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10 'tech innovations' by Indian Army, Indian Navy, DRDO and others to fight COVID-19

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Improvisation using low-cost and easily available resources have played a key role in India's fight against COVID-19. Be it converting railway coaches into isolation wards or students coming together to make hand sanitizers in bulk quantities, handy improvisation or simple innovations has been appreciated by all. Not to forget, our government's push to encourage people to make their own face masks at home. We have also witnessed IITs and other engineering colleges make 3D printed face shields or low-cost ventilators with bare minimum resources. What's interesting is that our Armed Forces along with Defence Research and Development Organisation (DRDO) also introduced tech solutions to help people ideate further in this race to fight the pandemic. Here are 10 'tech jugaad' by Indian Army, Indian Navy and DRDO to fight COVID-19.



DRDO uses sealant meant for submarine applications to make special suits for medical staff

DRDO has made a bio suit for medical professionals to help them fight coronavirus disease. Interestingly, the bio-suit made by DRDO has a unique feature. The DRDO is said to have prepared a special sealant as an alternative to seam sealing tape based on the sealant used in submarine applications. The special sealant used for submarine applications is required because as per DRDO, the bio suit production in India by its industry partners and other industries is being hampered due to non-availability of seam sealing tapes.



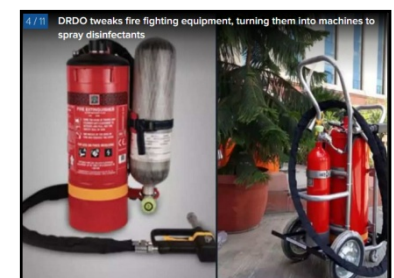
Indian Army EME develops remote-controlled trolley with wash basin to deliver essential items

The Corps of Electronics and Mechanical Engineers (EME) of the Indian Army has created a remote-controlled vehicle to deliver essential items to frontline healthcare staff and others. This remote operated trolley that comes equipped with a wash basin and dustbin. The trolley also has storage space which can be used in hospitals and isolation wards.



DRDO tweaks fire fighting equipment, turning them into machines to spray disinfectants

DRDO has tweaked fire fighting equipment, turning them into machines to spray disinfectants. These machines will be used to sanitise roads and other surfaces. Developed by the Centre for Fire Explosive & Environment Safety (CFEES), these machines are



spin-offs of fire suppressants. These portable sanitation equipment can be used to spray decontamination solutions consisting of 1% Hypochlorite (HYPO) solution for sanitisation of suspected areas.

Indian Navy makes in-house portable oxygen multifeeder that can cater to six patients together

Indian Navy has made a unique in-house portable oxygen multifeeder that can cater to six patients suffering from COVID-19 together. Dubbed as the Portable Multi-feed Oxygen Manifold, the device can be used for six patients from a single oxygen cylinder.



Indian Army makes low-cost thermal scanner, anti-aerosolization box

The Indian Army has developed several low-cost innovations to help medical workers fight coronavirus disease. These include innovative surgical masks, hand sanitisers, anti-aerosolization boxes and thermal scanners.



DRDL Hyderabad develops 'COVSACK' COVID-19 sample collection kiosk

Defence Research & Development Laboratory (DRDL), Hyderabad, has developed COVID Sample Collection Kiosk (COVSACK) for healthcare professionals. The kiosk is automatically disinfected without the need for human involvement, making the process free of infection. After the patient leaves the Kiosk, four nozzle sprayers are mounted in the kiosk cabin and disinfect the empty chamber by spraying disinfectant mist for a period of 70 seconds. It is further flushed with water & UV light disinfection. Voice command can be given through a two-way communication system integrated with the COVSACK.



DRDO develops mobile lab for faster COVID-19 sample testing

To speed up the screening process of those suspected with COVID-19 infection, Research Centre Imarat (RCI), the Hyderabad based laboratory of DRDO has developed a mobile laboratory. Called the Mobile Virology Research and Diagnostics Laboratory (MVRDL), the lab will also contribute to the research and development activities related to the novel coronavirus.



Contactless sanitiser dispenser, UV light-based disinfection box by CFEES

Centre for Fire Explosive & Environment Safety (CFEES), Delhi, using its expertise in mist technology for fire suppression, has developed automatic mist-based sanitiser dispensing unit. It is a contactless sanitiser dispenser which sprays alcohol based hand rub sanitiser solution for sanitisation of hands while entering the buildings/office complexes, etc.



Ultraviolet C Light-based sanitisation box and hand held UV-C device made by DRDO labs

Defence Institute of Physiology & Allied Sciences (DIPAS) and Institute of Nuclear Medicine & Allied Sciences (INMAS), DRDO laboratories in Delhi have designed and developed Ultraviolet C Light based sanitisation box and hand held UV-C (ultraviolet light with wavelength 254 nanometres) device. The UV-C consists of a shorter, more energetic wavelength of light. It is particularly good at destroying genetic material in COVID-19.



