COVID-19: DRDO's Contribution

THE HINDU

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DRDO to put up mobile viral research lab at ESIC Hospital

Two local companies identified to build the bio-safety level 3 lab

Defence Research & Development Organisation (DRDO), which has joined the battle against COVID-19 with gusto, is planning to introduce yet another novel facility — a viral research lab. It is going to be bio-safety level 3 lab with self-locking doors, negative pressure, high efficiency filters, ante-room etc.

Now that testing has become an important feature to control the pandemic spread, scientists say the clinical specimen inactivation should be performed in such a Bio-safety Level-3 (BSL3) laboratory as the pathogenicity of COVID-19 is not completely known yet.

Since constructing a permanent fixed bio-safety facility will take much time and resources, the premier defence lab has configured a mobile BSL3 with both bio-safety and flexibility urgently needed to handle the pandemic. Two local companies — ICOMM specialising in fabrication of shelters and iClean, a turnkey design and build company with years of experience in building the containment facilities — have been identified to build the lab.

Work is in progress at iClean to build mobile mobile BSL-3 lab for the ESIC Hospital in Erragadda to start screening patients immediately and it will also be useful for conducting research projects related to drug discovery, therapeutics and vaccine development in collaborations with other scientific organisations. "BSL3 lab is mandatory for live virus cultures and having this facility is the main criteria to get funding from research projects," they explained.

With viral outbreaks pretty frequent in the country, there is a need for timely diagnosis for an appropriate public health response to prevent any epidemics and this is where bio-safety labs play a key role in diagnostics. "This first of its kind mobile lab can be moved and scaled up quickly to speed up COVID-19 screening as we have only four BSL3 labs in the country," they informed.

This mobile lab can be put up at different places, is capable of screening 1,000 samples a day, provides safety to the personnel and helps identify unknown viruses causing significant morbidity in the community due to epidemics and/or potential agents for bio-terrorism. Public health authorities can also understand and conduct surveillance of existing and new viruses, develop diagnostic kits and undertake research for identification of newer genetically active/ modified agents, they added.

https://www.thehindu.com/news/cities/Hyderabad/drdo-to-put-up-mobile-viral-research-lab-at-esic-hospital/article31382643.ece

THE FINANCIAL EXPRESS

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Coronavirus pandemic: DRDO ramps up the fight against COVID-19! Here's how

The DRDO had earlier developed Personnel Sanitisation Enclosure (PSE), sanitisers, personal protective equipment (PPE), detection kits as well as ventilators to better equip the country in dealing with the disease

By Bulbul Dhawan

Coronavirus in India: The Defence Research and Development Organisation (DRDO) has been continuously using the existing technology and developing products that would help the country tackle the COVID-19 pandemic more effectively. Earlier, it had created Personnel Sanitisation Enclosure (PSE), sanitisers, personal protective equipment (PPE), detection kits as well as ventilators to better equip the country in dealing with the disease. The DRDO has now enhanced its list of products and included two more technologies – automatic mist-based sanitiser dispensing unit and UV sanitisation box and hand-held UV device, the military research organisation said in a press release.

Automatic Mist-Based Sanitiser Dispensing Unit

The DRDO's Centre for Fire Explosive and Environment Safety (CFEES), Delhi, applied the mist technology it uses in fire suppression to develop an automatic sanitiser dispenser, a contactless unit which sprays alcohol-based handrub sanitiser to be used at the entrances of offices and buildings. The water mist aerator technology has been used in the dispensing unit and the technology was designed to conserve water.

The UV-C radiation warps the structure of the RNA, preventing the coronavirus from multiplying. (Image: DRDO)

The unit is activated without contact with the help of an ultrasonic sensor. The mist is dispensed from a single nozzle and the rate of flow is low in order to minimise wastage. The dispenser releases 5-6ml of solution over 12 seconds in one go, and the dispensation is in the shape of a cone so that both the hands are covered with the solution, the DRDO statement said.

The compact unit also has the option to fill it in bulk, hence making it more economical for the establishments, and can be mounted on a wall or kept on a platform. Moreover, an LED light illuminates the spray of the mist to indicate operation. A unit has been installed at the DRDO Bhawan.

UV Sanitisation Box and Hand-held UV Device

Two of DRDO's Delhi laboratories – Defence Institute of Physiology and Allied Sciences (DIPAS) and Institute of Nuclear Medicine and Allied Sciences (INMAS) – have developed sanitisation box and hand-held device, both based on Ultraviolet-C (UV-C) light, which consists of a shorter wavelength particularly good at destroying the genetic material in COVID-19, the DRDO release said. The UV-C radiation warps the structure of the RNA, preventing the coronavirus from multiplying, it added.

The DRDO press release said that sanitisation of items using the UV-C-based items would help users in avoiding the harmful effects chemical disinfection can have, adding that their technology is environment friendly and also contactless.

