organisations and individuals through the Outer Space Act 1986. This process requires satellite operators to demonstrate they have considered any asso-ciated risks and have safeguards in place, such as the ability to manoeuvre satellites to avoid debris and other spacecraft, and to de-orbit them at the end of their lifetime."

The OneWeb satellite dispenser being readied in Baikonur during January 2020. Image: OneWeb

Astronaut applications open (Americans only)

As NASA prepares to launch American astronauts this year on American rockets from American soil to the International Space Station – with an eye toward the Moon and Mars – the agency is announcing it will accept applications March 2 to 31 for the next class of Artemis Generation astronauts.

Since the 1960s, NASA has selected 350 people to train as astronaut candidates for its increasingly challenging missions to explore space. With 48 astronauts in the active astronaut corps, more will be needed to crew spacecraft bound for multiple destinations and propel exploration forward as part of Artemis missions and beyond.

"We're celebrating our 20th year of continuous presence aboard the International Space Station in low-Earth orbit this year, and we're on the verge of sending the first woman and next man to the Moon by 2024," said NASA Administrator Jim Bridenstine.

The basic requirements to apply include United States citizenship and a master's degree in a STEM field, including engineering, biological science, physical science, computer science, or mathematics, from an accredited institution. The requirement for the master's degree can also be met by:

- Two years (36 semester hours or 54 quarter hours) of work toward a Ph.D. program in a related science, technology, engineering or math field;
- A completed doctor of medicine or doctor of osteopathic medicine degree;
- Completion (or current enrolment that will result in completion by June 2021) of a nationally recognized test pilot school program.

Candidates also must have at least two years of related, progressively responsible professional experience, or at least 1,000 hours of pilot-in-command time in jet aircraft. Astronaut candidates must pass the NASA long-duration spaceflight physical.

NASA expects to select the new class of astronaut candidates in mid-2021 to begin training as the next class of Artemis Generation astronauts.
Americans may apply to #BeAnAstronaut at www.usajobs.gov.
Source
http://www.nasa.gov/astronauts

Space Snippets

China to smash launch record in 2020

Beijing (Xinhua)
China will smash its record for space launches in 2020.The country is going to send more than 60 spacecraft into orbit via over 40 launches this year, according to a plan released last month in Beijing.

"This year will continue to see intensive launches," said Shang Zhi, director of the Space Department of the China Aerospace Science and Technology Corporation (CASC), at a press conference, where a blue book setting out China's space achievements and future missions was released.

According to Shang, there are three major missions, mainly focusing on the completion of the BeiDou-3 Navigation Satellite System, the lunar exploration and the network of Gaofen observation satellites.

Two geostationary orbit BeiDou satellites will be sent into space in the first half of 2020. The Chang'e-5 lunar probe, which is expected to bring moon samples back to Earth, and China's first Mars probe are also planned to be launched this year.

In addition, three new types of carrier rockets, which are the Long March-5B, Long March-7A and Long March-8, will make their maiden flights in 2020.

As a new generation of carrier rocket, the Long March-5B has the largest carrying capacity to low-Earth orbit. It will carry the core capsule and experiment capsules of China's space station.

