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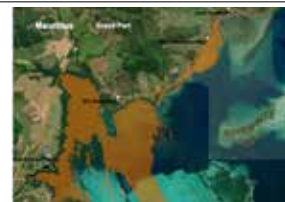
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African nations can now access high-resolution satellite images in the Digital Earth Africa (DE Africa) platform that will enable countries to monitor changes that relate to people and the environment due to the impacts of COVID-19 and other critical challenges...p11



Mauritius struck by worst ecological disaster ever

The Mauritius tourism-dependent economy could be affected for decades after an oil tanker ran aground on one of its coral reefs spilling some 1000 tonnes of oil on the coastline. The Japanese tanker MV Wakashio struck a coral reef...p12



Celebrated Namibian NASA scientist passes away

The celebrated Namibian NASA scientist Dr Japie van Zyl died on 26 August 2020 at the age 63 in a hospital in Pasadena, California after experiencing a heart attack at home while in self-isolation because of contact with COVID-19 positive cases...p13



Sir Branson to be on his first commercial space flight

Billionaire Sir Richard Branson will fly into space on a Virgin Galactic rocket ship early next year if two test flights go to plan, the space tourism company he founded has said. Mr Branson's trip to space hinges on the success...p15



From the Editor



So humans will land on Mars one day. And then what? This might seem an irritating question to many as there is so much Mars hype going around and so many nations climbing in for the honour to do a 'first' of something or other on the Red Planet.

To enable humans to walk on Mars, do some scientific experiments, collect samples and return back to Earth alive will truly be a magnificent scientific and technological achievement for humankind. We did the same thing traveling to the Moon and now fifty years later we are poised for the next leap. And then after Mars? A round trip to Mars will take some 3 years to pull off. The leap then becomes somewhat larger.

Astronomers found evidence of liquid water or oxygen on some of the moons of Jupiter such as Europa, Callisto and Ganymede so these seem to be the next logical targets to explore. But a round trip there could take up to 16 years. There is clearly no point in sending humans as they cannot survive zero gravity for such a long time. Unless rocket technology changes dramatically we will have to send robots to act on our behalf.

What about establishing a human colony on Mars? Is that feasible? Let's get down to the basics. Suppose we overcome all the physical challenges such as the danger of radiation, lack of water and oxygen supplies and enable humans to stay on Mars for as long as they want to. Did we then conquer Mars? In a way we would have, but there is one teensy weensy little matter that few seem to take into account. That is the force of gravity.

The gravitational pull on Mars is 38% of Earth's. If you move to Mars you will at first feel as light as feather and be able to hop, skip and jump around like some super athlete with no limitations. Eventually your body will adapt until you are not aware of it anymore. This will

probably take a few years but by then you and your fellow Martian colonists would have produced children whose bodies will be adapted to living on Mars only. They can never come back to Earth simply because their hearts, lungs, blood circulatory systems and bone structures will not be able to function in an environment with more than double the gravitational force they are used to.

On landing on Earth a Martian will immediately pass out because the blood will be drawn away from his head, possibly followed by collapsed lungs, cardiac arrest and broken bones. But should the Martian miraculously survive all of these there will still be the continual onslaught of a great variety of diseases his or her body has no defence against because of a poorly developed immune system.

Apart from the drive to be the first nation to land on Mars there is of course another reason why we are so keenly exploring other worlds in our solar system. We want to find signs of extra-terrestrial life or at least primitive forms of it. But what if we do not find any signs of life at all anywhere? Evolutionists will certainly have to relook their 'Primordial Soup Theory' which claims that life will spontaneously erupt where you have the right combination of sunlight, water, oxygen and a number of other chemicals already in abundance in our solar system.

At this stage it appears that Mars represents the limit of the human journey into outer space and that we are trapped forever in our own solar system. Unless of course we make a phenomenal scientific breakthrough which will make interstellar travel possible.

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.

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Dear Readers

The COVID-19 pandemic is still with us and definitely a force to be reckoned with. Although the number of infections on our continent has now crossed the million mark one could be conservatively optimistic and trust that it will not run rampant as it did in

some other parts of the world. The pain caused by the deaths that normally follows in the wake of such a pandemic will of course still be felt for a long time by many of those who lost their loved ones.

We have however the reassurance from the African Union Commission that they are not letting their guards down through the launch of their latest campaign called Africa Against COVID-19: Saving Lives, Economies, and Livelihoods. It incorporates inter alia strategies to protect borders, travellers, economies, livelihoods and schools all across Africa. This program will certainly assist a large number of Africans right across the continent to stay on their guard to prevent further spread of the virus while borders open up and we try to manage our economies and everyday existences back to normal.

During these times the value of remote sensing applications to fight of an epidemic has also become apparent. We have seen on numerous fronts how satellite-generated data has assisted experts whether

Message from the President

it be in the field of medicine, agriculture, environmental monitoring or the economy to fine-tune their strategies and apply their solutions more effectively. As always food security and health are the two topmost priorities for all the peoples of the African continent and the rest of the world. The professionals in the field of remote sensing applications can therefore be satisfied that their tools have proofed their value when it really matters.

The fact that African countries are opening up their borders has certainly bolstered the confidence of Ines-Ruhengeri, the organizers of our 13th AARSE International Conference in Kigali, Rwanda next year to go full steam ahead with their planning. The deadline for abstracts submissions has passed and a number of top-level keynote speakers have already confirmed their attendance. As the event is in the hands of a prestigious teaching institute we are all looking forward not only to not only to cement old ties and learn about the latest achievements and progress in the field of remote sensing and geotechnology but also to soak up the Rwandan experience. Truly something to look forward to. Hope to see you there.

All the best and stay safe.

Prof Kamal Labbassi - AARSE President 2018 - 2022

Advertise in our October 2020 edition

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](#) and the Facebook Page [Space News Africa](#)

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 October 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 October 2020 Newsletter

Bookings Deadline: Friday, 2 Oct 2020

Materials & Payments Deadline: Friday, 9 Oct 2020

Publishing Deadline: Last week Oct 2020

See samples of previous newsletters [here](#).

See more detail on AARSE Advertising [here](#).

See Facebook page [here](#).

Contact newsletter@africanremotesensing.org for more info.

