

DRDO at the forefront of fighting Covid-19

By Dibyendu Mondal

New Delhi: In a bid to fight against the deadly coronavirus pandemic, the DRDO (Defence Research and Development Organisation), using its scientific endeavour, has developed a host of protective equipment, ventilators and sanitisation equipment for helping the frontline workers.

The DRDO has developed 11 such products to combat the coronavirus. These products include visor-based full-face shield, isolation shelter, mobile area sanitisation system, advanced N99 masks, personal sanitisation equipment, portable backpack area sanitisation equipment, advanced PPEs (Personal Protection Equipment) for doctors and frontline health workers, ventilators and sanitisers.

With an anticipation of a growing need for ventilators in the coming days for patients fighting the coronavirus, the DRDO's Defence Bioengineering and Electromedical Laboratory in Bangalore, in partnership with Bharat Electronics Limited (BEL) and Scanray Pvt Ltd in Mysuru, will develop modern and portable ventilators at the earliest.

And, according to sources in the DRDO, works on the development of such ventilators are progressing and each scientist and technician is working to come up with the best and most advanced form of ventilator.

Apart from this, a personal sanitisation equipment which is a full body disinfection chamber has been developed by the DRDO's Vehicle Research and Development Establishment laboratory in Ahmednagar.

This personal sanitisation equipment, which is currently being used at the entrance of many markets across the country, is a walk-through full body disinfection chamber. It is a portable system equipped with sanitiser and soap dispenser. The decontamination is started using a foot pedal at the entry. On entering the chamber, an electrically operated pump creates a disinfectant mist of hypo sodium chloride for disinfecting. The mist spray is calibrated for an operation of 25 seconds and stops automatically, indicating completion of operation.

An official from the DRDO told The Sunday Guardian, "The person who enters the chamber will have to keep their eyes closed as per the procedure because of the disinfectant. This system consists of roof mounted and bottom tanks with a total of 700 litres capacity and approximately 650 personnel can pass through the chamber for disinfection until the refill is required. This system can be used for disinfection of personnel at the areas of controlled ingress and egress such as entry and exit to hospitals, malls, office buildings and critical installations."

Apart from this, the DRDO's Research Centre Imarat, Hyderabad laboratory and the Terminal Ballistics Research Laboratory in Chandigarh have developed a light weight face protection mask for frontline healthcare professionals handling Covid-19 patients.

According to the DRDO's laboratory, the frame of the mask has been made using 3D Printing, while the face covering thermoplastic is made using biodegradable renewable resources such as corn starch or sugarcane.

The DRDO's innovation to develop suits against CBRN (Chemical, Biological, Radiological and Nuclear) agents have also led to the development of a special bio suit for healthcare workers to fight Covid-19 using a "specific type" of fabric and a "specific type" of agent.

A DRDO official in the know of this development told this newspaper, "The suit has been prepared with the help of the industry and has been subjected to rigorous testing for textile parameters as well as protection against synthetic blood. The protection against synthetic blood exceeds the criteria defined for body suits by the Ministry of Health and Family Welfare.



Currently, the capacity of production exists at 7,000 suits per day, but efforts are on to ramp up the production to 15,000 suits per day.”

In an effort to help the government with rapid sanitization, the DRDO has also come up with a Trolley Mounted Large Area Sanitisation Equipment which has the capability of disinfecting up to 3,000 square metre area in one go.

<https://www.sundayguardianlive.com/news/drdo-forefront-fighting-covid-19>

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30 companies to manufacture ‘counter Covid-19 products’ with DRDO technology

According to the Directorate of Industry Interface and Technology Management, the technologies transferred to for this purpose are off-shoots of those developed by the organisation for defence purposes

By M Ramesh

Chennai: At least 30 companies will manufacture a range of ‘counter Covid-19’ products with technology provided by Defence Research and Development Organisation (DRDO). These are non-medicine products, such as ventilators, sanitisers, PPE, face shield and isolation shelters.