Defence Institute of Advanced Technology develops microwave sterilizer

Defence Institute Of Advanced Technology (DIAT) in Pune supported by DRDO has developed 'ATULYA' a microwave steriliser capable of disintegrating #NovelCoronavirus via differential heating at 56°C-60°C temperatures.



<https://www.gadgetsnow.com/slideshows/10-tech-innovations-by-indian-army-indian-navy-drdo-and-others-to-fight-covid-19/Ultraviolet-C-Light-based-sanitisation-box-and-hand-held-UV-C-device-made-by-DRDO-labs/photolist/75513682.cms>



Sun, 03 May 2020

किसी भी नॉन-मेटेलिक सतह से कोरोना वायरस का सफाया कर देगा 'अतुल्य'

पुणे में डिफेंस इंस्टीट्यूट ऑफ एडवांस टेक्नोलॉजी ने एक नई मशीन इजाद की है। ये मशीन किसी भी गैर-धातु वाली सतह, गद्दे या तकिए को कोरोना से डिसइंफेक्ट (विसंक्रमित) कर सकती है।

पंकज खेलकर

- DIAT ने तैयार की हाथ से चलाने वाली मशीन
- DRDO ने बड़े पैमाने पर उत्पादन के लिए कहा

पुणे में डिफेंस इंस्टीट्यूट ऑफ एडवांस टेक्नोलॉजी (DIAT) ने एक नई मशीन इजाद की है। 'अतुल्य' नाम की ये मशीन हाथ से पकड़ कर ऑपरेट की जा सकती है और किसी भी गैर-धातु वाली सतह, गद्दे या तकिए को डिसइंफेक्ट (विसंक्रमित) कर सकती है।

इंस्टीट्यूट के वाइस चांसलर सीपी रामनारायण ने कहा, "यह सब लगभग 21 दिन पहले शुरू हुआ जब हमने सोचा कि क्यों न एक ऐसी मशीन का आविष्कार किया जाए जो कोरोना वायरस से किसी भी सतह को डिसइंफेक्ट कर दे।"

DIAT के वाइस चांसलर के मुताबिक "इंस्टीट्यूट के वैज्ञानिकों को पहले से ही ऐसी मशीनें बनाने का अनुभव है जो कॉटन, सेनिटरी पैड, प्लास्टिक सीरिंज आदि जैसे अस्पताल के वेस्ट मैटीरियल को डिसइंफेक्ट कर देती हैं। इसलिए हमने इन लाइनों पर काम करना शुरू कर दिया और आज हमारे पास यह अनोखी माइक्रोवेव मशीन है। यह S- प्रोटीन को कामयाबी से नष्ट कर देती है जिसकी कोरोना वायरस जैसी बहुत सी समानताएं हैं।

DIAT एक डीमड यूनिवर्सिटी है और रक्षा अनुसंधान और विकास संगठन (DRDO) से समर्थित है।



DIAT ने तैयार की हाथ से पकड़ कर ऑपरेट की जा सकने वाली मशीन (फोटो-पंकज खेलकर)

इस माइक्रोवेव स्ट्रिलाइजर के जरिए हीटिंग से वायरस को विघटित किया जा सकता है। ये 560 से 600 डिग्री तक के तापमान की रेंज में काम करती है।

ये उत्पाद कम लागत वाला है और इसका पोर्टेबल या फिक्स्ड इंस्टॉलेशन दोनों तरह से इस्तेमाल किया जा सकता है। इस सिस्टम का ट्रायल इंसानी ऑपरेटर की सुरक्षा के लिए किया गया और इसे सुरक्षित पाया गया। इसको ऑपरेट करने का समय 30 सेकंड से एक मिनट तक का हो सकता है। ये इस बात पर निर्भर करता है कि कितनी बड़ी सतह पर इसका इस्तेमाल किया जा रहा है। सिस्टम का अनुमानित वजन तीन किलोग्राम है और इसका इस्तेमाल गैर-धातु की वस्तुओं के लिए किया जा सकता है।

DRDO सचिव ने जल्द से जल्द इस यूनिट के बड़े पैमाने पर उत्पादन के लिए कहा है। इसके साथ ही भारत के 12 प्रमुख शहरों में इलेक्ट्रॉनिक उपकरणों के निर्माताओं की पहचान की गई है। सभी मैनुफैक्चरर्स को जल्द से जल्द प्रोडक्शन शुरू करने के लिए कहा जा रहा है। इस मशीन के लिए आवश्यक कच्चा माल बाजार में आसानी से उपलब्ध हैं। ऐसी एक यूनिट की लागत लगभग 4500/- रुपये है। अगर बड़े पैमाने पर इसका उत्पादन होता है तो ये कीमत और कहीं कम होगी।