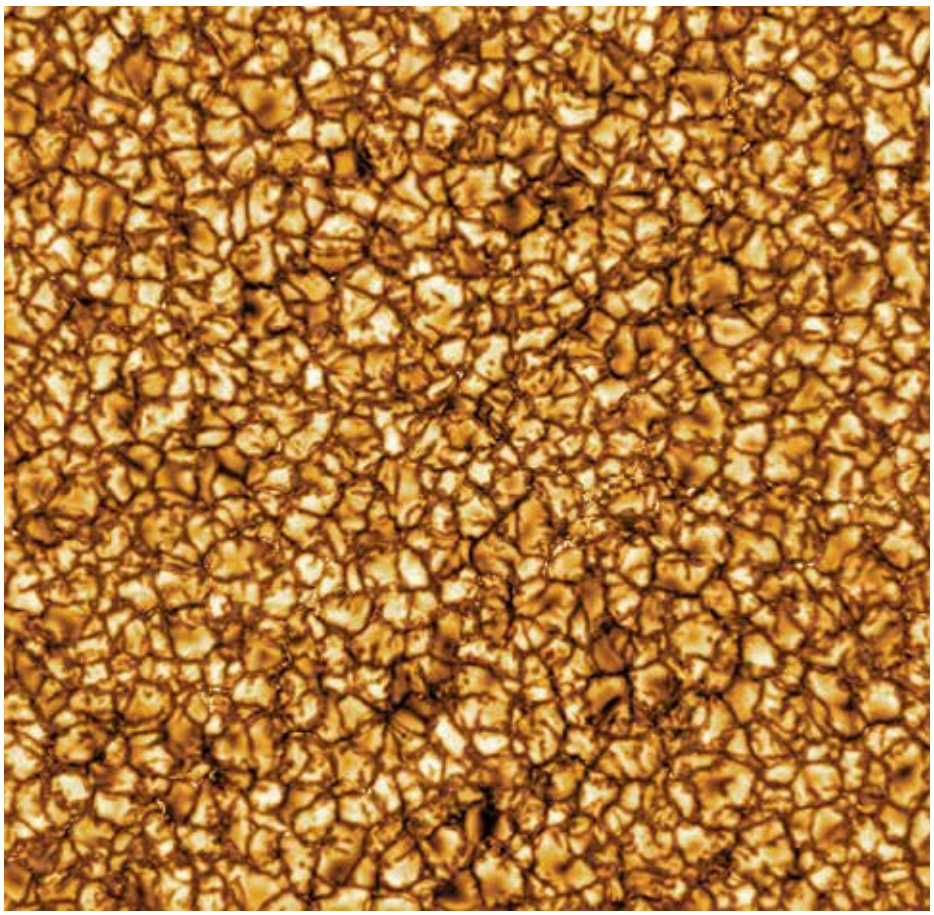
The Long March 7A represents the new generation of China's medium-sized high-orbit rocket. The Long March-8 rocket will increase China's lift capacity for launches to sun-synchronous orbits and meet the growing needs of commercial launches.

The Long March-5 rockets will be launched three times in 2020, carrying a new generation of manned spacecraft, a Mars probe and a Chang'e-5 probe into space.

The CASC will also send a number of satellites for China's civil space infrastructure system and plan a series of commercial launches this year, according to the blue book.

China completed 34 space launches in 2019, ranking first in the world.

Source:
http://www.xinhuanet.com



Highest resolution image ever of our Sun

The world's largest solar telescope the Daniel K. Inouye Solar Telescope (DKIST) still under construction on the peak of Haleakala on the Hawaiian island of Maui captured this image on Dec. 10, 2019. The observatory is not yet complete and therefore a single instrument, the Visible Broadband Imager (VBI), was operational at that time.

The VBI takes extremely high-resolution images of the solar surface and lower atmosphere. Construction on the 4-meter telescope which started in 2012 is winding down and the whole project managed from a 13-storey building nearby will be fully operational by June 2020. Inouye is meant to operate for 44 years, which should cover two of the sun's full 22-year solar cycles.