Notable among them is the Bengaluru-based PSU, Bharat Electronics Ltd, which will produce 30,000 ventilators. Dr Mayank Dwivedi, Director, Directorate of Industry Interface and Technology Management, which is a part of DRDO, told *BusinessLine* that the technologies transferred to for this purpose are off-shoots of those developed by the organisation for defence purposes. (DRDO transfers such technologies to the industry regularly; in this case, they happen to be for counter Covid-19 products.)

For instance, the know-how for ventilators comes from the on-board Oxygen generator technology developed under the Light Combat Aircraft (LCA) program.

All these technology agreements were put together in about ten days, Dr Dwivedi said. “To hasten the process of manufacture, DRDO has chosen to deal with industries who have been already working with us,” he said.

A good example of that is a Pune-based company called Raksha Polycoats, has been working with DRDO and ISRO for decades, making products like high altitude pulmonary odema (HAPO) bags and submarine escape suit for DRDO and products for satellite recovery systems for ISRO. Abjijit Sarkar, Managing Director of Raksha Polycoats told *BusinessLine* that the company would produce isolation shelters—basically, small, 10x10x9 feet rooms made out of metal frames and a special fabric. The company has capacity to make 500 shelters a month; production is to start next week. Raksha Polycoats is one of the two companies have DRDO has given technology to produce isolation shelters; the other one is Accurate Savan Defence, also based in Pune.

Hyderabad-based start-up, iMake, has been into the business of rapid prototyping since 2016. Interestingly, this company makes products, often using 3D printing, for the film industry. K Sudheer, one of the partners of iMake, said the company has made products such as jewellery worn by heroines in films. Now iMake is one of the five companies that have undertaken to produce visor-based face shields to be worn by health workers. (The others are Modern Manufacturers, Chandigarh, Kirat Mechanical Engineering, Chandigarh, Wipro 3D, Bengaluru, and Global Healthcare, Delhi.)

“Yesterday (Friday) we delivered 10,000 pieces,” Sudheer said. Because of its 3D printing, rapid prototyping expertise, iMake could come up with 14 versions of the products for DRDO to select from.

The company will produce 12,000 pieces a day; Sudheer said the capacity could be easily doubled if required.

Mumbai-based Setco is one of the companies that have undertaken to make sealants to seal seams in personal protection equipment (PPE). Yogesh Solanki of the company said that while the product was ready, there were problems in procuring raw materials and transporting them, during the lockdown phase. He said that the company could be producing “hundreds of tonnes” of the product once the “small, small problems” are removed.

Dr Dwivedi said that all these products are “world class” and also have huge export potential too.

<https://www.thehindubusinessline.com/companies/30-companies-to-manufacture-counter-covid-19-products-with-drdo-technology/article31315458.ece#>



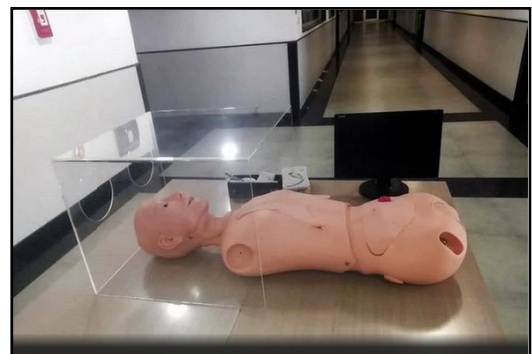
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Another shield by DRDO against Covid

Aerosol Containment Box has a transparent cube that covers a patient's head up to the chest

Hyderabad: The Defence Research and Development Organisation (DRDO), which has been making several products such as personal protective suits and sanitisers, has come out with yet another product against COVID-19 called ‘Enclosure for Intubation Procedure - Aerosol Containment Box’ on Friday.

Its premier labs — Research Centre Imarat (RCI) in Hyderabad and Terminal Ballistics Research Laboratory in Chandigarh — have designed the product using Acrylic and Perspex materials, respectively. It consists of a transparent cube which covers patient's head up to the chest and acts as a safety barrier against transmitting droplets from patients to the healthcare workers while giving treatment.



