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Outlook

THE FULLY LOADED MAGAZINE

Mon, 18 May 2020

DRDO joins hands in the war against COVID-19

A DRDO invention to supply air to fighter pilots comes in handy in the war against COVID-19. The premier Defence Research Organisation in the country (DRDO) is playing a major role in the preparedness against pandemic, COVID-19. DRDO shows the world how a R&D organisation can make a difference in a national emergency.

By Sandeep Unnithan

What are the challenges that a pandemic can bring before the country? What role a Defence-based R&D Organisation play?

This pandemic has posed a Bio-Psycho-Social challenge to this country that has few parallels in the modern history. Further, though the virus has created havoc globally, each nation needs to think and execute a 'Local Action Plan' because of differing conditions.

I am of the opinion that challenges can essentially be classified in four categories:

One Social: i.e. Fear of uncertain future, isolation for long periods, dislocated families and also that world had never experienced such a pandemic since 1918.

Two: Medical/health where understanding the pathology and transmission mode is proving to be a challenge, diagnosis and prognostication is also a challenge, no treatment is available and over and above there is raging debate on need and quality of ventilators and diagnostic kits.

Three: Economic challenges as Macroeconomic of the country will need recalibration, Micro-economics of a large number of households are destroyed. Now the question is to see if it will be followed by boom and opportunity for self-reliance?

It is very hard to say. Fourth challenge in front of us is Structural/political where, with this pandemic world political order may be different. New alliance may emerge.

This pandemic is a major challenge to all emergency preparedness agencies across the globe. R&D agencies are going to play a major role amidst this scenario.

DRDO being one such major Government agency geared up to help the nation in preparing essential items required for COVID-19 frontline workers in times of need as working for Defence has made us learn the art of doing things on war footing.



AK Singh, Director, General Life Sciences, Defence Research

In a such short time, DRDO has focussed on supply solutions of critical and deficient medical equipment and brought out over 46 products. How was it achieved in a short span of time?

I understand that there is difference between a Science and Technology-driven organization and other kinds of technology-based organizations. The life science labs at DRDO together with hard core strategic laboratories turned into biomedical laboratories to fulfil the emergent requirements DRDO not only produced Personal Protective Equipment (PPEs) kits, disinfectants i.e. sanitizers, but also provided biomedical equipment and Services which were used for PPE testing.

Our scientists deserve appreciation. They took risks of all kind to bring things to table at the shortest possible time. The toughest part was procurement of raw materials and subsystems. The complete Lockdown gave us opportunity to innovate but the same posed us a lot of challenges.

Our pre-existing network with industry, academia and governmental agencies was able to sustain the pressure exerted by industry lockdown and lack of transport options.

Working in a defence establishment had taught us how a war is won. War is won by coordination at different levels: between the Wings of Forces, between Defence sector and Government and between Government and people.

Are you happy with what you have done till now? Is there anything new can expect in a short time?

This country is facing a huge challenge. As I see it, DRDO and indeed all R&D agencies may have to do a rethink. I would like the agencies and academic institutes to come together and feed on each other new and innovative ideas.

Our scientists are doing the best they can. For some of us, the word 'Stay at Home' has no meaning. We work round the clock. I salute my team of scientists who are braving the situation. Essentially our future endeavours will follow the same four areas: PPEs, Disinfectants, Biomedical devices and Services. Our focus is now on scaling up and reaching the society directly, with more and for more. We are inspired by Mahatma Gandhi who said, "When I work, I have the man in street as my object. Unless he benefits, the work remains incomplete."

N95, N99 masks, ventilators and body suits are in short supply all over the world. DRDO is ready with masks and ventilators. Is that true?

Yes, that is true. The solutions need to reflect the problem. Initially, we focussed on getting together what should have been available but was not because of Lockdown. While this process on, our developmental teams got activated and used the raw material available for small innovations that were better or were import substitutes. The third layer were the research teams that did conceptual research and came up with products that did not even exist before.

This three-pronged strategy was evident in the products you mentioned.

We got made the conventional masks to serve the targeted people in a matter of days. In parallel, we innovated on N-99 masks and that were out in a couple of weeks. Research is a continuous process and the next batch will be better, more breathable, more cost-effective and probably reusable.

Similarly, lakhs of conventional PPEs were ordered through the existing networks. To cater to the masses, fabrics like Parachute material were innovated for PPE and are under production. In the third phase, we are expanding the concept to PPE-1 & PPE-2 and to enhance reusability of the disposable ones.

What is the advice from DRDO to the medical community and the common people involved in the war against COVID-19?

This is a new kind of war that has no parallel in the history of the New India.

We have fought 3 wars and won. But they were short wars of a few weeks' duration. The current pandemic is more like WW2. It will stretch for years. Medical and health workers are the foot soldiers and artillery of this new war. Medical authorities are convinced that COVID-19 is here to stay. There may be waves of epidemic and in between the virus will be endemic. It all

depends upon whether the virus keep on changing its antigenic character or not and how long the immunity against the disease lasts.

My expectations from the medical community is same as other ministries. We should have a cheap, effective vaccine as soon as possible which our biotechnology companies are able to mass

produce. We should focus on better, cheaper and more reliable diagnostic measures. There are lot of differentiated thinking on what the virus does to human body and how to treat our routine and serious cases. These issues are not yet settled. Finally, we have been given a wrap on our knuckles that we should have indigenization of everything. Our experience with ventilators has been excellent. If we can produce high end technologies in large numbers in a short time, we can very well do this with relatively low-end technologies like PPEs and masks. Plastics have been and will be used in a mammoth quantity. What do we do with this waste is something we do not

know as of now.

As far as Indian community is concerned, they have been exemplary and a role model for the rest of the world in this difficult time. This was for the first time that the society and community stood up as ONE and David is seen to defeat the Goliath. There were no ifs and buts or incessant arguments and dissensions. The common man was able to shrug off the typical 'chalta hai' attitude and did what the government asked them to do. We paid a heavy price but did not breakdown before this pandemic.

A word of caution for all of us is that COVID-19 shall not leave us hurriedly. Our 'Soldiers in White' are fighting this challenging and prolonged war in the hospitals and in the street. We must give them the respect they deserve as our saviours. They have a difficult job to do which may cause inconvenience to us for time being. We must realize they are putting their lives in danger while we are just being asked to stay at home. I share the same sentiments for our police, paramilitary and even the home guards and all Corona workers and saviours.

I also must also congratulate the media. They have set up exemplary standards for themselves. They indeed proved themselves to be the fifth column of democracy.

What is the interface between DRDO and the industry?

DRDO's approach from the beginning has been different from many other national research agencies. As a policy DRDO reaches out to the industry for scaling up research products. This flexible approach helped us to give 46 products in three months.

Working together for years generates an element of trust. As you can understand, in such times as COVID, one has no time for technical and administrative negotiations and largescale testing and remodelling. People have to work in coordination and develop confidence in each other. The system will not work if the subsystems do not work in tandem. It was gratifying to note that there were no products which we visualized, not delivered on time though multiple partners were involved. Yes, scale up remains a big challenge. Whether it is PPEs or equipment, the country needs everything in crores. Again ventilators are a living example. This country had about 17000 ventilators before COVID-19. It is been three months in the pandemic, we are expecting 50000 more, all indigenous, barring 1000.

COVID-19 has and will give a big impetus to Make-in-India and skill development schemes of hon'ble PM. Indian industry is responding in an unbelievable way in making masks, PPE, kits and other devices needed to combat the enemy.

Has DRDO performed the role expected of it in the current COVID-19 crisis?

This is for you to judge. As far as I am concerned, technically there are only a few labs in DRDO which are directly responsible to deal with Biological threats and they are performing well.