Source
www.space.com;
Image credit: NSO/NSF/AURA

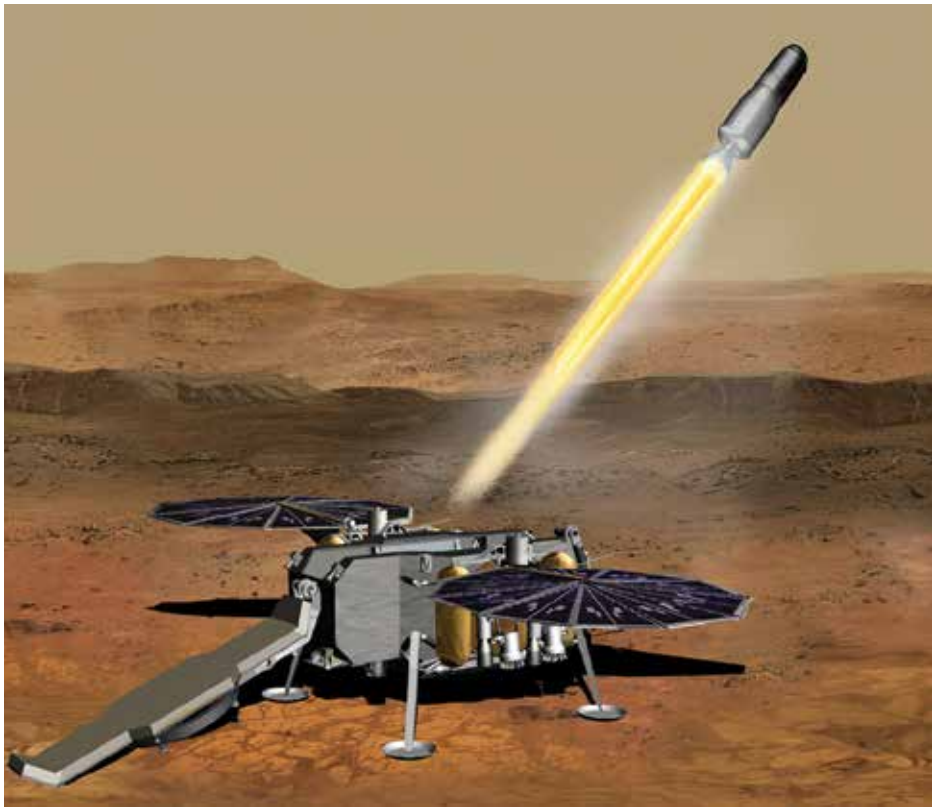
Mars soil samples not expected before 2031

NASA and the European Space Agency are solidifying concepts for a Mars sample return mission after NASA's Mars 2020 rover collects rock and soil samples and stores them in sealed tubes on the planet's surface for potential future return to Earth.

NASA will deliver a Mars lander in the vicinity of Jezero Crater, where Mars 2020 will have collected and cached samples. The lander will carry the ascent vehicle along with an ESA Sample Fetch Rover that is roughly the size of NASA's Opportunity Mars rover. The fetch rover will gather the cached samples and carry them back to the lander for transfer to the ascent vehicle; additional samples could be delivered directly by Mars 2020. The ascent vehicle will then launch from the surface and deploy a special container holding the samples into Mars orbit.

ESA will put a spacecraft in orbit around Mars before the ascent vehicle launches. This spacecraft will rendezvous with and capture the orbiting samples before returning them to Earth. NASA will provide the payload module for the orbiter. The samples are expected back on Earth by 2031, if all goes according to plan.

Source: www.jpl.nasa.gov



Artist's illustration of NASA's planned Mars Ascent Vehicle launching samples off the surface of the Red Planet.
Image: https://www.jpl.nasa.gov/spaceimages/

Newton's apple tree revived in space

Saplings grown from apple pips from Isaac Newton's tree and taken into space by astronaut Tim Peake have earlier this year been given homes to inspire the next generation.

The 8 young trees were grown from seeds taken from the 'Flower of Kent' tree at Woolsthorpe Manor, National Trust, in Lincolnshire, the home of iconic scientist Sir Isaac Newton who drew out the principles of gravity after seeing an apple fall.

The 'Flower of Kent' tree at Woolsthorpe Manor, National Trust, in Lincolnshire, the home of iconic scientist Sir Isaac Newton who drew out the principles of gravity after seeing an apple fall.
Image: Adam Swain/flickr
Source:
https://www.gov.uk/government/news/

Tim Peake took the seeds with him when he went to the International Space Station on the British European Space Agency (ESA) astronaut's Principia mission in 2015.

The seeds spent 6 months floating in micro-gravity as part of the 'Pips in Space' project and then landed back on Earth in 2016 to be nurtured into young trees. The UK Space Agency, the National Trust and the Royal Botanic Gardens, Kew, worked together on the project.

The Eden Project in Cornwall, Jodrell Bank in Cheshire, and the National Physical Laboratory in Middlesex, are among the winners of a competition to become home to one of the special saplings. The winners represent a mix of fields including educational, research, science, arboreal and horticultural organisations.

Record breaking female astronaut returns home

After setting a record for the longest single spaceflight in history by a woman, NASA astronaut Christina Koch returned to Earth Thursday, 6 February 2020, along with Soyuz Commander Alexander Skvortsov of the Russian space agency Roscosmos and Luca Parmitano of ESA (European Space Agency).