AARSE Executive Council (2018 - 2022)

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<https://africanremotesensing.org/applications-and-algorithm>

Capacity Building & Outreach Committee (25 members)

<https://africanremotesensing.org/capacity-building-outreach>

Politics, Economics & Entrepreneurship Committee (6 members)

<https://africanremotesensing.org/politics-economics>

Sensors and Data Committee (12 members)

<https://africanremotesensing.org/sensors-and-data>

The 13th AARSE Conference to go ahead in 2021



The 13th AARSE International Conference is to go ahead in Kigali, Rwanda next year from 29 March to 2 April 2021 after this year's conference had to be cancelled due to the COVID-19 pandemic.

The organizers have announced that this will be possible as Rwanda's Airport has re-opened for scheduled commercial flight operations which enabled conferences to resume. To ensure however the safety and health of passengers, crews and staff all airport operations have to adhere to guidelines developed by the Ministry of Health and recommendations of the International

Civil Aviation Organization (ICAO) through the Council Aviation Recovery Task Force (CART).

The AARSE 2021 International Conference will be hosted by the Institut d'Enseignement Supérieur de Ruhengeri (Ines-Ruhengeri) at the Kigali Conference and Exhibition Village (KCEV) in Kigali, Rwanda. The theme for the event will be *Space and geospatial technologies for the Africa we want*.

The main objective of AARSE 2020 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, as well as commercial exhibitions showing latest products and



services in remote sensing and geospatial information technologies.

Paper selection will however still be based on abstracts which had to be submitted by 20 August 2020 and full paper peer review following the guidelines provided in the "Call for Paper" document alongside the details of the registration fees that are currently available on the conference website www.aarse2020.org.

More information can also be obtained from Jossam Potel the coordinator of the Local Organizing Committee at +250788626576 or jossam2003@ines.ac.rw.

Keynote speakers



Dr. Petrus (Peter) J. 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. Amos T. Kabobah 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.



Dr. Emmanuel 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



Dr. Benjamin Koetz works as Senior Application and Mission Scientist in the Earth Observation Directorate of the European Space Agency. His tasks focus on the development of EO applications in close collaboration with relevant user communities, scientists and service providers. In particular he is responsible for the TIGER initiative dealing with EO for water resources management in Africa

and for the recently launched EO AFRICA initiative. He received his M.Sc. degree in Environmental Sciences from the University of Trier, Germany and PhD. with a specialization in Earth Observation from the University of Zürich, Switzerland.

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 applicant's 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 the employment or student status of the 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 during 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 Solomon Tesfamichael (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 Tesfamichael below and the final presentation should be emailed at the latest by 31 January 2021 to:
 Dr Solomon Tesfamichael; Secretary General: AARSE; councillor_wa@africanremotesensing.org; sgtesfamichael@uj.ac.za
 With copy to: Prof. Kamal Labbassi; President: AARSE
kamal.labbassi@africanremotesensing.org;
labbassi@ucd.ac.ma; or kamal_labbassi@yahoo.fr

In our series *Discovery of an African Space Institution*, in this issue, we focus on the African Regional Centre for Space Science and Technology Education - in French Language (le Centre Régional Africain des sciences et technologies de l'espace en langue française /CRASTE-LF) affiliated to United Nations.
See more at <http://www.crastelf.org.ma/>

Discovery of an African Space Institution

The African Regional Centre for Space Science and Technology Education - in French Language (CRASTE-LF) was established in Rabat, Morocco on 23 October 1998, following resolutions passed by the United Nations General Assembly as part of their Program of Space Applications.

Sanctioned by resolutions 45/72 of 11 November 1990 and 50/27 of 6 December 1995 the United Nations Office for Outer Space Affairs (UNOOSA) therefore went ahead and established 6 such educational centres worldwide to serve regions covered by the UN Economic Commissions namely in Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, and Western Asia. Africa was awarded two centres the second one being the African Regional Centre for Space Science and Technology Education - in English Language (ARCSSTE-E) in Nigeria.



The CRASTE-LF is based at the Mohammed V School of Engineers of the Mohammed V University of Rabat in Morocco. It was initially founded by 11 member states: Algeria, Cameroon, Cape Verde, Central African Republic, DRC, Gabon, Morocco, Mauritania, Niger, Togo and Tunisia, and subsequently joined by Senegal in 2002 and Côte d'Ivoire in 2004.

The CRASTE-LF is mandated to build capacities in space technology in African French-speaking countries and its objectives are largely the following:

- To increase knowledge in space sciences and technologies by organizing postgraduate and/or short courses, seminars, workshops, and conferences at regional level;
- To improve the technical competences of the experts, teachers, decision-makers and to keep them informed about technical progress in the field;
- To assist the countries of the region on the development of endogenous capacities in space tools;
- To strengthen the local and regional capacities;
- To promote cooperation with the developed countries and member states as well as among these states;
- To develop expertise in space sciences and technology;
- To provide advisory services to member states and regional institutions who request this; and
- To collect and disseminate information related to space and space technologies.

Since 2000 the CRASTE-LF has offered a two-year Masters in Space Science and Technology based on a study program drawn up on specifications prepared by UNOOSA experts. Students who enrolled in the program are offered six study options namely: Remote Sensing and Geographic Information Systems; Satellite Meteorology and Global Climate; Satellite Communications; Space and Atmospheric Science; Global Navigation Satellite Systems (GNSS); and Space Law.

Up to the end of 2019 the CRASTE-LF has organized 30 post-graduate training sessions for 444 students from 22 African countries. With the aim of universalizing its training the CRASTE-LF in 2012 adopted a policy tailoring its training to the Bologna Process and now has accreditation with the Moroccan educational and research institutions under the supervision of the Ministry of National



Continued on page 7 ...

...continued from page 6



Education, Vocational Training, Higher Education and Scientific Research of Morocco.

In summary the CRASTE-LF has organized 15 sessions in Remote Sensing and GIS for the benefit of 282 trainees; 7 sessions in Satellite Meteorology and Global Climate for 70 trainees; 3 sessions in Satellite Communications for 38 trainees; and 5 sessions in GNSS for 54 trainees.