As an R&D organization no one expected us to come up with innovations we did in the short span of time and when the entire system was locked down. No one expected our labs that had nothing to do with Biology to come up with solutions. No one expected us to scale up the masks and PPEs to millions in quantity. Traditionally, DRDO has gone the TOT way. This pandemic has finally taught us to be our own vendors.

There will be a new awareness in the public about what DRDO does when our products reach the ‘last man in the street’ and the remotest district. There will be a better understating in government agencies how soon DRDO can stand and deliver, and in what quantities.

I look forward to the media to carry forward this message far and wide.



Wed, 20 May 2020

DRDO into Overdrive, Develops Spin-Off Technologies to Combat Pandemic

By Ravi Shankar

Hyderabad: The Advanced Centre of Research in High Energy Materials (ACRHEM) – a DRDO Centre of Excellence in University of Hyderabad (UoH) has been granted a patent entitled “Hydroxyl Terminated Polybutadiene (HTPB) based Polyurethanes”.

Ever since the Chinese coronavirus outbreak came to notice, the Defence Research and Development Organisation (DRDO) has ensured that all its laboratories working under life sciences cluster is geared up to help corona warriors and civilian authorities in combating COVID-19. The DRDO took a call in the first week of March 2020 to enhance efforts to create countermeasures to stop the spread of the viral disease in India. It started focusing on creating mass supply solutions for critical medical requirements using years of experience and available technology to deal with the COVID-19 pandemic. As of result, the DRDO has quickly developed some frontline low-cost, high volume equipment desperately needed in the ‘War against Corona’.

These labs are working overtime to produce spin-off technologies and innovations that are being quickly converted to products. The developed technologies transferred to various industries have enabled ramping up production as per requirement. Many industries which develop components and sub-components for these primary industries have also been enabled. About 100 such industries have been activated to produce the required equipment and products. Though, the overall products of DRDO are being produced by 43 primary industries in the country, their numbers are increasing as products are qualifying in the testing process.

Over the past two months, the DRDO has been accelerating and enhancing products and countermeasures to combat the spread of the pandemic in the country. According to a report titled ‘Critical Equipment and Technologies Developed by DRDO for Combating COVID-19 Pandemic’ more than three dozen products have been listed that have been developed and designed. Some of these are spin-offs from existing critical technologies. The effort of the organization is to ensure uninterrupted creation of solutions by using available resources.

“The spin-off technologies and products are being produced in a very short period of time with great zeal, dedication and commitment by the scientists and technicians involved in the labs,” said Dr NK Arya, Director, Directorate of Public Interface (DPI) at DRDO. He further added that, “The efforts of young scientists are commendable who worked painstakingly at various hospitals to understand the requirements of frontline corona warriors to develop niche technologies at labs.”

These spin off products range from developing software products like quarantine tracking apps, video conferencing apps and COVID-19 infections prediction App- METRICS to developing multi-patients ventilator kits, and Robots for keeping frontline corona warriors safe in hospitals.

Besides, developing contactless sanitizer ‘Defence Research Ultraviolet Sanitizer’ (DRUVS), that disinfects mobiles, iPads, laptops, currency notes, challans etc., to developing automated luggage disinfector using UV-Bath, UV Blaster to sanitize office spaces and buildings. Medical equipment like microwave sterilizer called ‘ATULYA’ that helps in disintegrating the virus by differential heating in the range of 56 to 60-celsius temperature.

The DRDO is also actively involved in activities like sample testing facilities at DRDE, Mobile Virology Research and diagnostics Laboratory (MVRDL) to speed up virus detection and neutralisation and providing isolation shelters.

Apps to Track COVID-19 Patients

The Bengaluru based Centre for Artificial Intelligence and Robotics (CAIR), one of DRDO’s AI arms, has created a technology-driven solution for tracking of COVID-19 suspects under isolation or quarantine. A team of 20 young scientists have developed a mobile-based application called SAMPARC (Smart Automated Management of Patients and Risks) in over three weeks.

The development of the software has been done by a DRDO Young Scientist Lab (DYSL) dedicated to artificial intelligence which was set up recently on directions by the Prime Minister in January this year.

The app has already been offered to various state governments to enable AI-driven measures to slow the outbreak. It has been hosted exclusively for state governments in India. With several states including Uttar Pradesh, Maharashtra, Gujarat, Tamil Nadu and Delhi struggling to contain the spread of the virus, this initiative by CAIR will be effective as the country prepares to come out of an extended lockdown.

The SAMPARC system is focused on geo-fencing and AI-based automated face recognition, and would enable state officials to keep a track on patients using a map-like interface that displays relevant information. This interface would also be colour-coded to depict hotspots and containment zones in an area. Its widespread use could also mean that patients may be able to isolate themselves at home during the quarantine period, rather than rely on government facilities. This could greatly reduce the load on state machinery.

Besides, CVRDE, Chennai has developed a mobile-based application called Kavsam for COVID-19 tracking and resource allocation. The application enables data collection and entry by field workers at allocated streets which can be used for any resource allocation, like vaccination for COVID 19 at a later date.

DRDO has also developed a custom-designed IoT device “SurakshaKawach” for corona patient tracking and surveillance to fight with the pandemic. It is a GSM and GPS enabled rugged system for real-time tracking, central monitoring and management. The device can also be integrated with ArogyaSetu or any other mobile app.

Prediction of Pandemic Path

DRDO’s Delhi based ISSA has developed a data model METRICS (Mathematical Estimation for Tracking Infections of COVID-19 Spread in India) for generating a daily estimation report based on data available. The model predicts based on current data which signifies the lockdown situation. The prediction being done is for short term based on current reproduction number. Long term prediction is being done by curve fitting method integrated with multiple factors like social distancing, reproduction rate and other parameters. Multiple parameters can be varied to predict various scenarios post lockdown.

A tool for trend reversal prediction and estimation of new COVID cases per day ‘Agradoot’ has been developed by INMAS, Delhi and Young Scientist’s Laboratory – AI and Cyber (Advisor) teams. The model is being tuned based on daily developments in the Indian environment.

Video Conferencing Tools

In situations where interaction via video conferencing (VC) is necessary, there is a growing tendency to use non-private, insecure and easily mis-configured platforms compromising security and privacy. Due to lockdown, an urgent need was felt for trusted infrastructure to facilitate interaction from home and office. It was essential that the DRDO community does not use server

facilities not fully trusted for VC (such as Zoom/Skype etc.) In such platforms, presence of unauthorized users cannot be ruled out and server infrastructure is vulnerable to eavesdropping.

To provide a robust, secure and easy to use application for videoconferencing solution on internet, DRDO has developed two Video Conferencing solutions.

NARAD: This solution has been developed by Advisor (Cyber) team for enabling safe communication between government officials. Narad is an easy to use platform which can support up to 150 participants in the meeting. According to DRDO, it is a highly secure application having two layer authentication and participants can join the conference by clicking the unique link (unique link for each meeting instance) along with the access code generated by the meeting initiator. It is being used by limited users among government officials only.

Robots for keeping Hospital Safe: A team of scientists at CAIR has customized one of its robotic solutions to come up with a cost effective robot within a week. The robot is named as 'Sewak'. According to DRDO, these robots can be a safe alternative for the hospital staff like medical professionals and health workers in taking care of the COVID-19 patients in the quarantine centres and hospitals. It can be teleoperated by the hospital staff from a remote location and navigated in the quarantine zone and distribute food, water, medicine etc., to the affected persons. All this is possible while the hospital staff is positioned in a safe zone and the robot moves inside the quarantined zone. This eliminates the risks of exposure to the infection of frontline workers while taking care of the needs of the patients.

'Contactless Sanitizer' to Disinfect Phones, Gadgets, Currency Notes

RCI, Hyderabad, a DRDO unit, has developed an Automated contactless UVC Sanitization Cabinet 'DRUVS' (Defence Research Ultraviolet Sanitizer) which has been designed to sanitize mobile phones, iPads, laptops, currency notes, cheque leaves, challans, passbooks, paper, envelopes. It has also developed an Automated UVC Currency Sanitizing Device, 'NOTESCLEAN'.

