COVID-19: DRDO's Contribution

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Covid-19: DRDO comes with new technology to disintegrate coronavirus

A microwave sterilizer named as 'ATULYA' can be operated in portable or fixed installations and helps in disintegrating the virus by differential heating in the range of 56 to 60 Celsius temperatures

By Huma Siddiqui

From the moment the first positive case of COVID-19 was reported, Defence Research and Development Organisation (DRDO) has ensured that all its labs working under Life Sciences cluster is ready to help the civil authorities. These labs have been producing spin-off technologies which are helping the government to combat COVID-19. Defence Institute of Advanced Technology, Pune, a deemed university supported by Defence Research and Development Organisation has come up with a cost-effective solution to disintegrate coronavirus.

A microwave sterilizer named as 'ATULYA' can be operated in portable or fixed installations and helps in disintegrating the virus by differential heating in the range of 56 to 60 Celsius temperatures.

The DRDO over almost more than a month has been accelerating and enhancing products and countermeasures to combat the spread of COVID-19 in India.

According to the DRDO, this system has been tested for human and operator safety and depending on the size and shape has the capability to sterilize the object within 30 seconds to one minute. The system weighs around 3 kgs and it can be used for non-metallic objects only.

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According to a report titled `Critical Equipment and Technologies Developed by DRDO for Combating COVID19' has listed 20 products that have been developed and designed and some are spin-offs from the existing critical technologies. The effort of the organization is to ensure uninterrupted creation of solutions and using available resources.

It has listed many items including hand sanitizer, to PPE, face masks, face shield, aerosol containment box, sample testing, medical oxygen plant, ventilators etc.

Earlier this week, defence minister Rajnath Singh reviewed the efforts of DRDO, Ordnance Factory Board as well as other agencies involved in fighting against the COVID-19. He had also urged these agencies to compile a list of products that can be shared with the private sector in an effort to ensure bulk production.

As has been reported by the Financial Express Online

earlier, the DRDO has already transferred a lot of technologies to the private sector companies who are now producing the products.
https://www.financialexpress.com/defence/covid-19-drdo-comes-with-new-technology-to-disintegrate-coronavirus/1945501/

पत्रिका

Sat, 02 May 2020

कोरोना को मात देगा डीआरडीओ का अतुल्य, खास तकनीक से बना माइक्रोवेव स्टरलाइजर

धीरज शर्मा

- *Coronavirus का खात्मा करेगा DRDO का Atulya*
- *खास तकनीक से तैयार किया Microwave स्टरलाइज*
- *30 सेकंड से 1 मिनट में करेगा कोरोना वायरस का खात्मा*

नई दिल्ली। कोरोना वायरस (coronavirus) से निपटने के लिए इस वक्त देश के साथ-साथ पूरी दुनिया जूझ रही है। हर देश इस वक्त कोरोना जैसी महामारी को मात देने के लिए इलाज की तलाश में जुटा है। इस बीच कोरोना से जंग के लिए डिफेंस रिसर्च डवलपमेंट ऑर्गेनाइजेशन (DRDO) ने खास तकीनीक एक उपकरण तैयार किया है। अतूल्य (Atulya) नाम का ये उपकरण एक माइक्रोवेव-स्ट्रेलाइजर है।

दरअसल डीआरडीओ की ओर से तैयार ये माइक्रोवेव तापमान की तकनीक पर काम करता है। डीआरडीओ का दावा है कि कोरोना से लड़ने में ये मददगार साबित होगा है।

कोविड-19 ने पूरी दुनिया को अपनी चपेट में ले लिया है। देशभर में लगातार कोरोनावायरस के मरीजों की संख्या बढ़ रही है। अब तक 35 हजार से ज्यादा लोग इस वायरस की वजह से संक्रमित हो चुके हैं। इस बीच डीआरडीओ की ओर से राहत भरी खबर मिली है। अतूल्य की मदद से कोरोना को मात दी जा सकती है।

रक्षा मंत्रालय ने बयान जारी कर दावा किया है कि डीआरडीओ की पुणे स्थित डीम्ड यूनिवर्सिटी, डिफेंस इंस्टीट्यूट ऑफ एडवांस टेक्नोलॉजी ने इस माइक्रोवेव स्ट्रेलाइजर को तैयार किया है।