The CRASTE-LF courses are also presented with the support and collaboration of the international and Moroccan academic institutions who make their experts, staff and infrastructure available. These include the Mohammadia School of Engineers, the Faculty of Sciences of Mohammed V University of Rabat, the Hassan II Institute of Agronomy and Veterinary Medicine, the Royal Centre for Remote Sensing, the National Institute of Posts and Telecommunications, and the National Meteorology Direction.

In addition, CRASTE-LF students receive support from the Moroccan International Cooperation Agency (AMCI) which provides them with scholarships and the National Office University Social and Cultural Works (ONOUCS) which accommodates them at the university campus.

Moreover, CRASTE-LF regularly organizes short courses, workshops, seminars, conferences and technical expert meetings at regional and international level in collaboration with partners such as UNOOSA, the African Union (GMES & Africa Program), FAO, the Islamic World Educational, Scientific and Cultural Organization (ICESCO), the European Space Agency (ESA) and NASA.

These activities take place either at its headquarters in Rabat or in one of the

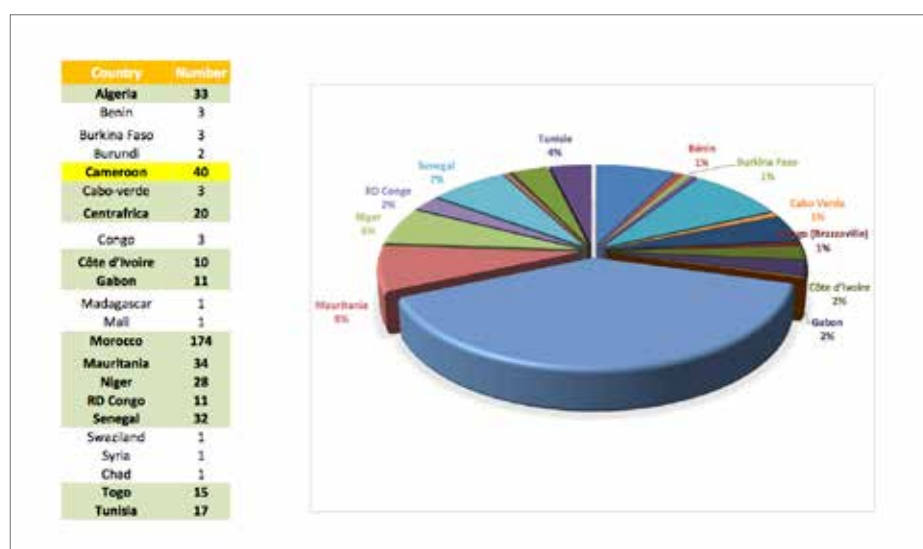
African French-speaking countries. Since its inception and until the end of 2019, the CRASTE-LF has organized 57 activities in 11 African French-speaking countries. These activities covered a wide range of topics related to space technology such as microsatellite technology, Space Law, Telemedicine, Cloud Computing, Smart Agriculture, climate change, disaster management and emergency management in Africa.

Thus, CRASTE-LF facilitates capacity building in the field of applied space technologies for the benefit of African French-speaking countries, in particular its member countries. It does this through its post-graduate and short-term training activities organized at regional and international level and through the dissemination of information and advice to countries in the field of space technologies.

CRASTE-LF regularly organizes short courses, workshops, seminars, conferences and technical expert meetings at regional and international level in collaboration with partners. During the period 2010 – 2019 it has presented 22 conferences attended by 1620 participants from 43 different countries.



CRASTE-LF has furthermore embarked on providing courses by E-Learning via its online platform e-Académie (<http://www.crastelf.org.ma/eacademie/>). It has also developed training kits for each category of course allowing unrestricted downloading of large data from online platforms. This strategy encompasses focus on webinars and massive open online courses (MOOCs) to provide distance learning.



Since its inception in 1998 and up to the end of 2019 the CRASTE-LF has organized 30 post-graduate training sessions for 444 students from 22 African countries. The graph indicates the number of students as well as percentages from these various countries.

Africa Union announces COVID-19 life-saving campaign across the continent

*Africa CDC weekly press briefing:
Addis Ababa, Ethiopia, 20 August 2020.*

H.E. Amira Elfadil Mohammed, Commissioner for Social Affairs, African Union Commission; H.E. Dr Amani Abou-Zeid, Commissioner for Infrastructure and Energy, African Union Commission; and Dr John Nkengasong, Director of the Africa Centres for Disease Control and Prevention (Africa CDC), today announced the launch of the “Africa Against COVID-19: Saving Lives, Economies and Livelihoods” campaign during the Africa CDC weekly press briefing on COVID-19.

“Last two weeks, Africa passed one million cases of COVID-19. Noting that we do not have a vaccine yet, and recognizing the socioeconomic effects of the pandemic on Member States, we must continue to be proactive so that we do not lose the precious gains made with the preventive measures. I am therefore proud to announce the official launch of the African Union Africa Against COVID-19: Saving Lives, Economies, and Livelihoods as an effort to use innovative tools, methods and partnerships to prevent further transmission, deaths and socioeconomic harm on the continent as economies, borders and schools re-open,” said H.E. Amira Mohammed.

The Saving Lives, Economies and Livelihoods campaign will facilitate the development of a harmonized strategy to protect borders, travellers, economies, livelihoods, and schools in Africa from the risk of increased COVID-19 transmission as countries begin to re-open their borders.

“Transport is a catalyst for many of the big initiatives on the continent such as the Single African Air Transport Market and the Free Trade Area, but transport has been halted around the world, affecting most sectors. It is important to work together as a continent to turn this crisis into an opportunity to improve our systems so we can reopen our economies quickly and safely,” said H.E. Dr Amani Abou-Zeid.

The campaign is supported by a consortium of private sector organizations, including Econet Group and pan-African institutions that are part of the PanaBios platform. These organizations pledged the generous donation

of their innovative technology platforms for the campaign.

“That many African organizations are supporting the PanaBios platform – African Organisation for Standardisation, Africa Economic Zones Organization, African Tourism Board, Koldchain BioCordon, and several others – is testament to a newfound spirit of public-private partnerships and the belief in local innovation that will transform the continent completely,” Dr Edem Adzogenu, Chairperson of AfroChampions, said.