The DRUVS Cabinet makes a contactless operation which is essential to contain the spread of the virus. Proximity sensor switches clubbed with drawer opening and closing mechanism makes its operation automatic and contactless. According to DRDO statement, it provides 360-degree exposure of UVC to objects placed inside the cabinet and once sanitization is done, the system goes in sleep mode.

UV Disinfection Tower to Sanitize Airports, Stations, Malls, Offices

A Delhi-based DRDO laboratory laser Science and Technology Centre (Lastec) with the help of New Age Instruments and Materials Private Limited, Gurugram has pitched in with an ultra-violet disinfection tower that can be used for sanitising places such as airports, shopping malls, metro stations, hotels, factories and offices. According to DRDO, the UV disinfection tower named UV Blaster is very useful in the fight against coronavirus disease as the tower can be used for rapid and chemical-free disinfection of high-risk areas where the flow of people is heavy.

Apart from all these niche products and activities, the DRDO is working on vaccine development and Therapeutic Drugs development is also going on.

(Ravi Shankar has over two decades of experience in communications, print journalism, electronic media, documentary film making and new media.)

<https://bharatshakti.in/drdo-into-overdrive-develops-spin-off-technologies-to-combat-pandemic/>

COVID-19: IIT Delhi develops PPE coverall with adequate levels of breathability

*The personal protective equipment, or PPE, coverall
can be used thrice, lowering the effective cost*

By Mridusmita Deka

New Delhi: The Indian Institute of Technology Delhi, or IIT Delhi, has developed a personal protective equipment (PPE) coverall that is reusable and with “adequate levels of breathability”, the institute said in a statement.

The PPE coverall is an integrated body-suit and shoe cover for the protection of health workers including doctors, nurses and paramedical staff, involved in the treatment of COVID-19 patients.

The PPE coverall meets the criteria specified by the Ministry of Health and Family Welfare, is developed by a researcher at the Department of Textile and Fibre Engineering, IIT Delhi and his student, Dr. Biswa Ranjan Das, Scientist ‘D’ and Assistant Director, DMSRDE (DRDO), Kanpur.

Dr S M Ishtiaque, Professor Emeritus, Department of Textile and Fibre Engineering, IIT Delhi in a statement said: “Breathability and feel of the coverall has been a major challenge and we have ensured we reach adequate levels of breathability and a softer feel, to support extended wearability.”

Breathable PPE

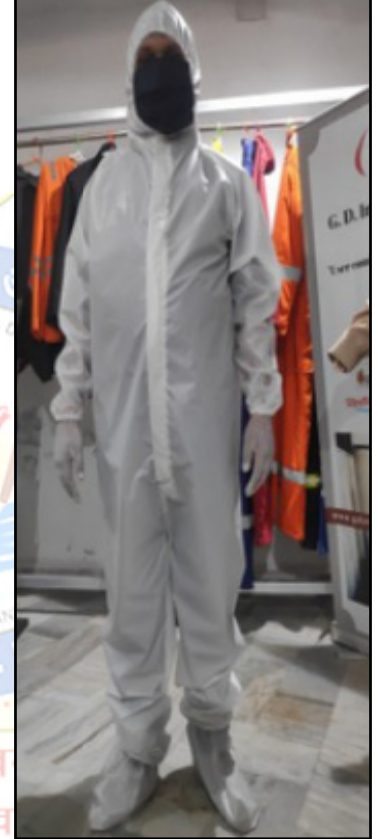
The coating applied over the light and compact polyester woven fabric makes the PPE lightweight, breathable and thus comfortable.

As per the statement issued by IIT Delhi, the PPE acts as a “complete protection against penetration of coronavirus”. The outer face of the PPE has oil and water repellency capacity.

The statement further added that the PPE coverall will be available in four sizes to fit a varied range of users from small size to extra large size.

Earlier, IIT Delhi in a bid to fight coronavirus had worked on a number of products starting from dashboards to predict COVID-19 spread to developing low-cost test-kits.

<https://www.ndtv.com/education/covid-19-iit-delhi-develops-ppe-coverall-adequate-levels-of-breathability>



COVID-19 PPE Coverall, body suit and shoe cover Image credit: IIT Delhi

INDUSTRY ADDA

कोरोनावायरस से जंग में DRDO ने बनाया नया PPE किट, 10 दिन तक किया जा सकेगा इस्तेमाल

नई दिल्ली: डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गनाइजेशन (डीआरडीओ) ने कोरोनावायरस के संक्रमितों से बचने के चिकित्सक टीम के लिए नए तरीके पीपीई किट तैयार किया है। अब तक इस्तेमाल में एक ही बार

एक पीपीई किट आता था, लेकिन अब एक पीपीई किट को दस बार इस्तेमाल किया जा सकता है। डीआरडीओ के लाइफ साइंस के डीजी डॉक्टर एके सिंह से एनडीटीवी की एक्सक्लूसिव बातचीत हुई।

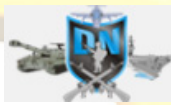
उन्होंने बताया कि डीआरडीओ ने पीपीई किट यानि कि बॉडी ओवरऑल एक ऐसे मटेरियल का था जिसके अंदर पोली योरीथिन कोटिंग है वो पूरा स्टैंडर्ड पर खरा उतरा है, जिसे भारत सरकार खरीद रही है।

डॉ। एके सिंह ने कहा, "जब इस किट को सरकार को दिया, फिर हमने रिसर्च किया कि क्या इसको डिस इन्फेक्ट करके दोबारा इस्तेमाल कर सकते हैं तो हमने **AIIMS** की मदद लेकर देखा कि यह दस बार तक अपनी कोई खासियत को लूज नहीं करता है। इसका हम बार-बार इस्तेमाल कर सकते हैं।"

डीआरडीओ के लाइफ साइंस के डायरेक्टर जनरल ने आगे बताया कि ये थोड़ा-सा महंगा जरूर है, पर बहुत महंगा नहीं है। इसको **HAL 925** रुपए में खरीद रहा है। पीपीई किट एक तरह से सिंथेटिक मटेरियल है, आने वाले समय में इसका डिस्पोजल बड़ी समस्या होगी। ये जो दोबारा इस्तेमाल होने वाला पीपीई किट है ये बड़ा काम का है। इसके जरिए बार-बार नए किट नहीं लेना पड़ेगा। पर्यावरण का भी कम नुकसान होगा।

उन्होंने कहा, "जब हमने इसको डिसइन्फेक्ट किया तो उसके हर पहलू का चेक किया हर स्टैंडर्ड को परखा। हमने पाया **10** बार तक अपने कोई प्रॉपर्टीज को नहीं खोया। सारे टेस्ट को पास किया। दो कंपनी इस किट बना रही है और ये सप्लाइ भी हो रहा है।"

DRDO Technology News



DefenceNews

Wed, 20 May 2020

Plan to buy 114 foreign fighters, Says Air Marshal days after CDS's Push for Made-in-India Tejas

Days after Chief of Defence Staff General Bipin Rawat said that the Indian Air Force was planning to the locally-manufactured Light Combat Aircraft 'Tejas', Air Chief Marshal RKS Bhadauria contradicted him while detailing a list of planned aircraft.

Bhadauria on Monday said that the list of aircraft planned to be inducted by the IAF includes 36 Rafales, 114 multirole fighter aircraft, 100 advanced medium combat aircraft (AMCA) and over 200 LCAs in different variants.

Bloomberg had quoted Chief of Defence Staff Bipin Rawat as saying that in order to replace the ageing fleet of the Indian Air Force (IAF), 83 more jets will be bought from Hindustan Aeronautics Limited (HAL).

The purchase, in addition to an earlier deal to buy 40 of the aircraft, will cost \$6 billion, he said. Rawat maintained that the induction of the LCA into the IAF will help establish India as an important defense exporter due to the relatively low prices.

