



## NEWS ALERT

*Forum for Indian Science Diplomacy*

RIS Science Diplomacy News Alert is your fortnightly update on Indian and global developments in science research, technological advancements, science diplomacy, policy and governance. The archives of this news alert are available at <http://fisd.in>. Please email your valuable feedback and comments to [science.diplomacy@ris.org.in](mailto:science.diplomacy@ris.org.in)

### GLOBAL

#### [UNDESA asserts revisiting SDG pathways](#)

An independent group of scientists has concluded in a major new report “*The Future is Now: Science for Achieving Sustainable Development*,” compiled by a team of 15 UN-appointed experts. The report will be at the centre of discussions during the UN summit on the SDGs on 24-25 September, 2019. The UN - Department of Economic and Social Affairs (DESA) has asserted for concerted action on addressing issues related to irreversible damage to the ecology and widening inequalities. The report called for a fundamental transformation in symbiotic relationship between people and nature, which would entail increasing investment in science for sustainability. The report identifies 20 points of intervention to accelerate progress in the next ten years..

#### [Intergovernmental Conference \(IGC\) discusses draft treaty on Marine Biodiversity](#)

The third session of the Intergovernmental Conference (IGC-3) took place on 19th-30th August 2019, at UN Headquarters in New York on the Conservation and Sustainable Use of Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ). The conference discussed the text of a draft treaty prepared by the Conference President. The dates on IGC-4 were announced in the event; it will take place from 23 March – 3 April 2020 and will discuss a revised draft treaty presented by the President of the Conference. With the international community poised to begin historic negotiations to develop a new international legally binding instrument for the conservation and sustainable use of biodiversity in areas beyond national jurisdiction, science diplomacy has a significant role to play in advancing governance of the vast ocean surface.

#### [India advocates South-South Co-operation at the 14th UNCCD Conference](#)

At the 14th conference of United Nations Convention to Combat Desertification (UNCCD), Prime Minister Modi stated that India would like to propose initiatives for greater South - South Cooperation (SSC) on addressing the issue of climate change, biodiversity and land degradation. UNCCD leadership has been asked to create a Global Water Action Agenda, as restoring the health of land is critical for sustainable development. India had issued soil health cards to the farmers to enable them to grow right type of crops, fertilisers, and use the right quantity of water. So far about 217 Million Soil Health Cards

have been distributed. Other Indian initiatives highlighted include the use of remote sensing, space technology for land restoration, cost effective satellite and space technology. [The New Delhi Declaration](#) on 'Investing in Land and Unlocking Opportunities' was proclaimed in the 14th conference of UNCCD , renewing the commitment on international co-operation in meeting the objectives of the UNCCD.

### [US air force space command conducts space wargame](#)

The Air Force Space Command, Colorado is set to conduct a wargame with a future scenario, set in the year 2029; it will explore critical space issues and examine the integration activities of multiple agencies associated with space systems and services. Starting on September 4, roughly 350 military and civilian experts from more than 27 commands and agencies around the country will participate in this endeavour. Also, there will be four international partners — Australia, Canada, New Zealand and the United Kingdom.

### [Artificial Intelligence answers school level academic tests](#)

The Allen Institute for Artificial Intelligence, a prominent lab in Seattle, has unveiled a new system that correctly answered more than 90 percent of the questions on an eighth-grade science test and more than 80 percent on a 12th-grade exam. Aristo was built solely for multiple-choice tests. It took standard exams written for students in New York, though the Allen Institute removed all questions that included pictures and diagrams. Aristo's advances could spread to a range of products and services, from internet search engines to record-keeping systems at hospitals. The new research could lead to systems that can carry on a decent conversation. But it could also encourage the spread of false information. At Google, researchers had built a system called Bert that could guess the missing word in a sentence and collected enormous amounts of information about the fundamental ways language is constructed. The Allen Institute built their Aristo system on top of the Bert technology. They fed Bert a wide range of questions and answers. In time, it learned to answer similar questions on its own. Such a system has implications for using AI in education and health services. Such systems can be deployed to facilitate user engagement in pedagogy and supplement learning in schools. Since the system also has learning capacities, it may be possible to adjust the pace of learning of students, depending upon the progress.

