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KNOWLEDGE ABOVE ALL

NASA HELICOPTER

BY SHREEYESH S.

The most sophisticated robotic explorer yet, NASA's Perseverance, is currently zipping through space en route to its final destination: Mars. Aiming to land in a hazard-laden crater next to an ancient riverbed, researchers hope our SUV-sized robot emissary will help us find fossilized clues of ancient life and collect samples that will eventually be returned to Earth potentially as early as 2031.

But NASA's Perseverance rover isn't the only machine going boldly to the Red Planet. Tucked beneath the Mars-bound rover's belly is a svelte hitchhiker named Ingenuity. In just a few weeks, it will attempt to become the first aircraft to take flight in an alien world.



Once Perseverance lands on the rugged Martian surface, the six-wheeled robotic geologist will set off on its own mission while also searching for a suitable place to deploy Ingenuity as soon as possible. "When we say suitable spot, we're looking for a flat piece of ground," Balaram adds. After the copter detaches from the rover, Perseverance will take social distancing to new heights by driving away about 330 feet from Ingenuity in order to minimize collision risk.

That being said, Ingenuity has relatively limited abilities. The solar-powered chopper is designed to take-off, hover no more than a few dozen feet above the surface, maneuver through Mars' thin air, and land on flat terrain. Over the course of 30 Martian days, a team of NASA engineers back home on Earth will test out Ingenuity's ability to fly.

Finally, Ingenuity will take off on its first flight well within the watchful eye of the Perseverance rover and its cameras. Assuming Ingenuity is able to get off the surface and land safely again, the copter will fly up to four more times. With each attempt, it will try to go a little higher and farther. But Balaram stresses this is a high-risk, high reward mission. "We are essentially trying a completely new form of mobility on a different planet, which has many challenges in terms of how you fly. Success is not guaranteed and we will take success with each step: When we land in three weeks, when we get deployed on the surface, when we check out and survive the first night without freezing, when we get that first flight under our belt, all of those will be important milestones along the way."

Alas, once the test period is over, Perseverance will bid Ingenuity adieu, having fulfilled its mission of proving that aircraft can operate on other worlds. If all goes well, Balaram says, the data acquired during these tests will help lay the groundwork to fly bigger and better aircraft, capable of carrying a full payload of scientific instruments to explore the skies of distant worlds.

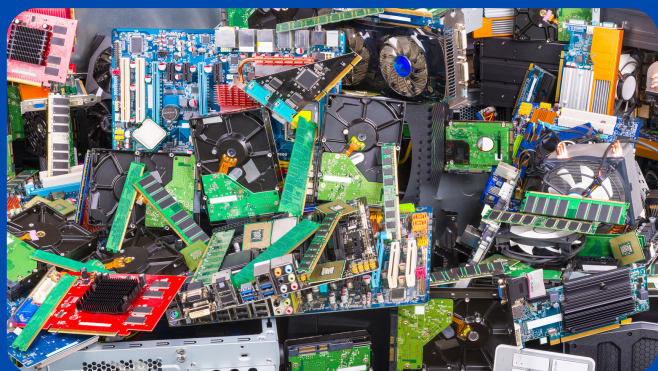
E-WASTE AND INDIA

CHETAN SABLE,
STUDENT

The world generated a record 53.6 million tonnes of e-waste last year, the Global E-waste Monitor 2020 has said. India is the third biggest contributor to this dump with 3.2 million tonnes, after China and the US. While the environmental hazard is worsening, some companies are beginning to take e-waste management seriously. "Things are certainly looking up since 2017 with several brands doing their bit in responsible e-waste management," says Pranshu Singhal, Founder, Karo Sambhav, a PRO (produce responsibility organisation) offering e-waste solutions and EPR (extended producer(extended producer responsibility) services.

For example, South Korean consumer durables giant LG has created a pan-India network of 40 recyclers, and collected and recycled almost 100 kilos MT of waste during 2017-2020. The company has also aligned its call centres to register take-back requests besides introducing exchange programmes. Hardware maker Dell, in a decade-long programme, has used plastic recovered from old computers to new make parts. "We provide free end-of-life management directly to the consumer in 75+ countries and territories," says Deepak Ohlyan, Dell Technologies' Vice President for global facilities across Asia-Pacific.

There are 312 registered recyclers with the Central Pollution Control Board (CPCB), but the key challenge is that "most registered recyclers don't even have a working shed, forget about a plant. So, there is no monitoring happening while giving the licences", says Nitin Gupta, Co-founder, Attero, a recycling company. "If the licences are given by CPCB instead of the state pollution control boards, monitoring would be strict and the system more streamlined." Effective monitoring would also require data, but India's recycling data is just not there. "Can anyone say how much metal has been recovered from the recycling that has happened in the past two years? There is no data available," rues Satish Sinha, Associate Director with Toxics Link, an environmental research and advocacy organisation.