The move will be a milestone in India's bid to start using locally-made weapons, even though there will be some quality issues in the beginning, the CDS was quoted as saying.



However, Bhadauria told ANI: "This project (114 jets) is in the middle-weight and is in the Rafale class, in this issue, we will deal with it in the Make in India region, with an increase in FDI, with support to the private sector. I think in future this will bring in technology which is required to support the aviation sector. I think it is important to have another generation of aircraft in terms of capability, technology as we go along."

<https://www.defencenews.in/article/Plan-to-Buy-114-Foreign-Fighters,-Says-Air-Marshal-Days-After-CDSs-Push-for-Made-in-India-Tejas-840666>



Wed, 20 May 2020

ORCA doesn't seem to be under IAF Radar

By Satyajeet Kumar

Air Force Chief RKS Bhadauria shared his road map to procure nearly 450 fighter jets for the air force in next few decades recently and the bulk of them will be a combination of 83 Tejas Mk1A and 100 Tejas Mk2 and 100 AMCA 5.5 Generation fighter jet giving a major boost to the local fighter jet programs in the country while IAF continues plans to procure 114 jets of " Rafale Class " in an International Competition for the fighter jets.

In Bhadauria's future fleet procurement vision what didn't cut, it seems to be the ADA proposed Twin-engine Medium Class Omni-Role Combat Aircraft (ORCA) or Twin Engine Deck Based Fighter (TEDBF) program both for Indian Air force and Indian Navy. ORCA aka TEDBF was proposed earlier this year by the ADA and HAL to meet the carrier-based fighter jet requirement of the Indian Navy and a lighter air force variant based on it was also on offer to the Indian Air Force. Few of the journalists who interviewed him also seem to be not aware of the proposed ORCA / TEDBF program due to which any clarity on the program could not be taken from the Air chief.

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<https://idrw.org/orca-doesnt-seem-to-be-under-iaf-radar/#more-227690>



Wed, 20 May 2020

IAF shelves 3 projects amid PM Modi's request of indigenisation

The Air Force Chief RKS Bhadauria informed that they will not be going forward with the planned projects and plans have been shelved at the moment for different reasons including Make in India

By Shailaja Tripathi

The Indian Air Force (IAF) has decided to shelve three major acquisition projects worth Rs. 8000 crore as the central government push for indigenisation.

These projects included IAF's plan to buy 20 additional Hawk Planes from Britain, 38 Pilatus basic trainer aircraft, and the plan to upgrade 30 Jaguar fighter planes with engines from the United States.

The Air Force Chief RKS Bhadauria informed that they will not be going forward with the planned projects and plans have been shelved at the moment for different reasons including Make in India.



Key Highlights:

- Air Force Chief RK Bhadauria informed on May 18 that the force will not be going forward with the additional Pilatus basic trainer aircraft that were intending to buy.
- Additional hawks (trainer aircraft) were also in the plan but they have been but the purchase has been shelved at the moment.
- There was also a Jaguar re-engining plan which was totally imported but the force has decided to shelve that project as well. The plan was to equip Jaguar fighter aircraft with new engines from Honeywell Corporation from the US.
- The deal of 20 additional hawk planes that have been expected to worth around Rs. 2000 crore has been shelved as the project was stuck for over 3-4 years mainly because of the price of the planes.

IAF supports Make in India

Indian Air Force Chief RK Bhadauria stated that the force will be going to go in with the HAL (Hindustan Aeronautics Limited) support and some other engine related upgrades that will be helpful to see through the fleet.

He further informed that the plans to acquire 38 additional Pilatus basic training aircraft that was worth around Rs. 1000 crore from Switzerland has been scrapped as HAL is already in the advanced stages of development of the HTT-40 trainer planes. The chief added that the force will buy 70 of these Made in India planes.

<https://www.jagranjosh.com/current-affairs/iaf-shelves-3-projects-amid-pm-modis-request-of-indigenisation-1589887580-1>



HAL entering Naval utility helicopters competition will erode Navy's operational capability

By Nitin Gokhle

Hyderabad: The Advanced Centre of Research in High Energy Materials (ACRHEM) – a DRDO Centre of Excellence in University of Hyderabad (UoH) has been granted a patent entitled “Hydroxyl Terminated Polybutadiene (HTPB) based Polyurethanes”.

One of the important policy reforms announcements done by the government in defence manufacturing in India last week was allowing foreign original equipment manufacturers (OEMs) to invest up to 74 per cent Foreign Direct Investment (FDI) in defence ventures in India. In the medium to long run, this could be a welcome measure but in the meantime, the proposals pending with the Defence Acquisition Council (DAC) will have to be quickly cleared since there are critical gaps that Indian armed forces are faced with.

One ready example is the long drawn out saga of procuring utility helicopters for the Indian Navy. First proposed in 2008, the case for replacement of the Chetak helicopters was projected under ‘Buy global’ category of procurement. For six years, nothing happened. In 2014, the DAC directed the Indian Navy to withdraw the case and initiate a new proposal under ‘Buy and Make (Indian)’. The next year, in 2015, the DAC again directed Navy to combine the requirement with the overall ‘Consolidated Helicopter Acquisition Strategy.’ Later, the DAC decided to progress the case under the strategic partnership (SP) model. The acceptance of necessity (AON)— the first step in the long road towards procuring a platform—was accorded in August 2018, three years after it was decided to go the Strategic Partnership (SP) model way!

So what is the SP model?

In July 2015, the Dhirendra Singh Committee on Make in India mooted the idea of SP Model for creating capacity in the Private Sector as an alternate to DPSUs/ PSUs in strategic sectors of defence manufacturing. Later, Dr Atre Task Force recommended the Model to be followed which did away with the bidding system. However, this was retained and Chapter 7 on SP Model was included in the DPP.

The then Minister of State for Defence, Dr Subhash Bhamre in a reply to Rajya Sabha stated, “SP Model would provide a Transparent, Objective and Functional mechanism to encourage broader participation of Private Sector in addition to DPSUs/OFB”. ‘It will provide greater self-reliance in meeting national security objectives’. This is also included in the Preamble of Chapter 7. It reads, in parts:

- Definition of SP Model vide Para 3 – “Such a partnership between the MoD and the Indian private Entity will be known as Strategic Partnership”.
- “Overall aim will be to build indigenous capability in the Private Sector to design, develop and manufacture complex weapon systems”.
- “...private companies have pointed to the lack of a level playing field as compared to DPSUs/OFBs”.
- “As with liberalization of economy in 1990s, involvement of Private Sector in defence manufacturing will have a transformational impact”.

While Para 9 of Chapter 7 states that “MoD may consider the role of DPSUs/OFBs at the appropriate stage(s) keeping in view the order book position, capacity and price competitiveness,” Para 18 of amplifying instructions issued to Chapter 7 at a later date clarify “At the accord of AoN,

DAC shall consider the participation of DPSUs/PSUs in the specific proposal keeping in view the order book position, capacity and price competitiveness”.

So in keeping with the above, the DAC before giving approval to AON for the Naval Utility Helicopters had indeed discussed the participation of Hindustan Aeronautics Ltd (HAL), a DPSU.

That time, according to all available figures, the HAL’s order book was overflowing even when it did not have the commensurate capacity.