### [Brazil develops low-cost biodegradable mosquito control agent](#)

By using corn starch along with the essential oil of the thyme plant, researchers from Brazil and the United States have managed to develop a low-cost, biodegradable larvicide system that can kill the larvae of aedes aegypti, a mosquito species that spreads Zika, dengue and chikungunya as well as yellow fever. The researchers used a corn starch, an abundant, cheap and biodegradable raw material, to develop microcapsules as a container to release thyme essential oil into the water. In a dry environment, the microcapsules remain inert and keep the thyme essential oil encapsulated. As soon as it is exposed to water, the shell begins to swell up and release the larvicide. After three days, when the eggs hatch and the larval stage begins, the capsules release thymol (the active substance) into the water. Researchers suggested that the public sector could produce the microcapsules to hold the larvicide and then make them widely available and accessible, so that people can pour them where rainwater accumulates. Thyme essential oil is a completely biodegradable material that is easily obtainable and does not represent any risk to human health. This can be helpful in places where mosquitoes are the major cause for spreading Zika etc. As the capsule and its contents are biodegradable it may be a better option than applications that use chemicals to control and eliminate population of mosquitoes.

### **Artificial Intelligence accelerates designing of novel molecules**

Insilico Medicine, a global leader in artificial intelligence for drug discovery, has used new artificial intelligence system called Generative Tensorial Reinforcement Learning (GENTRL) designed six novel molecules with health applications in 21 days, 25 days less than by conventional methods. The use of AI to discover new drugs could result in significant savings and public benefit. If this technology proves broadly useful it may well have transformational potential for future pharma products. How this will transform new drug discovery is to be tested. Given the long time it takes to develop a new molecule and test it, use of AI in hastening this process can result in savings in terms of resources and time.

### **A feedback phenomenon discovered to drive increasing drought and aridity.**

A new Columbia Engineering study indicates that the world will experience more frequent and more extreme drought and aridity than currently experienced in the coming century, exacerbated by both climate change and land-atmosphere processes. Earlier studies have looked at how atmospheric and oceanic processes drive climate extremes; the new study has focused on examining and modeling land-atmosphere processes, especially in setting up extremes that can be very destructive. The team discovered that feedback loops lead to a high probability of concurrent soil drought and extreme aridity. The role of soil moisture was critical. The study could help mitigate future risks. This study when read together with the recent IPCC report on Land Use and Climate Change can help policy makers in developing adaptation and mitigation strategies and in combating desertification.

### **Reactor developed to convert Greenhouse gas into pure liquid fuel**

A catalytic reactor developed by researchers at Rice University uses carbon dioxide as its feedstock and, in its latest prototype, produces highly purified and high concentrations of formic acid. In tests, the new electrocatalyst reached an energy conversion efficiency of about 42%. That means nearly half of the electrical energy can be stored in formic acid as liquid fuel. The new device uses a robust, two-dimensional bismuth catalyst and a polymer-based solid electrolyte. The current reactor, the lab generated formic acid continuously for 100 hours with negligible degradation of the reactor's components. The reactor could be easily retooled to produce such higher-value products as acetic acid, ethanol or propanol fuels. Carbon dioxide reduction is very important for fighting global warming and using electricity comes from renewable sources like the sun or wind, makes the cycle sustainable.

### **Emerging technologies to fight against global terrorism**

Belarus and the United Nations Office of Counter-Terrorism (UNOCT) organised an international conference on "Countering terrorism through innovative approaches and the use of new and emerging technologies" on 3rd- 4th September 2019. The Conference focused on the urgent need to strengthen international cooperation for tackling terrorist abuse of New Technologies & share innovative approaches to counter this threat. Participants also warned against attempts by terrorists to create home-made biological weapons. The two-day conference focused at global, regional and national levels on the misuse of new technologies and AI by terrorists; approaches and strategies to counteract terrorist propaganda; and the misuse of scientific innovations.

## **INDIA**

### **Chandrayan 2 Mission: A near success**

India's Chandrayaan-2 moon lander Vikram fell silent during a daring moon landing attempt near the lunar South Pole. During the landing maneuver on Sept. 6, about 2 kilometres above the moon's surface, signals from the spacecraft stopped. According to ISRO, it had a hard-landing very close to the planned (touch-down) site and is there as a single piece,

but in a tilted position. The image of the lander came from the Chandrayaan-2 orbiter. The duo was launched on July 22 and separated on Sept. 2 in preparation for the moon-landing attempt. Chandrayaan-2 is designed to last a year circling the moon from pole to pole and while carrying a suite of eight instruments. One of those instruments is the highest-resolution camera to be placed in lunar orbit to date; capable of resolving features just 0.3 metres across. The orbiter follows India's successful Chandrayaan-1 orbiter, which confirmed slabs of water ice are hidden below the lunar surface inside craters at the South Pole. The Chandrayaan-2 mission was designed to build on this success by augmenting a second orbiter with a lander and rover that would target the southernmost landing site to date.