“We are excited to be working with African Union Member States, Africa CDC and our implementation partners by offering the Health Status Report, a mobile-based, global health information platform – powered by secure blockchain technology – that captures a person’s COVID-19 testing data and results”, said Mr Strive Masiyiwa, Executive Chairman of Econet, and African Union Special Envoy for the Continental Fight Against COVID-19.

“This data can be shared by individuals confidentially and at their discretion with relevant government, transport and business entities, in a manner that respects personal data privacy,” added Mr Masiyiwa.

The campaign is being implemented by the Africa Task Force for Novel Coronavirus of the African Union, which includes representatives of Africa CDC, World Health Organization Africa Regional Office, African Union NEPAD, UNICEF, African Union Member States, public health institutions, and several

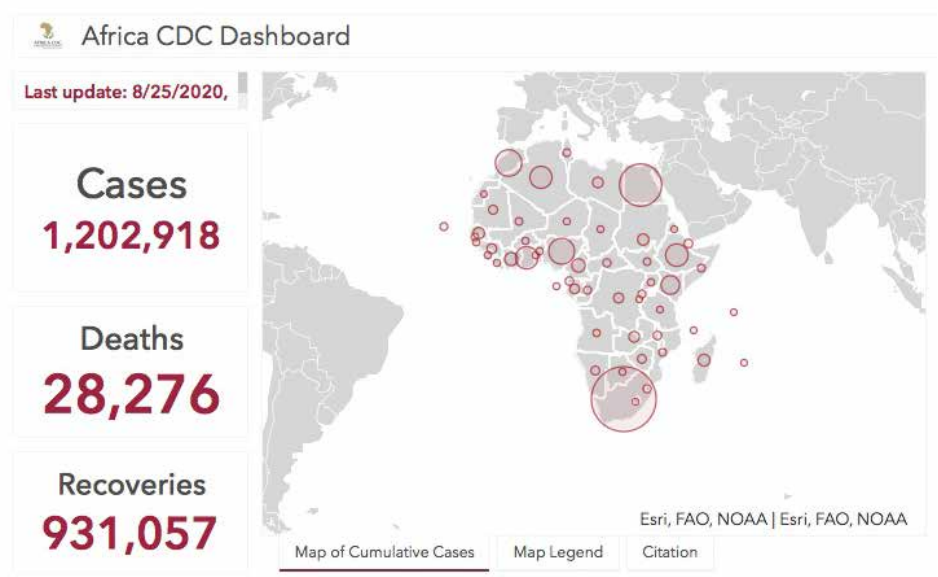
partners. Their objectives are to:

1. minimize the spread of infection within and across borders by creating a unified public health corridor for safe travel within the continent;
2. curtail the impact of COVID-19 on economies and livelihoods through the mutual recognition and acceptance of health information and data across Member States; and
3. ensure that schools are reopened safely through the establishment and engagement of a multi-sectoral committee to develop a school opening safety plan.

“When we talk about easing the lockdown of economies and border crossings, it’s all about people. It’s about how easily we can facilitate the movement of people while at the same time ensuring critical public health measures are in place,” said Dr John Nkengasong.

The campaign will leverage the African Union’s Partnership to accelerate the COVID-19 testing initiative to scale up testing, contact tracing and treatment in Africa while incorporating innovative indigenous technologies from the private sector to enhance surveillance, digitisation of COVID-19 test results, and data management.

Africa has passed the one million mark in number of COVID-19 infections according to this dashboard as on 25 August 2020 of the Africa Centres for Disease Control and Prevention (Africa CDC). South Africa leads with at the most number of infections at 613k; followed by Egypt with 97.6k and Ethiopia with 43.7k.



Italian Space Agency offers free and open access to PRISMA satellite products

The Italian Space Agency (ASI) has just announced that their PRISMA satellite launched on March 21, 2019 is now fully operational and that its products freely available to the user community with few restrictions.

The PRISMA (Hyperspectral Precursor of the Application Mission) is an Earth Observation system with electro-optical instrumentation that combines a hyperspectral sensor with a medium-resolution panchromatic camera. This enables the user not only to recognize the geometric characteristics of the scene but also to determine the chemical-physical composition of the objects present on the scene.

This offers the scientific community and users many applications in the field of environmental monitoring, resource management, crop classification, pollution control and other things. In addition, there may be other applications in the field of National Security.

The main fields of expected benefits offered to the scientific community are inter alia:

- forest analysis (forest disturbance, forest fires, forest classification, biomass analysis);
- precision agriculture (crop mapping, crop rotation, crop stress analysis, fertilization);
- inland and coastal waters (e.g., water quality, chlorophyll monitoring, alga bloom);
- climate change and environmental research (desertification, deforestation, vegetation stress, environmental degradation and hazards); and
- raw material exploration and mining (soil degradation and soil properties).

The primary area of interest is defined as: Longitude 180°W - 180°E; and Latitude: 70°S - 70°N. The expected performance and characteristics for the mission are the following: up to 223 images per day with scenes of 30 km x 30 km and a continuous strip acquisition capacity up to 1800km.

General information on the PRISMA mission can be found on their website at <http://prisma-i.it/index.php/en/>. Instructions to access PRISMA products can be found at <https://www.asi.it/en/2020/05/the-prisma-mission-opens-to-the-community/>. For additional information please contact Giovanni Rum at giovanni.rum@gmail.com



Final preparations of the PRISMA space segment defined as a single small class spacecraft with a mass of about 830 kg, placed on a frozen sun synchronous orbit with a repeat cycle of 29 days (430 orbits). The orbit mean altitude is about 614,8 Km with an inclination of 97.851. Image: ASI

Source: <http://prisma-i.it/index.php/en/www.earthobservations.org>

Togo uses satellite data to assist with farmer loan program during COVID-19 crisis

The effects of COVID-19 shutdowns in Togo, including many months of curfews, severely limited the ability of hundreds of thousands of the country's small farmers to produce an adequate food supply, and robust crops, such as soy and cotton. To help its farmers, the Togolese government utilized a cropland data map developed by NASA's Food Security and Agriculture Program, known as NASA Harvest, to develop a loan program that would help fund the cost of farming essentials.