Order Book Position vs Capacity of HAL in 2018

Total orders = 353 helicopters and 83 LCAs

- Ka 226T : 200
- LUH :15 (10 IAF+ 05 IA)
- ALH : 77 (16 IN+16 CG+45 IA)
- ALH(WSI): 18 (IA)
- Chetak/ Cheetah – 43 (25 IA+08 IN+10 IAF)

The Navy had pointed out over the years that despite knowing its requirements, HAL had not been able to provide it with a shipborne helicopter since 2003 when the first Advanced Light Helicopter (ALH) was delivered to the Navy. And yet, HAL, using various means has managed to insert itself as a competitor for the NUH which has now become a critical necessity for the Navy, further delaying the project, defence sources point out. Apart from a poor track record in meeting deadlines, HAL does not meet cost competitiveness in the NUH proposal either. According to one calculation, the cost of an advanced fully equipped helicopters in ALH class is between 13 to 18 Million US dollars whereas the cost of the ALH is estimated to be around 16 million US dollars. Moreover, the ALH is not yet a fully proven seaworthy platform.

Sources point out that the Indian Navy has lost five Chetak helicopters in the last 7 years. The number of Chetak helicopters available with the navy will reduce considerably by 2023 to 2025 and the navy will be faced with a major capability gap. Inclusion of HAL will result in setting back the procedure by at least another two years. The capability gap, therefore, will be a critical vulnerability of ships at sea. For this reason alone, HAL should be kept out of the competition in this particular proposal, those who have been watching the never-ending saga of NUH procurement point out.

Naval aviators have also listed out several other reasons why the ALH—proposed by HAL for the NUH competition—is not suitable. For one, the ALH does not meet the Qualitative Requirements of the Indian Navy. The helicopters being operated by the Navy presently and the 16 new ALH Mk III on order are to be operated only from the shore as they are not capable of being operated from ships.

Secondly, HAL has been indicating that it is working on the blade folding capability on ALH (a must for parking and storage on ships). However, the segmented blade folding as a concept has been rarely utilized across the world’s navy’s since it is not found to be practical. The Indian Navy is therefore in a fix. It fears that the inclusion of ALH MK III as a platform for NUH with HAL as a strategic partner will result in either or all of the following (a) Force the Indian Navy to accept a platform with reduced capabilities compromising its operational requirements.; (b) Necessitate modifications to NSQRs of NUH delaying the entire Project further and (c) Time overruns resulting in further delay in inducting this capability into the Navy.

None of the three scenarios is very palatable for a navy that is a premier security provider in the Indian Ocean and is facing increasing competition from the resurgent Chinese Navy.

Hopefully, Defence Minister Rajnath Singh and other members of the DAC will be sagacious enough not to force HAL’s entry into a critical project.

<https://bharatshakti.in/hal-entering-naval-utility-helicopters-competition-will-erode-navys-operational-capability/>

India isn't prepared to meet its defence needs

Recent reforms have potential. India must decide how to acquire effective military capabilities in a post-Covid world

By C Uday Bhaskar

Last week, finance minister Nirmala Sitharaman unveiled some major structural reforms in India's moribund defence sector, as part of a coronavirus disease (Covid-19)-related macroeconomic stimulus, and the increase in foreign direct investment in defence manufacturing to 74% is radical. However, these are all policy changes that have "potential" and need to be implemented effectively before their outcome can be objectively assessed.

In the interim, India's military security challenges, both current and long-term, came into unintended focus in this month even as the nation is grappling with the pandemic and its tragic impact on millions of citizens.

In early May, the Handwara terror attack saw the Indian Army losing a colonel and other personnel, pointing to the abiding tenacity of the low-intensity-conflict (LIC) that has been simmering in Kashmir. This is a complex proxy war where the external Pakistani stimulus has permeated the internal security strand with all its corrosive communal elements. It is unlikely to end soon.

Currently, India is managing an anomalous territorial challenge exigency, albeit of a low order. The eastern Ladakh sector saw a stand-off between Indian and Chinese soldiers in the Pangong Tso sector. While it is well below Doklam, media reports indicate that stones were used and it is encouraging that no ordnance was exchanged, as has been the pattern for well over three decades. But the long-festering territorial dispute with China, remains alive on the national security radar.

The more intriguing element is that Nepal summoned the Indian ambassador on May 11 to lodge a protest against the construction of a road by India in an area (Lipu Lekh pass to Dharchula in Uttarakhand) that Kathmandu claims lies within its territory.

To add to the spectrum of challenges, reports have emerged of China enhancing its Indian Ocean (IO) footprint in an island proximate to Male in the Maldives. Thus the possibility of a Hambantota kind of facility/access for the PLA navy in the IO cannot be ignored by Indian security planners.

And to cap this opaque security challenge, May also symbolises India's complex nuclear-missile anxiety. The regional strategic environment became rough for India when China acquired nuclear weapons in October 1964; the subsequent Sino-Pakistan weapons of mass destruction (WMD) covert cooperation presented Delhi with a *sui generis* security conundrum. The Pakistani nuclear weapon that Beijing had enabled was being used to help terrorism stoked by religious fervour — what one had described as the nuclear weapon-enabled terrorism (NWET) dilemma.

India sought to assuage its latent WMD anxiety in May 1998 through the Shakti nuclear tests under Atal Bihari Vajpayee's watch on May 11. Two decades later, the regional WMD-terror nexus has become muddier and the techno-strategic permutations are bewildering.

Does India have the wherewithal to deal effectively with this complex spectrum of national security challenges — one part of which is further aggravated by the current domestic political-ideological orientation? The answer is no — and for years experts have been pointing out that the annual defence allocation cannot sustain the kind of human, material and inventory profile that India needs. The last defence budget (excluding pensions) was Rs 3,37,000 crore. The amount available for modernisation of equipment and new acquisitions was shrinking to about 32% from the optimum of 40% of the budget.

In the backdrop of Covid-19, India's macroeconomic challenge will worsen. The fiscal deficit is set to breach the recommended 3.5% limit; the only question is how high it would go. On May 8,

the government pegged central borrowing for 2020-21 at Rs 12,00,000 crore — a significant increase from the budget estimate of Rs 7,80,000 crore. This fiscal stress will have a bearing on sectors earlier referred to as “non-plan” in the budgetary allocation, of which defence is a visible component. Thus, it is unlikely that the armed forces will receive anything close to Rs 3,50,000 crore (approx \$46 billion). There are also unconfirmed reports of a budget slash in defence allocation due to Covid-19, ranging from Rs 40,000 to Rs 80,000 crore.

Given that the Covid-19 challenge and its accumulating debris of economic devastation and human destitution will be the higher national priority for some years, India will have to embark on a radical review of its security challenges and the road map to deal with this complex spectrum. Many nations are facing a similar predicament, but some abiding elements in the Indian context must be noted. Strategic geography and its attendant security exigencies will not change due to the pandemic. The low-intensity conflict stoked by Pakistan and the internal security fabric will be turbulent and the political apex will seek to assuage national sentiment in this regard.

What kind of military capability India needs, its technological contour, and how this can be both nurtured and sustained in an affordable manner in a post-Covid-19 world needs careful and objective assessment. Against this backdrop, some of the sweeping remarks attributed to the Chief of Defence Staff General Bipin Rawat, justifying lower defence spend and suggesting that the military may have been misrepresenting its requirements are perplexing, to put it mildly. One hopes this is not the distilled wisdom of Modi 2.0 in the security domain.

(C Uday Bhaskar is director, Society for Policy Studies, New Delhi. The views expressed are personal)

<https://www.hindustantimes.com/analysis/india-isn-t-prepared-to-meet-its-defence-needs/story-pMlerg6SmoHC6N0vZhsO.html>



DEFENCE AVIATION POST
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Wed, 20 May 2020

Indian Army to bring out 'Tour of Duty' for civilians

As ET had reported, the Indian Army is considering a proposal that entails allowing common citizens to voluntarily join the force for three years as part of a model called “Tour of Duty”.

Army Chief General M M Naravane on Wednesday said that the idea came up after the army learnt from visits to colleges and universities that the youth were eager to experience army life. “When our officers addressed youths in colleges, we came across the feeling that they want to experience army life, but not as a career. Taking a cue from this, this idea was born of why not give them an opportunity to serve for two to three years,” he said.