Furthermore, while the box has been designed for disinfection of personal items like mobile phones, purse, tablets, currency, office file covers, etc, the hand-held device can be used to disinfect objects such as chairs, food packets, postal delivered packages and files etc in office as well as the households.

https://www.financialexpress.com/lifestyle/health/coronavirus-pandemic-drdo-ramps-up-the-fight-against-covid-19-heres-how/1933164/

THE HINDU

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COVID-19 | Assam to use PPE kits from China only if doctors are satisfied with quality, says Health Minister

The kits will be used only after getting them tested for quality at DRDO or any other lab recognised by the Central government, said the Minister.

The Assam government has decided to use the Chinese **Personal Protective Equipment** (PPE) kits after doctors are satisfied with their quality, in view of allegations of having imported them by bending rules.

State Health Minister Himanta Biswa Sarma had last week said Assam was the first State in the country to directly order 50,000 PPEs from China. He also said the Centre, which had earlier imported such kits separately, had been kept in the loop.

The PPEs had come directly in a cargo flight from Guangzhou to Guwahati on the evening of April 15.

However, reports that the Defence Research and Development Organisation (DRDO) had trashed the PPEs, have made the State government decide not to use them for now. Mr. Sarma said he checked with the DRDO, which denied having rejected the kits.

"We barely had around 2,200 PPEs when he had ordered them from China. We have about 1.5 lakh PPEs now, brought from different parts of India and will use the ones brought from China only after getting them tested for quality at DRDO or any other lab recognised by the Government of India," he said on Saturday evening.

The Minister said reports implying the poor quality of the imported PPEs created anxiety among the doctors and nurses in Assam.

He asserted that the State government did not pay for the imported kits. Some private parties made the advance payment on behalf of the government on the condition that they may not be reimbursed, he added.

"One of the parties has been asked to store the 50,000 kits. We will not force the doctors to wear those even if they pass the test. They have to be satisfied first," Mr. Sarma said.

https://www.thehindu.com/news/national/other-states/covid-19-assam-to-use-ppe-kits-from-china-only-if-doctors-are-satisfied-with-quality-says-health-minister/article31380834.ece

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Test Pilots explains why Pilots are not cleared to fly above 1.6Mach on LCA-Tejas

By Karan Thakur

Harsh Varshan Thakur who is Test Pilot with India's State-owned aerospace and defence company Hindustan Aeronautics Limited (HAL), recently explained on Twitter, why LCA-Tejas which was engineered to fly at 1.8M has been tested till 1.6M and why it will never be cleared to Pilots to fly beyond that. This particular query how SAAB's Gripen has 2.0M speed while using the same GE's F-404 engine India's LCA-Tejas max speed is limited to only 1.8M prompted his response.

Thakur explains that simple pilot type intake design used on LCA-Tejas is what prevents LCA-Tejas to have engineered speed of 2.0M while to achieve this speeds, LCA air intakes could have to re-done and also employ intakes cones as seen in Mirage-2000 and Mig-21 which moves move in or out of the intakes to maintain the shockwave in its the proper position, ahead of the first stage of the engine and need to be adjusted by the pilot.

Lack of intakes cones in LCA-Tejas means a hassle-free operation for the Pilot but this new phenomenon is not limited to LCA-Tejas alone but many are countries are now limiting Mach speed on many modern fighter jets after intense study and data collected over the years of the max speed at different attitudes as pointed by Thakur, who gives an example how below 22000 feet altitude Mach speed over 1.6 is not possible and a plane flying at Mach 1.8 has the advantage of only 60knot when it is above 28000 feet altitude.

In the cold war era, Mach speed mattered the most only in getaway drive and little actually in the combat, also in the cold war era, jets were not made to last 6000 hours of airframe life nor were to be operational for 40 years. lower production cost in the 60-70s meant those jets with higher max speeds could barely last beyond 20 years before airframe stress and hairline fractures on the fuselage could have grounded them for good but when jets became more expensive due to avionics and improved technology, many countries start studies effect of high-speed stress on the airframe and it was concluded that unnecessary high speed which has little advantages in combat scenarios should be avoided to prolong the airframe life of the jets.

The LCA-Tejas airframe has been engineered to achieve 1.8Mach speed and it was supposed to be tested till that speed to achieve its specification mark but that could not be done due to fear of possible FBW failure and loss of control due to excessive vibrations at that speed and max speed achieved was 1.6Mach, which now has become the gold standard of max speed in new jets to maintain a long life of the airframe and to also avoid critical premature airframe failures.

India's next two fighter jet programs like Medium Weight Fighter and AMCA will also have Max speed of 1.8Mach, but this time engineers and its developers plan to test to its limit but Pilots will always be told to keep it below 1.6Mach.

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https://idrw.org/test-pilots-explains-why-pilots-are-not-cleared-to-fly-above-1-6mach-on-lca-tejas/#more-225532