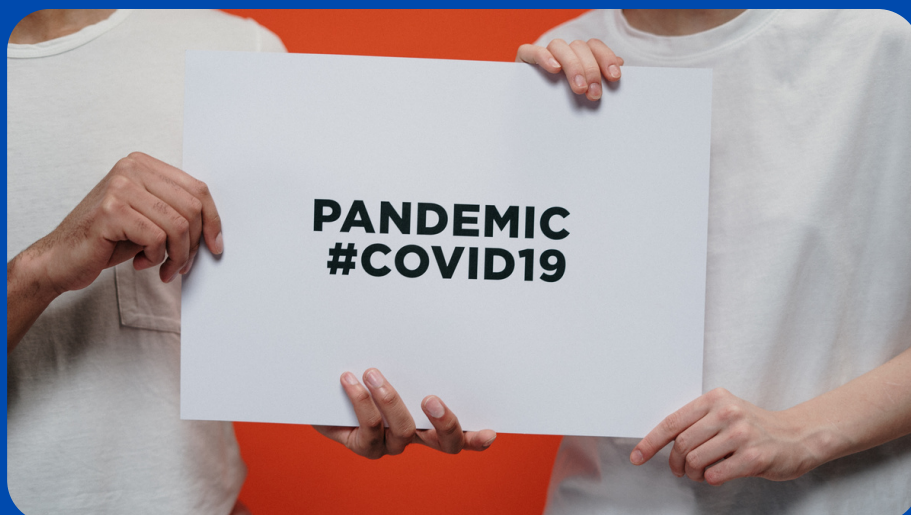
INNOVATION IN INDIA

VIPUL PATIL,
STUDENT

Defence Food Research Laboratory (DFRL) Mysore, pursuing the mission to support corona warriors, has developed this quick response asset to deal the situation arising due to contagious diseases including the Covid-19 pandemic. The Laboratory stationed on mobile platform has been named PARAKH. It provides for unidirectional airflow and gradient negative room pressure with class III Biosafety cabinet (BSC) for entry and safe processing of clinical samples. The viral inactivation and first 2 steps of viral lysis of RNA extraction are performed inside the BSC assuring personnel protection

The lab facility is built on ISO 20 feet dry container and mounted on a chassis for mobility. The exhaust air being HEPA (high efficiency particulate air) filtered, satisfies Class 10,000 or ISO7 air quality. Complete Heating Ventilation Air Conditioning (HVAC) is used to maintain desired unidirectional airflow and room pressure gradients of negative pressure as compared to the ambience.

Real time PCR provided for COVID-19 screening from clinical samples can test about 300 samples per day. The Lab has been Handed over to Viral Research and Diagnostic Laboratory (VRDL) of Mysore Medical College and Research Institute (the sole authorised COVID-19 testing facility in Mysore region) to enhance their testing capability.



A hand-drawn mind map of business concepts radiating from a lightbulb. The central lightbulb is white with a black base. A hand holding a black marker is positioned to the right, drawing the lightbulb. Radiating from the lightbulb are various business-related icons and text labels. The labels include: 'Growth' (with a bar chart), 'Money' (with a money bag), 'Strategy' (with a lightbulb), 'Teamwork' (with a group of people), 'Success' (with a star), 'Finance' (with a target), 'Data' (with a document), 'Idea' (with a lightbulb), 'Plan' (with a dollar sign), 'Investment' (with a dollar sign), 'Growth' (with a bar chart), 'Strategy' (with a lightbulb), 'Teamwork' (with a group of people), 'Success' (with a star), 'Finance' (with a target), 'Data' (with a document), 'Idea' (with a lightbulb), 'Plan' (with a dollar sign), 'Investment' (with a dollar sign). The background is white with a large blue circle containing the Indian flag's tricolor and Ashoka Chakra at the top. The overall theme is business and innovation.

According to the statement, the consistent improvement in the GII ranking is owing to the immense knowledge capital, the vibrant startup ecosystem and the amazing work done by the public and private research organisations. The Scientific Departments like the Department of Atomic Energy; the Department of Science and Technology; the Department of Biotechnology and the Department of Space have played a pivotal role in enriching the National Innovation Ecosystem, it said.

The statement said the GII is the fulcrum for the governments – across the world – to assess the social and economic changes in their respective countries. Over the years, the GII has established itself as a policy tool for various governments and helped them to reflect upon the existing status quo, it added.