Officials explained that the proposed model of Tour of Duty (ToD) has been proposed to be implemented on a trial basis for officers and other ranks in the army for a limited number of vacancies. The vacancies would be increased if the model is successful. The proposal is a shift from the concept of permanent service in the armed forces towards an “internship” for three years.

Officials said that the cost, including training, pay and allowances, incurred on people joining under the new model would be Rs 80-85 lakhs, as compared to over Rs 6 crore for an officer under the Short Service Commission, who serve up to 14 years. The army believes that the savings from this can be used in modernisation. Savings will also be in other areas. “With the ToD concept implementation, there is likely to be an exponential reduction in our salary and pension budgets,” an official explained.

<https://www.defenceaviationpost.com/2020/05/indian-army-to-bring-out-tour-of-duty-for-civilians/>

Business Standard

Wed, 20 May 2020

ISRO receives patent for highland soil simulant for future lunar missions

The simulant can be used to control the mobility of the rover for scientific exploration and for the study of geo-technical or mechanical properties of lunar soil

By Gireesh Babu

Chennai: Indian Space Research Organisation (Isro) has received a patent for its method of manufacturing highland lunar soil simulant. The simulant is made in bulk from similar rock samples identified and picked out from Sittampundi Anorthosite Complex, almost 67 km from Salem, in Tamil Nadu.

The procedure has satisfied all aspects such as mineralogy, bulk chemistry, grain size distribution and geo-mechanical properties. The method used for preparing the lunar simulant is cost-effective, reproducible and easy to scale up, said the patent specification filed by the Space Agency.

The simulant is quite similar to the regolith (loose unconsolidated rock and dust that sits atop a layer of bedrock according to Encyclopaedia Britannica) of lunar highland region. It can be used to control the mobility of the rover for scientific exploration and for the study of geo-technical or mechanical properties of lunar soil.

The simulant could also be used for fundamental theoretical and experimental research for constructing civil engineering structures on the surface of the Moon, and to make headway in lunar locomotive engineering.

There are bright and dark areas on the Moon's surface. The dark areas are called Maria or mare, which are mostly flat, while the highlands are heavily cratered and mountainous. Isro's patent application claims that most of the countries produced simulants representing lunar mare region, while the highland crust occupies 83 per cent of the lunar surface. Yet, only a limited number of simulants represent the regolith of this region.

It is difficult, expensive, and time-consuming to produce simulants in large numbers. Hence, there is a need for low-priced simulants for diverse lunar applications in order to minimise mission risk. The inventors have ingeniously arrived at a method to make a lunar simulant that has a chemical and mineralogical composition, and mechanical and geotechnical properties that are similar to those of lunar soil.

"Most future missions propose for soft landing on the lunar highland region. Hence there is an urgent need for bulk quantity of lunar soil simulants that represent the highland lunar crust," it said in the patent specification filed in 2014. Isro added that its simulant is exclusively manufactured to represent lunar highland region and should also be useable in diverse lunar applications to provide lowest possible risk.

It may be recalled that for Chandrayaan-2, India's first moon landing experiment, Isro had developed lander and rover indigenously after the Russian promise to offer the technology did not come up. These were tested in a simulated atmosphere with support of surface created by rocks transported from Salem. These rocks were similar in composition to the Moon's surface. Reports said the rocks were crushed to the required size and moved to Bengaluru where the facility was created. The mission, with an orbiter, a rover and a probe, successfully placed the orbiter which

will have an extended lifespan of seven years, while the lander crashed on the Moon's south pole in September 2019.

Several countries have been developing and producing lunar simulants, including the US, Japan and China, and several attempts has been made in the past to reproduce the lunar environment for research purpose. There has been renewed interest by many of these countries in probing Earth's only natural satellite for its mineral content in the recent past.

Reports quoting Isro in 2019 said the space agency has plans to explore a joint satellite mission in Moon's polar region in collaboration with Japan Aerospace Exploration Agency (Jaxa).

According to reports, Isro has announced a Chandrayaan-3 mission similar in configuration to the second Moon mission. It said that Chandrayaan-2 was a highly complex mission, as it brought together an Orbiter, Lander and Rover to explore the Moon's south pole. This mission was unique in that it aimed at studying not just one area of the Moon but all areas combining the exosphere, the surface as well as the sub-surface of the satellite in a single mission.

"The Moon is the closest cosmic body at which space discovery can be attempted and documented. It is also a promising test bed to demonstrate technologies required for deep-space missions, said Isro in its Chandrayaan-2 mission page.

Chandrayaan-2 was aimed for enhancing our understanding of the Moon, stimulate the advancement of technology, promote global alliances and inspire a future generation of explorers and scientists".

https://www.business-standard.com/article/current-affairs/isro-receives-patent-for-highland-soil-simulant-for-future-lunar-missions-120051901514_1.html

Outlook
THE FULLY LOADED MAGAZINE

Wed, 20 May 2020

Indian space sector reforms: Will it be a big bang approach?

Chennai: Space industry experts are divided over whether big-bang changes/reforms proposed in the Indian space sector are going to be incremental.

"This time, the approach is expected to be big-bang, involving restructuring of the Indian Space Research Organisation (ISRO)," an industry expert told IANS preferring anonymity.

The restructuring he speaks about is corporatisation of ISRO's production/operational units so that the private sector can be a co-traveller in ISRO's space missions and there is a level playing field for them.

The production units of ISRO -- rockets and satellites and the rocket launch centre at Sriharikota and the upcoming one in Tamil Nadu -- should be corporatised so that there is no conflict of interest, the expert said.

Similarly, the satellite payload and data product services too can be hived off into a company. The development of payloads can be done by technology labs, universities and the private sector, the expert added.

According to him, with the strategic space activities with Defence Research Development Organisation (DRDO), Indian space sector can fully focus on commercial aspects with a sectoral regulator.

On May 16, Finance Minister Nirmala Sitharaman announced that Indian private sector will be a co-traveller in India's space sector journey and a level-playing field will be provided for them in satellites, launches, and space-based services.

She also said a predictable policy and regulatory environment will be provided to private players.

According to her, the private sector will be allowed to use the facilities of Indian Space Research Organisation (ISRO) and other relevant assets to improve their capacities.

Sitharaman said future projects for planetary exploration, outer space travel and others are to be opened up for the private sector, adding there will be a liberal geo-spatial data policy for providing remote-sensing data to tech-entrepreneurs subject to various checks.

"The reform announced is a big bang reform. Already ISRO follows a Government-Owned-Company-Operated (GOCO) model. Many private entities are using ISRO's facilities in SHAR in Sriharikota such as the solid propellant casting plant. These facilities can be corporatised and put under one public sector unit, New Space India Limited," Vijay Anand, former Financial Advisor, Department of Space and Former Advisor to ISRO Chairman, told IANS.

Pointing out that nearly 90 per cent of the rockets and satellites are fabricated in the private sector and given the complexity of the systems, the design authority, quality assurance, integration and mission planning are with ISRO.

"Barring quality assurance and design authority, in due course industry can form a consortium and take it over. There is such a proposal on which action has been initiated," Anand, who is currently an independent external monitor at Indian Institute of Science and Indian Rare Earth Ltd, said.

According to him, certain facilities and labs can be earmarked for testing by the private sector at a cost. Further ISRO can hand hold, review, transfer technology and others at a price.

"Products from the Indian space industry should be rated to international standards, built to specification rather than built to print and capable of capturing a part of the global market," Anand added.

On the research side, instead of ISRO sponsoring it, it is the industry that should be doing that.

According to Anand, the larger issue is creating a level playing field in the industry.

On the other hand, ISRO will be required because there are sovereign liabilities when it comes to launches, space debris and others.

"This requires a Space Act with rules there under which will prescribe the liabilities, penalties, insurance and safety standards for such activities. In order to avoid a conflict of interest, a space regulatory authority has to be created," Anand added.