इस मशीन के जरिए 56 से 60 डिग्री सेल्सियस तापमान पर कोरोना वायरस को खत्म करने का दावा किया गया है।

किफायती भी और कारगर भी

डीआरडीओ की मानें तो ये प्रोजेक्ट काफी किफायती है। इतना ही नहीं इसे बहुत कम जगह में फिट किया जा सकता है। यानी से जगह भी कम घेरता है।

इंस्टिट्यूट ने इसको लेकर टेस्ट भी किए हैं जो सफल रहे हैं। इन टेस्ट में अतुल्य पूरी तरह सुरक्षित पाया गया है।

इसकी मदद से किसी भी सामान को सिर्फ 30 सेकंड में सट्रेलाइज किया जा सकता है। जिस सामान को स्ट्रेलाइज करना है उसके साइज के हिसाब से 30 सेकेंड से करीब एक मिनट तक इसके सामने रखना रखना होता है।

इसे घर या दफ्तर में कहीं भी रखा जा सकता है। इसके चालू करने के एक मिनट के अंदर कोरोना के किटाणु मर जाएंगे।

आपको बता दें कि इससे पहले भी डीआरडीओ के वैज्ञानिक और अलग-अलग लैब कोरोना वायरस से लड़ने की तकनीक और सामान तैयार कर चुके हैं।

https://www.patrika.com/miscellenous-india/beat-coronavirus-drdo-pune-institute-make-new-technology-microwave-6056911/

WION

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COVID-19 battle: DRDO develops PU coated nylon & polyester to be manufactured in India

The empowered group chairman on coronavirus said that the total demand for ventilators is 75,000 in India out of which 19,398 ventilators are available and 60,884 ventilators have been ordered

"DRDO has developed three types of new PU coated nylon/ polyester and technology transfer to manufacturers of India," PD Vaghela, Chairman of the empowered on coronavirus, said.

"Demand for PPE kits has been projected at 2.01 crore in India. We have placed orders for 2.22 crore kits out of which 1.42 crore kits are being procured in the domestic market," Vaghela said, adding."1.87 lakh kits are being produced daily in the country."

Meanwhile, the ministry of home affairs allowed movement of migrant workers, tourists, students and other persons stranded at different places to be transported by special trains.

The Railway ministry said that on arrival at the destination, passengers will be received by the state government, who would make all arrangements for their screening and quarantine if necessary

The home ministry said that no separate passes are required for traffic of trucks and goods carriers, including empty trucks.

https://www.wionews.com/india-news/covid-19-battle-drdo-develops-pu-coated-nylon-polyester-to-be-manufactured-in-india-296098

COVID-19: DRDO/ IIT Contribution

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IIT Guwahati students design, develop low-cost intubation boxes

Guwahati: The Indian Institute of Technology (IIT) Guwahati students have designed and developed low-cost intubation boxes.

The device functions as an aerosol obstruction box which is placed atop the patient bed on the head-side, limiting the flow of virus-laden droplets from the patient to the doctor, especially during the process of intubation.

As in the case of COVID-19, patients develop respiratory failure thus requiring assistance in the form of endotracheal intubation. Given the nature of this process, healthcare providers are at risk of contracting the virus via droplets either exhaled or coughed out by the patient. The device is inspired by the design of Dr Hsien Yung Lai, an anesthesiologist from Taiwan.

It is developed and designed by a student venture for medical innovation named Mitochondrial. Mitochondrial is mentored by Dr. S. Kanagaraj and Dr. Sajan Kapil of the Department of Mechanical Engineering, IIT Guwahati. It is a low-cost alternative to intubation boxes and is easier to manufacture and deliver amid the lockdown. The projected cost per box is Rs 2000, which is significantly lower than existing alternatives.

The team has received assistance from the DRDO for prototyping and testing at the Solid State Physics Laboratory, New Delhi, and is consulting Dr. Johann Christopher of Care Hospitals, Hyderabad, and Dr. Abhijeet Bhatia of NEIGRIHMMS Shillong, to ensure the efficacy of the design.

Speaking on the latest development related to COVID-19, Dr. TG Sitharam, Director, IIT Guwahati said, "It is a matter of great pride that after the major initiatives taken by faculty members and alumni of IIT Guwahati to develop various products for the containment of COVID-19 and major research initiatives, IITG students are also coming up with novel products and immediate solutions for protecting doctors, nurses and healthcare workers in this national effort against COVD-19."