<https://aajtak.intoday.in/story/drdo-pune-based-diat-institute-invents-corona-virus-destroying-machine-from-microwave-transmitter-1-1186776.html>

अमर उजाला

Thu, 30 Apr 2020

डिबेर के वैज्ञानिक और एसटीएच के डॉक्टर कोरोना से लड़ रहे

माई सिटी रिपोर्टर

हल्द्वानी। डिफेंस इंस्टीट्यूट ऑफ वायो इनर्जी रिसर्च (डिबेर) हल्द्वानी कोविड 19 से लड़ाई में सुशीला तिवारी अस्पताल की मदद कर रहा है। डिबेर ने संक्रमित मरीजों के नमूने के परीक्षण में प्रयुक्त होने वाला उपकरण सुशीला तिवारी अस्पताल की लैब को उपलब्ध कराया है। अब तक इससे हजारों जांचें हो चुकी हैं। संस्थान के वैज्ञानिक एसटीएच में कोविड 19 परीक्षण में सहयोग कर रहे हैं।

नेशनल हेल्थ मिशन उतराखंड के



कोविड 19 जांच के लिए सुशीला तिवारी अस्पताल की वायरोलॉजी लैब के लिए डिबेर ने आरआरटीपीसीआर यंत्र उपलब्ध करवाया है।

- डॉ. सीपी भैसोड़ा, प्राचार्य, मेडिकल कॉलेज हल्द्वानी

अनुरोध पर डिबेर ने कोरोना जांच के लिए यह पहल की है। संस्थान की निदेशक डॉ. मधुबाला के निर्देशन में आरआरटीपीसीआर वायो रेड सीएफएक्स-96 मशीन को एसटीएच की लैब में उपलब्ध करवाया गया।

इससे विषाणु की उपस्थिति का पता लगाने के लिए मानक परीक्षण होता है। इसे गोल्ड स्टैंडर्ड टेस्ट के नाम से जाना जाता

है। एसटीएच के पास पहले से एक मशीन थी। एक महीने से संस्थान के वैज्ञानिक डॉ. मरवीन ने एसटीएच की वायरोलॉजी लैब हेड डॉ. विनीता रावत और अन्य डॉक्टर के साथ 2000 से अधिक नमूनों के परीक्षण किए हैं। डॉ. मरवीन और एसटीएच के अन्य डॉक्टर इस परीक्षण से संबंधित न्यूक्लिक अम्ल के निष्कर्ष के काम में भी लगे हुए हैं।

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New director for LRDE

Bengaluru: P. Radhakrishna is the new Director of defence laboratory Electronics & Radar Development Establishment (LRDE), Bangalore, according to the Defence Research & Development Organisation (DRDO).

He succeeds S.S. Nagaraja who has superannuated.

The change of guard happened on April 1 but was announced on Friday apparently owing to problems faced due to the lockdown against COVID.

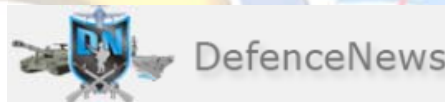
Mr. Radhakrishna, who did his M.Tech in computer engineering from IIT-Kharagpur and B.E. in electronics and communications engineering from Andhra University, joined LRDE in 1988.

Prior to the latest promotion he was associate director (systems) with additional charge as Associate Director (HR).

The release said Mr. Radhakrishna is a specialist in radar systems and played a major role in the design and development of different radars built for the Army, Navy and the Air Force, specially the Rajendra used in the Akash surface-to-air missile system.

He has also headed the Airborne Radars Division responsible for developing different radars used in the surveillance aircraft AEW&CS, UAVs and the indigenous Light Combat Aircraft.

<https://www.thehindu.com/news/national/karnataka/new-director-for-lrde/article31489146.ece>



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Can India make 5th Generation AMCA like F-22 Raptor

AMCA is designed by ADA and manufactured by HAL. AMCA will be a single seat, Twin engine, stealth multi-role fighter jet. First stage of AMCA is done and stage two work is started. It's first flight is scheduled in 2025. It is supposed that it will consist of all modern weapons and modern avionics, some of them are under development and remaining taken from Tejas, Rafale, Su-30mki and other modern fighter jets.

Speed of AMCA will be 2,655 km/h and this fighter jet will be powered by Kaveri engine which is under development stage. AMCA also consists of modern sensors, Radars, Missiles which will be a mix of Israel, India, Russia, France and some other technologies from India's friendly countries too.