India is a signatory to various outer space treaties and the sovereign liability devolves on the Government of India represented by the Department of Space.

He agreed that the strategic aspects of the space are with DRDO and occasionally they do take a launcher or get a satellite contract manufactured.

Dismissing any big bang approach of corporatisation of ISRO's production and other units, a senior space sector official on the condition of anonymity told IANS: "Already ISRO's facilities are being used by the private sector."

According to him, the reforms/changes that would be brought in will bring in more clarity and give comfort factors for the private sector.

While welcoming the private participation in the Indian space research activities former Chairman of ISRO Madhavan Nair had told IANS: "However we have to carefully consider some of the policy matters. First of all, there has to be our national space law which will define responsibilities and liabilities."

Nair said there has to be a proper control mechanism to ensure that the sensitive and critical technologies do not fall into the wrong hands.

"In spite of not having a viable aerospace industry in the country, ISRO has taken up initiative to ensure industrial participation in its programmes," Nair said.

According to him, space doesn't bring large revenues or profits and that how many would take up this challenge is a question.

"Space exploration is still more complex because returns are negative and it is only a long-term investment. The implementation has to be done taking into account sensitivity to international

regulations like MTCR (Missile Technology Control Regime) and international space laws," Nair said.

(Disclaimer: This story has not been edited by Outlook staff and is auto-generated from news agency feeds. Source: IANS)

<https://www.outlookindia.com/newscroll/indian-space-sector-reforms-will-it-be-a-big-bang-approach/1839320>



Wed, 20 May 2020

Keep away from water: Skoltech scientists show a promising solid electrolyte is 'hydrophobic'

Skoltech researchers and their colleagues have shown that LATP, a solid electrolyte considered for use in next-generation energy storage, is highly sensitive to water, which has direct implications for potential battery performance and lifetime. The paper was published in the journal *Chemistry of Materials*.

Although renewable energy sources attract much interest all over the world due to green technologies and high conversion efficiency, their integration remains a challenge as renewables are inherently cyclic and inconsistent. As night follows day and calm follows wind, the idle mode follows power generation. Evidently, such an unpredictably intermittent power supply will hardly meet consumers' expectations, but there is a solution that can overcome this obstacle, namely energy storage grids. These systems are expected to collect spontaneously generated energy and then distribute it on-demand, providing stable and flexible power delivery.

Among the wide range of energy storage systems, redox-flow batteries seem to be the most appropriate due to easy scalability, operation, and controllable output power. A redox flow battery is, in a way, a conventional battery turned inside out: electrodes become liquids (anolyte and catholyte) while the ion-conductive electrolyte becomes a solid membrane. The properties of this membrane determine final performance and lifetime of the battery, so scientists are considering various materials, both inorganic and polymeric, that would be suitable for this purpose.

One of these compounds is $\text{Li}_{1.3}\text{Al}_{0.3}\text{Ti}_{1.7}(\text{PO}_4)_3$, or LATP. It is a well-known lithium conductive material belonging to the NASICON-family (named after the first well-described sodium-conductive representatives -- Na Super Ionic CONductor). This family is defined by a similar crystal structure that determines its high ionic conductivity.

LATP conductivity and structural features are described quite thoroughly, yet its stability towards ordinary environmental factors, such as air and water, remains poorly understood. So Mariam Pogosova of the Skoltech Center for Energy Science and Technology and her colleagues decided to find out whether pure water influences LATP properties.

"LATP triggered our scientific curiosity. A well-known superionic conductor, LATP has a high potential for further chemical and technological improvement. We knew its limitations, such as poor mechanical properties (brittleness) and instability towards metallic lithium. However, these

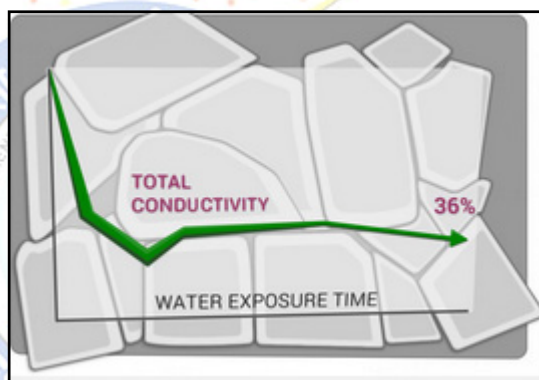


Image: Skoltech researchers and their colleagues have shown that LATP, a solid electrolyte considered for use in next-generation energy storage, is highly sensitive to water, which has direct implications for potential... view more

limitations were quite acceptable as we planned to compensate them through the creation of composite material. So, we started our experiments," Pogosova explains.

Earlier studies by the group showed that LATP ceramics were losing conductivity rather drastically when stored for several days in both ambient air and argon. The researchers hypothesized that humidity might play a key role in this degradation and set out to explore LATP exposure to water.

First, the scientists synthesized LATP through the original two-stage solid-state reaction. They then put their samples in deionized water and left for different periods of time up to 12 hours and conducted subsequent electrochemical, structural, chemical, morphological analyses supported by theoretical modeling.

The experiments showed that LATP ceramics degrade significantly in contact with the water, losing up to 64% in total ionic conductivity after approximately two hours of exposure. The scientists also observed a bunch of other evidence of degradation: microcracking, grain's shape distortion, formation of nanoparticles, chemical composition shifts, unit cell shrinkage, and intrastructural polyhedra and strain changes. All of this led them to conclude that LATP ceramics are highly sensitive to water and probably unsuitable for use in aqueous redox flow batteries.

"Evidently, the impact of water is a concern for pure LATPs and their suitability for redox-flow systems, especially aqueous ones. I want to stress that the deionized water/LATP system analyzed in this study doesn't represent the real redox-flow battery conditions, as the anolyte/catholyte solutions are more complex. Therefore, at this point, I wouldn't try to predict the future of LATP. Nevertheless, I believe the fundamental knowledge obtained is already valuable and applicable: any kind of water is now clearly a reason to be on the alert. For example, now we can preserve the initial performance of LATP ceramics through a simple drying-and-vacuum treatment," Mariam Pogosova says.

She also notes that, surprisingly, their research is the first thorough and versatile study of water impact on LATP. "So we are surely planning more studies in order to refine LATP behavior in other media, to reveal whether it is going to perform well under redox-flow conditions", Pogosova adds.

Other organizations involved in this research include Lomonosov Moscow State University and N. N. Semenov Federal Research Center for Chemical Physics. The work was supported by the Skoltech-MIT Next Generation Project "Lithium Redox Flow Batteries for High Power and High Energy Density Energy Storage".

(Disclaimer: AAAS and EurekAlert! are not responsible for the accuracy of news releases posted to EurekAlert! by contributing institutions or for the use of any information through the EurekAlert system.)

https://www.eurekalert.org/pub_releases/2020-05/sios-kaf051920.php

Bangladeshi doctors tout COVID-19 'cure': Could a coronavirus treatment be hiding in plain sight?

Studies have indicated that Doxycycline and Ivermectin have shown efficacy in inhibiting the replication of SARS-CoV-2.

Key Highlights

- **Dr Tarek Alam, the head of the medical department at the Bangladesh Medical College Hospital, and one of the senior members of the team, stated that a combination of the two drugs were administered to 60 patients**
- **Ivermectin is an anti-parasitic drug commonly used to cure roundworm infections, and belonging to a class of drugs known as antihelmintics**
- **As a tetracycline, Doxycycline is often used to treat the flu and the common cold, as well as in the prevention of malaria**

A team of medical doctors from Bangladesh have, reportedly, had “astounding” success in treating patients suffering from COVID-19 with two commonly used drugs, Doxycycline and Ivermectin.

Dr Tarek Alam, the head of the medical department at the Bangladesh Medical College Hospital, and one of the senior members of the team, stated that a combination of the two drugs were administered to 60 patients, all of whom experienced full recoveries within four days. The patients had, reportedly, been suffering from respiratory problems, as well as other symptoms of SARS-CoV-2.