The two circular ports allow the health worker's hands to pass and perform the airway procedures. The acrylic/perspex material used here is 50% lighter thermoplastic compared to glass making it easy to handle. The enclosure for aerosol containment is useful while taking samples from a suspected patient, during intubation, observation or during treatment to completely avoid droplets and aerosols emanating from them due to cough and sneeze, said an official spokesman.

Two Sizes

Two sizes of these Aerosol Containment Boxes have been designed and developed by DRDO for use by adult and child patients. The use of the enclosure could safeguard against spread of viral contamination of COVID-19 to reach on gown, gloves, face mask, eye shield, shoes and also on the floor of the hospitals effectively.

RCI Hyderabad has manufactured the prototype units at the local industry partners here and a demonstration has also been carried out by a team of doctors at ESI Medical College, Erragadda, upon which the design has been validated and accepted. Similarly, the design of TBRL has been tested and qualified at PGIMER, Chandigarh.

Required quantities of this latest innovation from the DRDO labs were being produced both in Hyderabad and Chandigarh, he added.

<https://www.thehindu.com/news/cities/Hyderabad/another-shield-by-drdo-against-covid/article31313244.ece>



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Lightweight integrated aircrew helmet for Su-30, BISON, MiG 29 and Mirage aircraft tested: DRDO

Wind Blast Test on Lightweight Integrated Aircrew Helmet and Pressure Breathing Oxygen Mask for Pilots designed to primarily incorporate Helmet Mounted Display and Sight (HMDS) as per IAF requirement was subjected to open jet wind blast test at 600 KEAS at DGA, CEAT, France and was tested in eight different profiles and it has successfully withstood all the tests thereby proving the integrity of Helmet-Mask assembly during ejection.

The integrated helmet with internally retractable dual polycarbonate visor system (with EMI/EMC complied pre-amplifier meeting RS-03 test) and pressure breathing oxygen mask has been developed by Defence Bio-Engineering & Electro Medical Laboratory (DEBEL), Bengaluru, against specific QRs issued by Indian Air Force.

Lightweight Integrated Aircrew Helmet with EMI/EMC complied pre-amplifier has been developed for for Su-30, BISON, MiG 29 and Mirage aircraft.

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<https://idrw.org/lightweight-integrated-aircrew-helmet-for-su-30-bison-mig-29-and-mirage-aircraft-tested-drdo/#more-225079>



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Static testing of 3rd stage rocket motor of Agni-V successfully tested: DRDO

Advanced Centre for Energetic Materials (ACEM), Nasik, successfully conducted sea level static testing of the third stage rocket motor of Agni-V on 4 March 2020. This test was conducted to qualify the propellant and evaluate the ballistic performance parameters.

Various parameters, viz., thrust, chamber pressure, igniter pressure, temperature, strain, displacement, vibration and acoustic pressure, were validated and real-time data was recorded. The pressure-time and thrust-time plots of the rocket motor matched exactly with the prediction. The



ballistic performance parameters closely matched with the predicted values.

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<https://idrw.org/static-testing-of-3rd-stage-rocket-motor-of-agni-v-successfully-tested-drdo/#more-225078>



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What is BrahMos missile's latest upgrade?

Last week, the Defence Research and Development Organisation (DRDO) carried out two successful tests of the latest variant of the BrahMos missile, one from the land platform and the other from air. BrahMos, developed through a collaboration between India and Russia, is one of the most advanced weapons in India's armoury.

The missile:

BrahMos is a cruise missile, meaning it can be guided towards a pre-determined land- or sea-based target. With a capability to attain speed 2.8 times that of sound (Mach 2.8), BrahMos is classified as supersonic cruise missile. A newer version under development is aimed at flying at speeds greater than Mach 5. These are called hypersonic cruise missiles. Besides decreasing the reaction time of the enemy, higher speeds also substantially reduce the chances of the missile getting intercepted.