### **IIT-Kharagpur and IIT-Delhi selected for SATHI initiative**

IIT Kharagpur and IIT-Delhi have been selected for setting up a Sophisticated Analytical and Technical Help Institute (SATHI), supported by Department of Science and Technology. INR 1250 million has been earmarked for each institution, over a period of three years. The primary objective will be to extend help to the academic institutes in the neighbouring regions. Research establishments and industries, particularly start-ups and manufacturing units, will also be able to use the sophisticated instruments in a few select areas. At least 70 percent of instrument use time will be reserved for other academic institutes, national laboratories, start-ups, entrepreneurs and also the industry. The facility would involve highest level of expertise of IITs in several key convergence domains of science and technology such as medical sciences, soft materials, structural and safety engineering, quantum photonics, advanced communication and nanotechnology.

### **France-India collaborate to develop ship tracking satellite constellation**

The National Centre for Space Studies (CNES) and Indian Space Research Organisation (ISRO), have agreed to start the development and production of a constellation of satellites on which studies have been underway since 2018. This constellation, carrying telecommunications (AIS\*) and radar and optical remote-sensing instruments, will constitute the first space-based system in the world, which will be capable of tracking ships continuously. The satellites will be operated jointly by France and India to monitor ships in the Indian Ocean. The system will cover a wide belt around the world with revisit capability.

### **Space-tech start-ups gaining momentum in India**

Bellatrix Aerospace, a space technology startup in Bengaluru, has developed a microwave plasma thruster. It has secured \$3 million in pre-series funding from investors. Its development contract with ISRO is unique because instead of giving a blueprint of a product, ISRO has shared a problem statement with Bellatrix, and the venture is coming up with the technology and the final commercial product. India's space programme is witnessing the emergence of several of space technology startups. From propulsion and rocket technology ventures, to satellite makers, these companies aspire to bid for entire programmes, rather than supply piece-meal components. The miniaturisation and affordability of satellite technology, and rapid advances in multiple technologies have led to drastic reduction in costs. Earth observation, imaging, navigation and technology applications with an increased thrust towards the utilisation of the low earth orbit are areas that will see the rise of private space startups in India. The ecosystem of customers to use the products and services of these startups is also growing at a faster pace. Potential clients include countries that do not have their own space programmes, and are considering the use of satellites.

### **India-Israel proposes joint R&D initiatives in solar energy**

The Department of Science & Technology, Government of India, and the Ministry of Science and Technology of State of Israel will fund joint research on advanced materials for next-generation solar energy utilization and energy storage. The deadline for the submission

of proposals is December 5, 2019. Industrial partners are allowed to participate in research teams, as long as they are headed by principal investigators from an academic institution. Israel would provide financial support of up to INR 8 million for each approved research proposal. The DST would fund all the approved science and technology activities on the Indian side, during the project period. Project completion period is two years. The expected start date for the approved projects is June 2020.

### [Serum Institute establishes a new vaccine plant](#)

The Serum Institute of India (SII) has inaugurated its new plant in Pune, designed to produce up to 500 million doses of vaccines in a year over the next three years. This is the world's largest multifunctional product facility which is in compliance with the vaccine manufacturing regulations of American and European markets. This facility would export to about 150 countries and will help increase the company's market share by 10-15% internationally. The company will invest over Rs 40 billion in the plant so far, and help create over 3,000 jobs over the next five years. The company invests about half its profits – about Rs 8 billion- towards research and development and clinical trials each year and has been working at introducing new products in both vaccines and monoclonal antibodies. It recently developed a thermo-stable rotavirus vaccine in association with NIH (USA). Touted as a revolutionary development, the vaccine remains stable and has the highest level of potency for a longer duration in non-regulated temperatures. The vaccine, called Rotasiil, remains stable for up to 30 months at a temperature of 25°C. The new plant will maximize the production of vaccines such as HPV and TDAP in addition to Thermostable Rotasiil along with monoclonal antibodies like Trastuzumab (Herceptin) and Ustekinumab. With such expansion and growth, India will strengthen its position in becoming a leading supplier of vaccines, thereby positioning itself in the health diplomacy arena.

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### **Research and Information System for Developing Countries**

Core IV B 4th Floor, India Habitat Centre, Lodi Road, New Delhi 110003, India

Tel:-011- 24682176, E-mail: [science.diplomacy@ris.org.in](mailto:science.diplomacy@ris.org.in)

Website: [www.fisd.in](http://www.fisd.in)

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