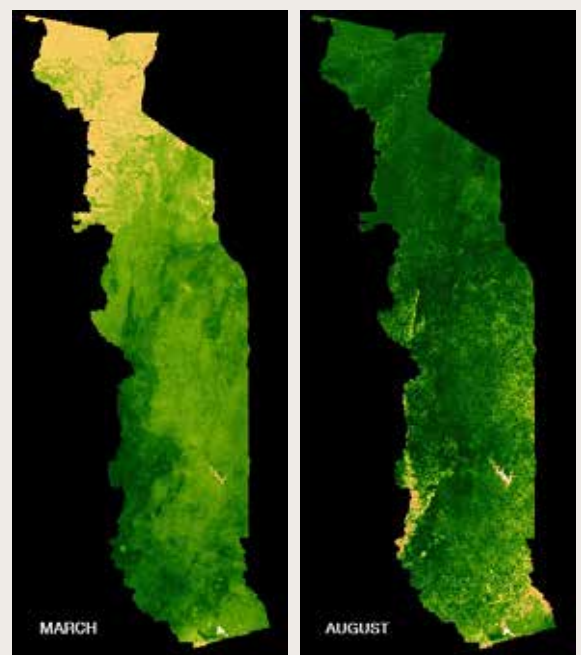
In the past, farmers eligible for such loans would have been identified using Togo's census data. However, the existing census only accounts for growers who list their primary occupation as farming. This vastly underestimates the number of informal small-holder growers impacted by the pandemic. When rapid action was needed and mobility across the country was limited due to the COVID-19 outbreak, satellite data offered an effective way to map the country's distribution of croplands and characterize the nature of agricultural fields during the pandemic.

NASA Harvest developed a national level satellite-derived cropland map for Togo at 10-meter resolution within a 10-day timeframe using

data from the European Space Agency's Copernicus Sentinel 2, from commercial partner Planet Inc and from NASA-USGS Landsat satellites. Overlaying data from poverty maps developed in collaboration with UC Berkeley and Innovations for Poverty Action [IPA] then enabled the Togolese government to determine the physical size and geographic location of agricultural lands that census data might have missed.

Source: <https://eodashboard.org>

A Moderate Resolution Imaging Spectroradiometer (MODIS) was used to determine the normalized difference vegetation index (NDVI) of Togo. This example gives an indication of the changes in live green vegetation between the months of March and August respectively.



Free online Copernicus course (MOOC) starts this Sept

Module	Title	Module speakers	Module release date	Webinar presenters	Live Webinar date*
Chapter 1: Understanding Copernicus data and services					
1	Introduction to Copernicus	Tonie VAN DAM , University of Luxembourg	14/09/2020	Tonie VAN DAM , University of Luxembourg Anca ANGHELEA , European Space Agency (ESA) Fabienne JACQ and Astrid-Christina KOCH , European Commission (EC)	17/09/2020 5pm (CET)
2	Accessing Copernicus data and services	Carlos LÓPEZ-MARTÍNEZ , Polytechnic University of Catalonia	21/09/2020	Carlos LÓPEZ-MARTÍNEZ , Polytechnic University of Catalonia	24/09/2020 5pm (CET)
Chapter 2: Learning through success stories					
3	Renewable energy	Vincent-Henri PEUCH and Stijn VERMOOTE , ECMWF Gil LIZCANO , ClimateScale	28/09/2020	Vincent-Henri PEUCH and Stijn VERMOOTE , European Centre for Medium-Range Weather Forecasts (ECMWF) Gil LIZCANO , ClimateScale	01/10/2020 5pm (CET)
4	Security and emergency management	Patrick MATGEN , Luxembourg Institute of Science and Technology (LIST) Taras MATSELYUKH , OPT/NET BV Peter BUNUS , CyStellar	05/10/2020	Taras MATSELYUKH , OPT/NET BV Peter BUNUS , CyStellar Uxue DONEZAR HOYOS , Tracasa	08/10/2020 5pm (CET)
5	Resource management	Pietro CECCATO , SPACEBEL Guillaume RIEU , TerraNIS	12/10/2020	Pietro CECCATO , SPACEBEL Diana CHAVARRO-RINCON , University of Twente	15/10/2020 5pm (CET)
6	Land Use and Management	Kizito ODHIAMBO , agriBORA Pierluigi MILONE , AGRO 4.0	19/10/2020	Kizito ODHIAMBO , agriBORA Pierluigi MILONE , AGRO 4.0	22/10/2020 5pm (CET)
7	Air quality, water pollution and ecosystem health monitoring	Thomas HEEGE , EOMAP Jurgen EVERAERTS , VITO Remote Sensing	26/10/2020	Thomas HEEGE , EOMAP Jurgen EVERAERTS , VITO Remote Sensing	29/10/2020 5pm (CET)
8	Combining Copernicus data with other types of data; AI; Machine learning	Oisín MCGRATH , DroneSAR Pierre-Philippe MATHIEU , European Space Agency (ESA) Taras MATSELYUKH , OPT/NET BV Vincent-Henri PEUCH , ECMWF	02/11/2020	Oisín MCGRATH , DroneSAR Jamila MIFDAL , ESA	05/11/2020 5pm (CET)
Chapter 3: Do It Yourself!					
9	Ideation – Build up your idea for a Copernicus-enabled product or service	Susan COLEMAN , PwC Luxembourg	09/11/2020	Susan COLEMAN , PwC Luxembourg	12/11/2020 5pm (CET)
10	Prototyping – Test and validate your product or service	Siemon SMID , PwC Luxembourg Susan VRONA BEJINA , PwC France	16/11/2020	Siemon SMID , PwC Luxembourg Susan VRONA BEJINA , PwC France	19/11/2020 5pm (CET)
11	Developing – Unlock the full value of Copernicus data and services	Laurent PROBST , PwC Luxembourg	23/11/2020	Laurent PROBST , PwC Luxembourg	26/11/2020 5pm (CET)
12	Collaboration – Working together to develop the next generation of Copernicus-enabled services	Brian KESSLER , PwC Luxembourg	30/11/2020	Brian KESSLER , PwC Luxembourg	03/12/2020 5pm (CET)
Final exam			Available from 07/12/2020 to 20/12/2020		



Copernicus the European Union's Earth Observation Programme is offering a free online course to anyone with an interest in using geo-information data to address societal challenges and develop new business opportunities. The Copernicus Massive Open Online Course (MOOC) will be delivered in 12 sessions of 2 hours each and runs from 14 September to 30 November 2020.