"At IIT Guwahati we have initiated the COVID-19 Grand Challenge for encouraging the students to come forward with ideas and solutions to fight this pandemic and we are expecting several products in the near future," Sitharam said.

Amid the dearth of PPE such as powered air-purifying respirators (PARPs) and well-sealed face masks, it becomes essential to complement the use of makeshift acrylic face shields, N95 masks and surgical respirators, with a proper obstruction for aerosol spewed via the mouth and nose of the patient. The intubation box allows having this protection in place by limiting the infection within the box's volume around the patient.

As opposed to other PPE, this box works effectively for multiple doctors and nurses serving the patient. While the transparent material allows visual access to the head of the patient inside, the arm-holes on the box allow for the care-provider to perform any necessary tasks including intubation and extubation, which are both processes known to be cough inducing. Further, the boxes are reusable, as they may be cleaned thoroughly with 70 per cent alcohol or bleach, to allow use for the next patient.

Speaking about the development, Umang Mathur, a BTech student of the Department of Bioscience & Bioengineering, IIT Guwahati, said, "We feel that it is our responsibility to contribute to this fight against a global pandemic and there could not be a better time and opportunity for IIT graduates to start building upon their world-class education background and exposure, to provide solutions centred around simplicity and make India self-reliant, instead of being dependent on imported technologies especially at this time of crisis".

The primary prototype of the design has been completed at DRDO, New Delhi, and the box is currently being reviewed in the field at major COVID-19 care centres, such as AIIMS, New Delhi. Based on the continuous feedback, the design will be further optimised for improved efficacy, before the first batch is manufactured in Gurgaon, Haryana.

The team has started a crowdfunding campaign in order to manufacture these boxes and provide them to government hospitals for free. The campaign raised a record Rs 50,000 within six hours of launching.

https://timesofindia.indiatimes.com/home/education/news/iit-guwahati-students-design-develop-low-cost-intubation-boxes/articleshow/75484379.cms

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Scenarios: Will IAF have room for Tejas Mk2, ORCA, and AMCA at the same time?

By Satyajeet Kumar

By 2035, Indian Air Force (IAF) plans to retire nearly 300 front line fighter jets which include 100+ Upgraded Mig-21Bis, 90+ Jaguar Ground Strike aircraft and 110 mix fleet of Mirage-2000 and Mig-29, according to some media reports, IAF also has plans to retire the first batch of 50 Su-30MKIs from 2035 onwards which brings the total tally to 350 jets by 2035, even though we are not factoring in close to 120+ Mig-27s which have been retired from 2010 onwards and are yet to be replaced with the newer planes.

IAF's current procurement plans involve the purchase of an additional 8 Su-30MKI, 21 Mig-29, 36 Dassault Rafale, 40 Tejas Mk1, and 83 Mk1A along with procurement of 114 jets of International origin. which by 2030 will see the induction of nearly 300 jets plus there will be room for nearly 100 MWF-Mk2 which is already under development and it is expected to enter production by 2026 and could have produced at least 50 jets by 2030.

IAF Combat Aircraft in 2020				
MiG-21	Soviet Union	Multirole	112	
MiG-29	Soviet Union	Multirole	66	WWW.IDRW.ORG
Sukhoi Su-30	Russia	Multirole	272	Production complete
HAL Tejas	India	Multirole	16	24 on order
Mirage 2000	France	Multirole	41	
Dassault Rafale	France	Multirole	3	Total 36 on order
SEPECAT Jaguar	UK / France	Ground attack	91	
			601	

Aircraft	Origin	Type	In service	Notes
IAF Combat Aircraft in 2030 (Without ORCA factored in)				
MiG-29	Soviet Union	Multirole	87	
Sukhoi Su-30	Russia	Multirole	280	WWW.IDRW.ORG
HAL Tejas Mk1/A	India	Multirole	123	
Mirage 2000	France	Multirole	41	
Dassault Rafale	France	Multirole	36	
SEPECAT Jaguar	UK / France	Ground attack	40	
MMRCA	Unknown	Multirole	114	Prodcution at 24 jets per annum
MWF-Mk2	India	Multirole	50	21 jet per year
			771	

50 more MWF-Mk2 might come in period from 2030-35 for IAF which will mean that IAF will have around 350 newer generation jets from a period of 2020-2035 when it will be retiring nearly 300 jets in this period and the replacement rate will be one to one for the next 15 years assuming that all the procurements take place in time and deliveries are on schedule. IAF which has sanctioned strength of a fighter fleet of forty-two squadrons usually requires nearly 800 jets at its

disposal for a two-front war with China and Pakistan but even in the 2030-35 period, it will have only 300 jets replacing 300 older jets thus negating any major bump in aerial firepower fleet.