The broad requirements outlined for the AMCA are to incorporate a high degree of stealth, a high internal and external weapons payload, high internal fuel capacity, and the ability to swing from an air-to-air role to air-to-ground. It is also expected to have the ability to super cruise.

The initial design of the AMCA was a tailless, delta wing aircraft with twin engines. The design was changed to include horizontal and vertical stabilizers in design 38-01. It featured a double delta wing configuration, that was altered in design 38-09 similar to the F-22.

The aircraft will have a weight of 16-18 tons. 16-18 tons with 2-tons of internal weapons and 4-tons of internal fuel. Combat ceiling will be 15-km, max speed of 1.8-Mach at 11-km. The AMCA will be powered by 2 x 90KN engines with vectored nozzles.

AMCA also comes with self protection jammer system to jam enemy radar guided missiles from both air and ground, electronic counter measure systems to confuse the infrared guided missiles and a radar warning receiver too added to detect enemy radar frequency's.

AMCA like F-22 Raptor

AMCA is not going to be a dedicated air-superiority fighter like F-22. Rather it's more like F-35 in purpose and role. Both are Multi-role. Also, both AMCA and F-35 are medium weight where F-22 is heavyweight.

F-22 is advanced a fighter and India has just started own advanced jet development. F-22 is a very secret technology and USA didn't even export it to anyone, even NATO allies.

AMCA will not be as advanced as F-35 (for example, in aspects like network-centric capability, highly integrated software-defined character and Electronic warfare) or F-22 (for example, in aspects like high-degree stealth) but will be a balanced machine with decency in many of those aspects which is enough for India's requirement.

I think, There will be mixed philosophies like stealth and supercruise (mainly western) and supermaneuverability (mainly Russian) so it will be a unique mix of interesting technologies of various origin (with constraint of Physics, obviously).

Same happened with Tejas. Tejas is a mix of the best 4/4.5 gen features of various origin fighters compacted in a small platform customized for India. IAF pilots are experienced using various origin planes and their feedbacks about better aspects of various aircrafts went into Tejas.

Following the similar philosophy, AMCA will be a mix of the best 4.5/5/5+ gen features of various origin compacted in a medium platform customized for India. But, as for 5th gen technology, there is no previous user experience, things will be based on technological speculations rather than practical experience and that's an important reason why I have said that standard will not touch that of USA (at least initially) but will be world-class.

At the time USA started work on 5th gen fighter (beginning of 1980s), they had warplane development experience of about 60 years with two world wars. USA also developed stealthy aircrafts before F-22. India has modern fighter development experience of around 30 years and has no previous experience of stealth technology.

The HAL AMCA has integrated with latest avionics suite which include AESA radar, Integrated avionics systems, Helmet Mounted Display, Datalink capabilities,IRST, E/O Targeting System (EOTS), Multi-functional integrated radio electronics system (MIREs), ECM Suite, Laser-based counter-measures against infrared missiles,IRST for airborne targets,Ultraviolet warning sensors and Targeting pod.

Overall AMCA looks close to F-22 with a faceted shape making up the fuselage. The single-seat cockpit will seat behind a short nose cone assembly with angled, rectangular intakes fitted to either side and aft of the cockpit position. These openings will aspirate the twin turbofan engine arrangement found at the extreme aft section of the aircraft, arranged in a side-by-side formation.

The main wingplanes will be set a midships and aft while being completed in a symmetrical trapezoidal form. The horizontal tailplanes will be featured directly aft of the mainplanes. Its weapons bay will be installed at the airframe's center mass, slightly ahead of midships. Probably AMCA will have almost similar aerodynamic and energy – maneuverability performance like F22 raptor. The incorporation 3D thrust vectoring make AMCA extreme maneuverable. AMCA also can with stand departure resistants at a similar level like in F22.

The material with which the body is made is specially designed to absorb radar waves. It has another RAM coating too. This is a very critical technology. India probably has developed some RAM for using in MiG-21 and Rejas but this time much more advanced RAM is required. Development work is in progress:

The Electronic Warfare suite is probably developed (by the Defense Avionics Research Establishment with support from the Defense Electronics Research Laboratory). As India has already developed 'Mayavi' EW suite for Tejas, this thing should not be alien to India.

Net-centric warfare is the future warfare. As India is on its way to establish network-centric armed forces, AMCA will surely have net-centric capability. It may not be as advanced as F-35 initially but it has to be there for the future war scenario. In 2010 India has installed AFNET (Air Force Network)

<https://www.defencenews.in/article/Can-India-Make-5th-Generation-AMCA-like-F-22-Raptor-830404>