The course will address three key topics:

- Understand Copernicus data and services – what they are, and how they can be accessed and used;
- Learn from success stories – how existing Copernicus-enabled services and applications have been developed and deployed; and
- Do it yourself – acquire the key skills and knowledge to develop and deploy Copernicus-enabled products and services and to navigate the Copernicus ecosystem.

For registration go to <https://mooc.copernicus.eu>.

See full details and program left.

Africa satellite data to support COVID-19 response and recovery

African nations can now access high-resolution satellite images in the Digital Earth Africa (DE Africa) platform that will enable countries to monitor changes that relate to people and the environment due to the impacts of COVID-19 and other critical challenges.

DE Africa has made available vast amounts of data captured by Europe's Sentinel-2 satellites in a format that makes it accessible and suitable for general use. Satellite images captured by Sentinel-2 are particularly important for Africa because they offer ten-metre resolution and are captured every five days, so land and water can be analysed in unprecedented detail.

"Satellite imagery can be used to address many challenges faced by the African continent as it enables countries to actively monitor and manage natural resources and respond to crises," said DE Africa Managing Director, Dr Adam Lewis.

"We are pleased to announce the availability



Sentinel-2 imagery of Bazaruto Archipelago, Mozambique.

of this new data within the DE Africa platform. It is the first analysis-ready data at the continental scale for Africa, meaning it is made available shortly after images are captured and provided in a familiar image file format," said Dr Lewis.

Managing Director for Earth Observation at the South African National Space Agency and Co-chair of the DE Africa Technical Advisory Committee, Ms Andiswa Mlisa, said that not

only is this an important milestone for the program but it comes at an important time.

"Whether that is finding the right water sources for handwashing to stop the spread of the virus or addressing feared food security shortages through the ability to map food crops," said MS Mlisa.

More information about DE Africa is available at digitalearthafrika.org

NASA and South African Space Agency to build ground station for human space exploration

In a recent statement by the South African cabinet, the South African National Space Agency (SANSA) has been given the green light to collaborate with the U.S. National Aeronautics and Space Administration (NASA) in conducting a study to investigate the technical, environmental, and operational feasibility of establishing and hosting a space vehicle tracking and communications ground station in South Africa. The intention of the study is to confirm whether an identified area near Matjiesfontein in the Western Cape would be suitable for hosting such a facility in the region.

According to Raoul Hodges, SANSA Managing Director of the Space Operations Programme, "the study will look at the regions' environmental conditions, suitability of the site in terms of access, infrastructure and services. The study also investigates the regulatory environment of South Africa and the local capabilities to support deep space antennas."

South Africa and Matjiesfontein have been considered as a potential hosting site for the ground station as a result of the advantageous geographical positioning of the country, as well as the consistent excellent service delivery and technical capabilities offered by SANSA.



Dr Val Munsami Chief Executive Officer of the South African National Space Agency (SANSA)

Dr Val Munsami the Chief Executive Officer of SANSA states, "Our strong relationships with international space agencies such as NASA enables South Africa to be well positioned with global partners which provides our country with opportunities to compete and participate in international space programmes, which contributes to the development of more careers in the science and technology field as well as the industry."

The outcome of the study will enable progress towards setting up a facility for space vehicle tracking and communications to form part of a global network and other long-term partnership projects between SANSA and NASA. The deep space antennas will enable missions such as NASA's Artemis program, which will send humans to the Moon again.

"Such projects and partnerships stand to benefit our local space industry, academia and communities through knowledge and skills development, as well as propel South Africa's intention in growing its knowledge economy," concludes Dr Munsami.

Source: SANSA

Mauritius struck by worst ecological disaster ever

The Mauritius tourism-dependent economy could be affected for decades after an oil tanker ran aground on one of its coral reefs spilling some 1000 tonnes of oil on the coastline.

The Japanese tanker MV Wakashio struck a coral reef on 25 July at Pointe d'Esny a known Mauritius sanctuary for rare wildlife

which also contains wetlands designated as a site of international importance by the Ramsar Conventions on Wetlands.

Oil started leaking from the tanker on 8 August and spread over an area of some 10 square kilometer causing serious pollution on the coastline so much so that locals jumped to the task to help scoop up oil from the beaches and created floating booms made

from straw filled sacks to contain floating oil.

Professional teams have arrived in the meantime and managed to pump out the remaining 3000 tonnes of oil on the ship before it split into two pieces on Saturday, 15 August. One part has been towed away and sunk in a deeper part of the ocean while the part containing the engine room is still stuck on the reef.

The captain and second-in-command of the MV Wakashio have been arrested and will appear in court on provisional charges of negligence while the rest of the crew is also being interrogated. According to the Mauritian coastguard the ship has ignored repeated warnings that it was following a dangerous course too close to the coast.

Japan has announced that more experts are on their way to help clean up the spill with special oil-absorbent materials.

Sources: Aljazeera; BBC; UNITAR; UNOSAT



This map illustrates satellite-detected potential floating oil of some 10 square kilometer at the surface of the Grand Port Bay, Republic of Mauritius as observed from TerraSAR-X imagery acquired on 15 August 2020. The bulk oil carrier which ran aground on 25 July started leaking oil on 8 August 2020. The analyzed area is about 87 square kilometer and this is only a preliminary analysis which has not been validated. Oil spill (indicated by the orange grid lines) analysis from radar images may overestimate the presence of floating oil due to backscattering properties of the radar signal. Ground feedback can be sent to UNITAR – UNOSAT. Image: UNOSAT

Celebrated Namibian NASA scientist passes away

Dr Japie (Jacobus) van Zyl (1957 - 2020)

The celebrated Namibian NASA scientist Dr Japie van Zyl died on 26 August 2020 at the age 63 in a hospital in Pasadena, California after experiencing a heart attack at home while in self-isolation because of contact with COVID-19 positive cases.

Dr Van Zyl was born and went to school in the small town of Outjo in the northern part of Namibia from where he went on to climb to the highest ranks of the scientific space community and become an ambassador for Africa and an inspiration to young scientists on the continent.