Aircraft	Origin	Type	In service	Notes
IAF Combat Aircraft in 2035 (Without ORCA factored in)				
Sukhoi Su-30	Russia	Multirole	230	Assuming 50 older jets are retired
HAL Tejas Mk1/A	India	Multirole	123	
Dassault Rafale	France	Multirole	36	WWW.IDRW.ORG
MMRCA	Unknown	Multirole	114	
MWF-Mk2	India	Multirole	100	
AMCA MK1	India	Multirole	40	
WWW.IDRW.ORG				
			643	
Aircraft	Origin	Type	In service	Notes
IAF Combat Aircraft in 2035 (With ORCA factored in)				
Sukhoi Su-30	Russia	Multirole	230	Assuming 50 older jets are retired
HAL Tejas Mk1/A	India	Multirole	123	
Dassault Rafale	France	Multirole	36	
MMRCA	Unknown	Multirole	114	WWW.IDRW.ORG
MWF-Mk2	India	Multirole	100	
AMCA MK1	India	Multirole	40	
ORCA	India	Multirole	50	
WWW.IDRW.ORG			693	

IAF fighter fleet strength in 2030 will rise briefly but by 2035 Jaguar and Mirage/Mig-29 fleet will be flagged for the replacement which will again flatten the growth curve for the IAF in the period unless it decides to prolong this jets in service. By 2035 350+280 Su-30MKI fleet will still make its fleet strength of 630 jets if we assume all Jaguar and Mirage/Mig-29 fleet is retired by then, still IAF will be short of nearly 200 jets even in 2035.

Aircraft	Origin	Type	In service	Notes
IAF Combat Aircraft in 2040 (With ORCA factored in)				
Sukhoi Su-30	Russia	Multirole	150	Assuming 130 older jets are retired
HAL Tejas Mk1/A	India	Multirole	83	Assuming older 40 MK1 are retired
Dassault Rafale	France	Multirole	36	
MMRCA	Unknown	Multirole	114	WWW.IDRW.ORG
MWF-Mk2	India	Multirole	150	
AMCA MK1	India	Multirole	40	
AMCA MK2	India	Multirole	50	
ORCA	India	Multirole	100	
			723	
Aircraft	Origin	Type	In service	Notes
IAF Combat Aircraft in 2040 (Without ORCA factored in)				
Sukhoi Su-30	Russia	Multirole	150	Assuming 130 older jets are retired
HAL Tejas Mk1/A	India	Multirole	123	
Dassault Rafale	France	Multirole	36	
MMRCA	Unknown	Multirole	114	WWW.IDRW.ORG
MWF-Mk2	India	Multirole	150	
AMCA MK1	India	Multirole	40	
AMCA MK2	India	Multirole	50	
WWW.IDRW.ORG				
			663	

IAF will induct AMCA with older F414 engines from 2030 onwards and it is expected that the first 40 jets will be delivered by 2035 when the production for Mk2 will commence but IAF will

still be short by over 100 jets even in 2035 assuming all jets are inducted in time and older ones also retired in time. IAF is likely to agree to field at least 50 more MWF-Mk2 from 2035 onwards.

Possible Scenario if ORCA and AMCA is cleared by IAF for induction for 2035 and also if ORCA never happens

Possible Scenario if ORCA and AMCA Mk1 and Mk2 is cleared by IAF for induction in 2040 and also if ORCA never happens.

Note: Attrition due to accidents if calculated at an assumed average of 6 jets per annum will mean every 5 years 30 jets will be less in the fleet, so around 60 jets will be less in 2030 and 60+30 in 2035 and 60+30+30 in 2040. Since it is difficult to know exact make of the jet which will be lost over the years calculation is for the whole fleet.

https://idrw.org/scenarios-will-iaf-have-room-for-tejas-mk2-orca-and-amca-at-the-same-time/#more-226656