An amalgam of the names of the rivers Brahmaputra and Moskva, BrahMos is being produced by BrahMos Aerospace, a joint venture company set up by DRDO and Mashinostroyeniya of Russia in 1998. The first version of the BrahMos supersonic cruise missile was inducted into the Indian Navy in 2005, meant to be fired from INS Rajput.

The test:

While the missile has been in India's arsenal for long, it is continuously upgraded and updated with new hardware and software. This is what necessitates periodic tests of the missile.

DRDO scientists said that in every such exercise of a specific variant of BrahMos, different parameters are put to test. Though the exact details are not disclosed, additional hardware and software systems are tested based on the inputs from the user, against more complex targets, and under different atmospheric conditions. The test results and observations are important for future analysis and further advancement.

"India's missile development programme has made sure that its missiles are upgraded and new systems are also developed. BrahMos has undergone development through the early 2000s till date. Its land-to-land, submarine-fired and now air-fired variants have been developed stage by stage. Each new version has something additional compared to the previous version," said a DRDO scientist.

<https://www.defenceaviationpost.com/2020/04/what-is-brahmos-missiles-latest-upgrade/>



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Behind final clearance for Tejas, 10 concessions given to fighter jet

The indigenously-built Light Combat Aircraft (LCA), Tejas, received around 10 concessions, which enabled it to get the final operational clearance (FOC) last month, ThePrint has learnt.

The FOC was granted during the Aero India Show at Bengaluru in February, allowing the aircraft to be inducted into the Indian Air Force (IAF). Production, however, has already been delayed by seven years.

Highly-placed sources in the defence establishment told ThePrint that the drop tank (external fuel tanks) and other weapon configurations in the aircraft are yet to be cleared while the airframe fatigue test is still underway.

These are some of the 10 concessions granted to Tejas with regard to the FOC.

The number of concessions is significant as the much-delayed fighter jet is being inducted into the IAF to boost its depleting squadron strength. They are set to replace the ageing MiG-21 fleet.

In military industry parlance, concessions are those requirements that could be included at a later stage, in the final make of the aircraft, when feasible.

An officer involved in the Tejas programme, on condition of anonymity, however, said these concessions do not comprise structural changes to the aircraft. But the officer did say that “the airframe fatigue test is in progress and will take some time”.

The airframe fatigue test is a crucial test to determine the strength of an aircraft. It entails hanging a fully-loaded aircraft for a certain number of hours.

HAL spokesperson Gopal Sutar told ThePrint that given the complex eco-system of defence manufacturing, concessions are a norm in the aerospace industry.

<https://www.defenceaviationpost.com/2020/04/behind-final-clearance-for-tejas-10-concessions-given-to-fighter-jet/>



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India's Arjun tank took decades to make. Why?

In the mid-1970s, India began development on a totally new, advanced main battle tank that would satisfy the needs of the country's Armoured Corps. An impressive combination of firepower, armour protection and mobility, the tank was to be India's first indigenously produced tank—and one of the best in the world. The service date for the tank, known as Arjun, was confidently set for 1985.

Instead, the Arjun suffered a tortuously long development period spanning two centuries. The final result, introduced into the army twenty-six years later than originally planned, is a mess of a tank that not even the Indian Army wants.

The Indian Army's Armoured Corps has been in existence for seventy-four years, tracing its roots to the Second World War, and has fought in every one of India's wars with neighbour and rival Pakistan. The Corps has across has sixty-three armoured regiments (the equivalent of battalions), spread across eight armoured and mechanised divisions and another seven armoured and mechanised brigades.



The decision to produce an indigenous Indian tank was made in 1972, shortly after the Indo-Pakistani War of 1971. In 1974, the state-run Defence Research and Development Organisation (DRDO) was tasked with developing the tank. It was to be a forty-ton vehicle, armed with a 105-millimetre gun. It would be small enough to be strategically mobile, capable of being shuttled on internal lines (roads and railroads) to vital sectors along the long border with Pakistan.