After school he went to the University of Stellenbosch in the Western Cape Province of South Africa where in 1979 he obtained his Hons. B. Engineering (Cum Laude) in electronics engineering. After a two year stint in the South African Navy he continued his studies at the California Institute of Technology (Pasadena, California) where in 1983 and 1986, respectively he received his MSc and PhD in electrical engineering.

He joined NASA's Jet Propulsion Laboratory (JPL) in 1986, and held positions of increasing responsibility in the synthetic aperture radar program, managed the Radar Science and Engineering Section, the Earth Science Flight Missions and Experiments Office, and the Focused Physical Oceanography and Solid Earth Program Office. He later served as deputy director for the Astronomy and Physics Directorate before heading that directorate.

In 1997 he received the Fred Nathanson Memorial Radar Award for advancement of radar polarimetry, radar interferometry, and synthetic aperture radar from the Aerospace and Electronics Society of the IEEE. This is also known as the Young Engineer of the Year Award given to engineers below the age of 40. In 2010 he received the Distinguished Achievement Award from the Geoscience and Remote Sensing Society of the IEEE for his contributions to polarimetric SAR remote sensing.

During this period he also served as an adjunct faculty member in the Mechanical and Aerospace Engineering Department



Dr Japie van Zyl meets Namibian President Hage G Geingob during a visit to the country a few years ago. Image: Namibia State House.

at the University of Southern California, where he taught the class "Remote Sensing Systems from Space" from 1997 to 2001. Since 2002, he has been teaching the class "Physics and Techniques of Remote Sensing" at Caltech. He was also appointed as an extraordinary professor in the Stellenbosch University's electrical and electronic engineering department.

Dr Van Zyl was appointed as Associate Director of Project Formulation and Strategy on 15 August 2011 until his retirement from NASA earlier this year to pursue other interests in private business. At the time of his appointment to this position Charles Elachi, the then director of JPL said of Dr Van Zyl "His vision and intellectual command of our complex enterprise will provide essential strengths as we lay out how the laboratory can best serve NASA and the nation in the years ahead."

During his career at NASA he contributed to at least 20 successful space missions and was awarded the NASA Outstanding Public Service Medal which puts him in the same league as astronauts Neil Armstrong, Buzz Aldrin and Michael Collins. He served on JPL's executive council, held two patents and 17 NASA certificates of recognition.

He is survived by his wife Mrs Kalfie van Zyl.

Sources:
<https://descanso.jpl.nasa.gov>
<https://www.ee.sun.ac.za>

The Stellenbosch University, South Africa honoured Van Zyl with an honorary doctorate in 2015 "for his contribution as driving force behind many a successful space project, ambassador for Africa and Stellenbosch University in probably the most advanced technological environment globally, and an inspiration for young scientists on his home continent".

Despite his many successes overseas, "the soil of Africa and the potential of the continent remained close to his heart".

As extraordinary professor in SU's Electrical and Electronic Engineering Department, he ploughed back into the next generation of engineers and scientists at his alma mater.

SU expressed its deepest condolences to Van Zyl's family.

"The passing of Dr Japie van Zyl has robbed our nation of an outstanding scientist whose contributions in space research advanced our understanding of the universe.

My exchanges with the highly affable Dr van Zyl during his visits to the country of his birth were always pleasant and illuminating,"

President Hage G. Geingob/Twitter

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.iafastro.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 @All 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.



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.



43rd COSPAR Scientific Assembly
Connecting space research for global impact

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.

AARSE Conference 2021

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.

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.iafastro.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.

SpaceX launches 11th batch of internet satellites

SpaceX launched its 11th batch of Starlink satellites on Tuesday morning, 17 August 2020 at the Cape Canaveral Air Force Station Launch Complex 40 in Florida. When deployed it will bring its total number to some 650 internet satellites in low-Earth orbit.

Each satellite weighs approximately 260kg and features a compact design to minimize volume and allow for dense launch stacking inside SpaceX's Falcon 9 rocket fairing. Each satellite is equipped with 4 powerful antennas to allow for big throughput and redirection in a short time. It operates with a single solar array and ion thrusters powered by krypton. The thrusters enable the satellite to maneuver in space for instance to raise its orbit and to deorbit at the end of its lifespan. Each satellite also has a

debris tracking system which operates with inputs from the Department of Defense to autonomously perform maneuvers to avoid collisions with debris in space.

Elon Musk's SpaceX company aims to eventually have 12 000 such satellites in low-Earth orbit which are designed to provide internet connectivity across the globe especially to those in remote areas with unreliable, expensive or no current access. The company will first target servicing the Northern U.S. and Canada in 2020 and will then expand to near global coverage by 2021.

Source: starlink.com

*A view of 60 SpaceX Starlink satellites crammed into the payload fairing of a Falcon 9 rocket.
Image: @elonmusk*



Sir Richard Branson to be a passenger on his first commercial space flight

Billionaire Sir Richard Branson will fly into space on a Virgin Galactic rocket ship early next year if two test flights go to plan, the space tourism company he founded has said.

Mr Branson's trip to space hinges on the success of two upcoming test flight programs, Virgin Galactic Holdings Inc said, with the first powered spaceflight scheduled for later this year from Spaceport America.

The company competes with billionaire-backed ventures such as Blue Origin to usher in a new era of space tourism, racing to be the first to offer sub-orbital flights to civilian space travellers.

Virgin Galactic offers zero-gravity experiences to customers with its centrepiece SpaceShipTwo plane and has long-term point-to-point travel plans to quickly transport

passengers from city to city at near-space altitudes.

Mr Branson said he hoped to be the first passenger when its commercial flights begin. New design plans show the rocket ship would have enough space for six passengers, who would be able to see themselves floating weightlessly against the backdrop of the Earth below while 16 cameras document the adventures, the company said in late July.

There are a dozen windows for viewing, seats that will be customized for each flight's six passengers and capable of adjusting for G forces, and, naturally, mood lighting.

Virgin Galactic Holdings has yet to set a date for flights with paying passengers. The company has said more than 600 people have put down deposits. The initial seats were sold at \$US250,000 each.

A spokesperson said the long-term goal was to make the adventure more accessible, possibly at a lower cost.

Source: Reuters/AP

*Sir Richard Branson shows off a model of his Virgin Galactic Space Ship.
Image: Connected Women/ Hardo Müller*



Who's going to Mars?