The trio departed the International Space Station at 12:50 a.m. EST and made a safe, parachute-assisted landing at 4:12 a.m. (3:12 p.m. Kazakhstan time) southeast of the remote town of Dzhezkazgan, Kazakhstan.

Koch's extended mission will provide researchers the opportunity to observe effects of long-duration spaceflight on a woman as the agency plans to return humans to the Moon under the Artemis program and prepare for human exploration of Mars.

Koch launched March 14, 2019, alongside fellow NASA astronaut Nick Hague and Russian cosmonaut Alexey Ovchinin. Her first journey into space of 328 days is the second-longest single spaceflight by a U.S. astronaut and also places her seventh on the list of cumulative time in space for American astronauts with one or more missions.

Christina Koch looks through the station's "window to the world," the seven-windowed cupola. She was photographing landmarks as the orbiting lab flew 259 miles above the Pacific Ocean off the coast of South America. While astronauts look out this window for fun, they also use it to make valuable Earth observations such as unexpected weather events, which robotic sensing platforms cannot capture. Credits: NASA

NASA astronaut Christina Koch is helped out of the Soyuz MS-13 spacecraft just minutes after she, Roscosmos cosmonaut Alexander Skvortsov, and ESA astronaut Luca Parmitano, landed their Soyuz MS-13 capsule in a remote area near the town of Zhezkazgan, Kazakhstan on Thursday, Feb. 6, 2020. Credits: NASA/Bill Ingalls

Supporting NASA's goals for future human landings on the Moon, Koch completed 5,248 orbits of the Earth and a journey of 139 million miles, roughly the equivalent of 291 trips to the Moon and back. She conducted six spacewalks during 11 months on orbit, including the first three all-woman spacewalks, spending 42 hours and 15 minutes outside the station. She witnessed the arrival of a dozen visiting spacecraft and the departure of another dozen.

For Parmitano and Skvortsov, this landing completed a 201-day stay in space, 3,216 orbits of Earth and a journey of 85.2 million miles. They launched last July with NASA's Andrew Morgan. Morgan also is participating in an extended duration mission on the orbiting laboratory and will return to Earth April 17.

Completing his second mission, Parmitano now has logged 367 days in space, more than any ESA astronaut in history. During his time in space for Expeditions 60 and 61, Parmitano conducted four spacewalks, totaling 25 hours and 30 minutes. He has now conducted six spacewalks in his career, totaling 33 hours and 9 minutes. Parmitano was commander of Expedition 61.

Skvortsov completed his third mission and a total of 546 days in space, placing him 15th on the all-time spaceflight endurance list.

Following post-landing medical checks, the crew will return to the recovery staging city in Karaganda, Kazakhstan, aboard Russian helicopters. Koch and Parmitano will board a NASA plane bound for Cologne, Germany, where Parmitano will be greeted by ESA officials for his return home. Koch will continue home to Houston. Skvortsov will board a Gagarin Cosmonaut Training Centre aircraft to return to his home in Star City, Russia.

The Expedition 61 crew contributed to hundreds of experiments in biology, Earth science, human research, physical sciences and technology development, including improvements to the Alpha Magnetic Spectrometer in an effort to extend its life and support its mission of looking for evidence of dark matter and testing 3D biological printers to print organ-like tissues in microgravity.

With the undocking of the Soyuz MS-13 spacecraft with Koch, Skvortsov, and Parmitano aboard, Expedition 62 officially began aboard the station, with NASA astronauts Jessica Meir and Morgan as flight engineers and Oleg Skripochka of Roscosmos as station commander. They will remain on board as a three-person crew until early April, when NASA astronaut Chris Cassidy and Russian cosmonauts Nikolai Tikhonov and Andrei Babkin will launch to the station.

Sources
https://www.nasa.gov/press-release/record-setting-nasa-astronaut-crewmates
https://www.nasa.gov/press-release/nasa-astronaut-s-record-setting-mission

Christina Koch works inside the Life Sciences Glovebox conducting research for the kidney cells investigation that seeks innovative treatments for kidney stones, osteoporosis and toxic chemical exposures. This experiment examines how kidney health is affected by microgravity and other factors of space travel, including water conservation and recycling, and altered diets. Credits: NASA