DRDO decided to make the tank, called Arjun, a mostly Indian design. The Combat Vehicles Research and Development Establishment, part of DRDO, was to design the hull, armour, turret, gun and running gear. The main gun and engine would be imported. Unfortunately, India's defence-industrial base was nowhere near capable of creating such a vehicle. As if that weren't enough of an obstacle, India's world-famous bureaucracy and red-tape machine was another enemy to progress.

Today, the Arjun Mk 1 is a sixty-two-ton tank, complete with a 120-millimetre gun, advanced composite armour, a 1,400-horsepower turbocharged engine, and advanced fire control and thermal sights. Although the tank's specifications are impressive, the actual product leaves a lot to be desired.

By 2009, thirty-five years after it was originally conceived, Arjun was "ready" for production. Despite shortcomings revealed in testing, the Indian Army was forced to buy 124 Arjuns—enough to equip just two armoured regiments—to keep state tank production facilities open. By mid-2015, two years after the purchase was complete, nearly 75 percent of the Arjun force was inoperable due to technical problems.

<https://www.defenceaviationpost.com/2020/04/indias-arjun-tank-took-decades-to-make-why/>



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Combating Covid-19: IAF lifts raw materials for PPE production by DRDO

New Delhi: Amid the lockdown in wake of coronavirus outbreak, Indian Air Force (IAF) on Saturday flew dedicated sorties for Defence Research and Development Organisation (DRDO) and airlifted around 9000 Kg of raw material from various nodal points for producing Personal Protective Equipment (PPE) at the production facilities of DRDO.

IAF also airlifted N95/99 Masks manufactured by DRDO. The Indian Air Force (IAF) is making all efforts to ensure uninterrupted supply of essential commodities to the states.

On Friday, the IAF's C-17, C-130, IL-76, An-32 and Dornier aircraft dropped essential commodities at Mumbai, Bengaluru, Guwahati and Leh in the night.

Apart from this, the IAF flew over 140 sorties to ferry loads over 200 tonnes to locations across the country.

The government on March 24 announced a complete lockdown of the entire country for 21 days to fight COVID-19. All road, rail and air services will remain suspended during the lockdown. However, freight movement has been carrying essential commodities across the country.

Essential services like medical shops, petrol pumps, grocery stores milk booths and online shopping have been exempted from the lockdown.

India's total cases of coronavirus on Saturday climbed to 7,529 including 242 deaths and 652 people, who have either been cured or discharged, said the Union Ministry of Health and Family Welfare on Saturday.

<https://www.aninews.in/news/national/general-news/combating-covid-19-iaf-lifts-raw-materials-for-ppe-production-by-drdo20200411192105/>



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Indian Air Force ensure timely delivery of the essential medical supplies and ration to the nodal points of various States

New Delhi: Indian Air Force (IAF) continues to be ready 24 x 7 to undertake any task for complementing the efforts of the Govt of India to contain the spread of the Novel Coronavirus. All efforts are being made to ensure timely delivery of the essential medical supplies and ration to the nodal points of various States, thereby equipping the State governments and supporting agencies to combat the contagion effectively and efficiently.

During the last few days, IAF airlifted essential medical supplies and commodities from nodal points to various States across the country including Maharashtra, Kerala, Telangana, Nagaland and the Union Territories of J&K and Ladakh.



Indian Air Force flew dedicated sorties for DRDO and airlifted around 9000 Kg of raw material from various nodal points for producing PPE at the production facilities of DRDO. It also airlifted N95/99 Masks manufactured by DRDO. Meanwhile, IAF is ensuring that all necessary precautions as specified by the Govt of India to prevent the spread of the contagion, are put in place while undertaking these tasks.

IAF is ever ready and geared up to meet all the emerging needs to support the fight against prevailing pandemic situation in the country.

<https://orissadiary.com/indian-air-force-ensure-timely-delivery-of-the-essential-medical-supplies-and-ration-to-the-nodal-points-of-various-states/>