In 1877 the Italian astronomer Giovanni Virginio Schiaparelli made some telescopic observations of a dense network of linear structures on the surface of Mars. He called these “canali” which in English meant “channels” but was incorrectly translated as “canals” by the popular media. This fired up the general public's imagination who believed this to be proof of intelligent life on Mars who constructed these “canals” possibly for irrigation purposes. The most fervent public supporter of the hypothesis of intelligent life on Mars was the American astronomer Percival Lowell who spent much of his life until his death in 1916 trying to prove that intelligent life could exist on Mars.

Sadly, we had to give up hope of finding little green men on Mars as it turned out to be little more than a cold, barren rock-strewn desert subjected to extreme conditions unknown on Earth. Our best shot at still finding life there would be signs of microbial life that once could have evolved in conditions that existed on Mars similar to that on Earth some billions of years ago.

No wonder this once again led to a flurry of Mars expeditions taking off from Earth this past two months to make use of the launch window which occurs only every 26 months when the two planets are the closest to one another. The most prominent launch was most definitely that of NASA's Perseverance Rover which took off from the Cape Canaveral Air Force Station in Florida on 30 July on top of a United Launch Alliance Atlas V rocket destined to land in the Jerezo Crater on Mars in February 2021. Not to be upstaged were the Chinese with the launch of their Tianwen-1 (Question to Heaven) orbiter and rover on 23 July destined to reach Mars around the same time as Perseverance next year. Then there was the United Arab Emirates who joined the small club of interplanetary explorers with their Al-Amal (Hope) orbiter which departed on a Japanese rocket on 20 July. The only rover which missed this opportunity was the Rosalind Franklin Rover, a joint project of the European Space Agency (ESA) and Russia. Due to complications and hold-ups caused by the COVID-19 pandemic this launch had to be postponed to 2022.

The Perseverance Rover will be a mobile laboratory which will test several new exploration technologies

on Mars. These include an instrument which will try to generate oxygen from the carbon dioxide-dominated Martian atmosphere, fly a tiny helicopter in the thin atmosphere but most importantly retrieves samples of rock and soil from Mars. These samples will be sealed in cannisters and dropped off on the surface to be collected by a sample return mission to Earth, possibly around 2031.

Perseverance will hopefully continue the success story of NASA's rovers on Mars which have all performed marvellously well and exceeded their expected lifespans by far. Their Curiosity Rover originally designed for two years of exploration has now done eight years of service on Mars and is still going strong. Other earlier successes include the Opportunity which operated from 2004 to 2018; Viking (1976); Pathfinder (1997); Spirit (2004); and Phoenix (2008).

All Mars missions are of course not successful. While the Soviets and NASA logged the most failures simply because they already started way back in the 1960s countries such as China, Japan and the ESA also had their share of bad luck. Many of these attempts already failed shortly after launch not even leaving Earth's orbit. The Soviets can nevertheless claimed to have landed the first human made object Mars 2 which crashed followed by their Mars 3 in 1972 which managed a soft landing but stopped transmitting 14,5 seconds after the landing; NASA also experienced two failures in the 1960s with their Mariner program when they had two failures (Mariner 3 & 8) and in the 1990 there were more mishaps with their Mars Climate Orbiter and Mars Polar Lander. The ESA really had bad luck with Beagle 2 launched from their Mars Express orbiter which landed in 2003 but failed to establish communication. Then again in 2016 this was followed by the crash of the Schiaparelli lander released from the Trace

Gas Orbiter. Fortunately the Mars Express and the Trace Gas Orbiter were successful and are still orbiting Mars.

Apart from the two NASA landers Curiosity (Aug 2012) and InSight (Nov 2018) still operating there are also 6 active spacecraft currently orbiting Mars. They are:

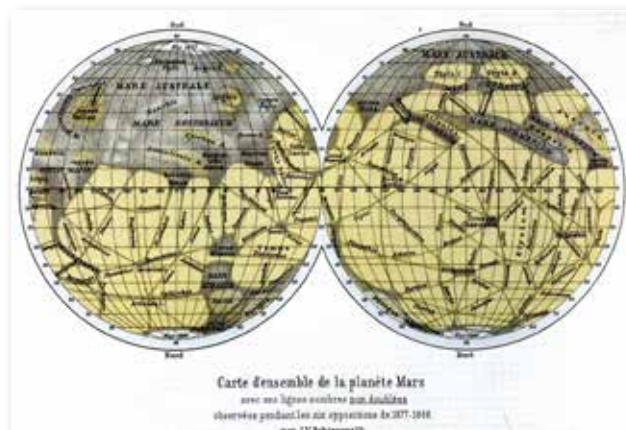
Mars Odyssey Oct 2001 NASA
Mars Express Dec 2003 ESA
Mars Reconnaissance Orbiter March 2006
NASA
Mars Orbiter Mission Sept 2014 India
MAVEN Sept 2014 NASA
ExoMARS Trace Orbiter Oct 2016 ESA &
Russia

All of this sets the stage for humans landing on Mars. In 1990 President George Bush Sr promised that humans will set foot on Mars by July 20, 2019 to mark the fiftieth anniversary of the first moon landing. This date has come and gone and no-one is yet prepared to predict another exact target date. Unless of course if you are Elon Musk who has visions of traveling there himself and even establishing human colonies on Mars.

Even if Elon Musk's company SpaceX and Jeff Bezos' Blue Origin are building heavy rockets capable of carrying heavy equipment to Mars a journey with humans on board is still fraught with many unknown challenges. Firstly the matter of time is the biggest challenge as a round trip to Mars can take up to 3 years. That's made up of around 6 to 8 months travelling there, then waiting out the next launch window for some 15 months and then it's another 8 months back.

We might not see humans walking on Mars before the late 3030s are the conservative estimates at this stage.

Report by Anthony Penderis



Sources: www.spacedaily.com;
www.wikipedia.com; www.gov.uk;
<https://executivegov.com>;
www.space.com; www.marsdaily.com;
www.aviationweek.com;
<https://astronomy.com>;
<https://www.popularmechanics.com>

Giovanni Schiaparelli's map of the channels he envisaged on Mars. Although these are rejected by astronomers today as inaccurate optical illusions he was correct in deducing that water once flowed on this planet.