Dr Alam also noted that the team was preparing a scientific paper discussing the effectiveness of the treatment to be published for peer-review.

Ivermectin

Ivermectin is an anti-parasitic drug commonly used to cure roundworm infections, and belonging to a class of drugs known as antihelmintics. The drug has been granted FDA approval, and is typically ingested orally. The drug works by binding to the structure of a parasite, inhibiting it from producing larvae, before eventually paralysing and killing it completely.

Side effects associated with the drug may include a loss of energy, vomiting, abdominal pains, nausea, a loss of appetite and tiredness among other relatively mild conditions. In more serious cases, these could include bleeding, redness, swelling, lack of control over urinary and bowel movements, loss of vision, and seizures.

In March, a study conducted by researchers from the University of Melbourne and Monash University in Australia suggested that Ivermectin showed success as an inhibitor of COVID-19 in vitro. The study noted that a single treatment was “able to effect a 5000 fold reduction in the virus at 48 hours in cell culture.” As a generic drug, Ivermectin is also included on the WHO's list of essential medicines.



A team of Bangladeshi doctors, reportedly, cured 60 COVID-19 patients with a combination of two commonly used drugs. | Photo Credit: PTI

Doxycycline

Doxycycline is an antibiotic used to treat a wide range of bacterial infections. As a tetracycline, the drug is often used to treat the flu and the common cold, as well as in the prevention of malaria. It has also been used to treat acne and infections caused by ticks, lice and mites. Like Ivermectin, the drug is also orally ingested.

Commonly found side effects may include vomiting, nausea, a loss of appetite, skin rashes and itching, vaginal itching or discharge, and mild diarrhoea. More serious symptoms may include severe stomach pains, irregular heart rhythm, inability to urinate, severe headaches, jaundice, and vision problems.

At the start of April, researchers at the Department of Ophthalmology and Visual Sciences at the University of British Columbia in Canada, wrote a letter to the editor of the academic journal, *Pharmacotherapy* outlining evidence of the efficacy of tetracyclines in the treatment of COVID-19.

Research around the novel coronavirus has shown that it relies extensively on host matrix metalloproteinases (MMPs) for survival, cell infiltration, and replication. The letter noted that tetracyclines, being highly lipophilic (attracted to lipids), are able to inhibit MMPs, thereby reducing viral activity.

<https://www.timesnownews.com/health/article/bangladeshi-doctors-succeed-in-curing-covid-19-could-a-likely-coronavirus-treatment-be-hiding-in-plain-sight/594091>

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Tue, 19 May 2020

Chinese scientists claim new drug can stop COVID-19 pandemic without vaccine

Chinese scientists say a new drug they are developing can help stop the novel coronavirus infection, perhaps, without a vaccine.

Key Highlights

- **Scientists at China's prestigious Peking University say they are working on a drug that can help cure coronavirus infection**
- **Test results show the medication could help shorten the recovery time for patients**
- **Currently, there's no specific drug or vaccine to treat to prevent the SARS-CoV-2 virus**

New Delhi: Chinese scientists said they are developing a new drug, claiming that the medication can help stop the coronavirus pandemic, perhaps, without a vaccine. The drug being developed at China's prestigious Peking University has been tested successfully on animals.

Researchers said the drug could shorten the recovery time for patients infected with COVID-19. Test results also showed that the drug has the potential to offer short-term immunity from the virus.

"The drug has been successful at the animal testing stage. When we injected neutralising antibodies into infected mice, after five days the viral load was reduced by a factor of 2,500," Sunney Xie, director of the university's Beijing Advanced Innovation Center for Genomics, told AFP. Xie said the results indicate that this potential drug has (a) therapeutic effect.



Chinese scientists claim new drug can stop COVID-19 pandemic without vaccine|Photo Credit: iStock Images

The drug works by generating neutralising antibodies - produced by the human immune system to prevent the virus infecting cells - which researchers isolated from the blood of 60 patients who had recovered from COVID-19.

“The hope is these neutralised antibodies can become a specialised drug that would stop the pandemic,” Xie added.

The findings, published Sunday in the scientific journal *Cell*, suggested that using the antibodies provides a potential ‘cure’ for the disease and shortens recovery time.

“Our expertise is single-cell genomics rather than immunology or virology. When we realised that the single-cell genomic approach can effectively find the neutralising antibody we were thrilled,” said Xie, adding planning for the clinical trial of the drug is underway and it will be carried out in Australia and other countries since cases have dwindled in China, offering fewer human guinea pigs for testing.

Xie said the drug should be ready for use later this year and in time for any potential winter outbreak of the virus. Last week, a Chinese health official revealed that the country is currently working on five potential coronavirus vaccines, which are at the human trial stage. Meanwhile, Massachusetts Biotechnology Company Moderna said its coronavirus vaccine mRNA-1273 has shown positive results in the early human trial.

So far, at least 316,333 people across the world have lost their lives to COVID-19. As many as 4,759,650 cases of coronavirus have been reported in 196 countries and territories.

https://www.timesnownews.com/health/article/chinese-scientists-claim-new-drug-can-stop-covid-19-pandemic-without-vaccine/593975?utm_source=taboola&utm_medium=referral&utm_campaign=en-article-health

TIMESNOWNEWS.COM

Tue, 19 May 2020

Is a coronavirus cure around the corner? Moderna vaccine trial, new Chinese drug raise hopes

News of vaccine-related breakthroughs at Moderna and Peking University are, indeed, positive, but there are still numerous challenges to overcome before a viable vaccine may be ready for delivery.

Key Highlights

- *Moderna's experimental vaccine was able to stimulate an immune response against the virus in eight people who received two doses each, without any side effects detected.*
- *Researchers at China's Peking University claimed to have tested a new drug on mice that reduced their viral loads “by a factor of 2,500”*
- *Once a vaccine is found to be both, effective and safe, it will need to acquire the requisite regulatory approvals*

American bio-technology outfit, Moderna provided the world with a glimmer of hope in the battle against the SARS-CoV-2 pandemic on Monday, when it announced its preliminary findings from a pre-clinical trial of an experimental vaccine. According to the company, the vaccine was able to stimulate an immune response against the virus in eight people who received two doses each, without any side effects detected.

The latest development saw Moderna's stock rise by over 25 per cent by Monday afternoon, and reflects the unprecedented speed at which vaccine development is currently taking place at.



Moderna's stock rose by over 25 per cent on Monday on the back of its latest vaccine-related breakthrough. | Photo Credit: PTI

Now, under 24 hours from when Moderna made its announcement, a Chinese laboratory has also professed to have found a “cure” for COVID-19. Researchers at China's Peking University claimed to have tested a new drug on mice that reduced their viral loads “by a factor of 2,500.” The drug, reportedly, uses neutralising antibodies naturally produced by the human immune system to inhibit the virus' infection of cells.

The antibodies were isolated from the blood of 60 previous COVID-19 patients who had experienced recoveries, according to Sunney Xie, the director of the university's Beijing Advanced Innovation Center for Genomics. The team have already published a study in the scientific journal, Cell, and are now preparing clinical trials to be carried out in Australia.

Why does vaccine development take so long?

With several countries continuing to struggle under the weight of the pandemic, researchers have been working around the clock to expedite the development of a vaccine – a process that typically takes between two and five years.

Several companies including CanSino, AstraZeneca (in partnership with the University of Oxford), and Pfizer (in collaboration with BioNTech) have already developed potential vaccines, with as many as eight already at the stage of human trials. According to the World Health Organisation, another 100 other vaccine candidates are currently undergoing pre-clinical evaluation.

However, the WHO has warned in the past that a possible vaccine could take over 18 months to develop, with some of its representatives even sending out warnings that a single vaccine may not be enough, in the event that the virus mutates.

Developing a vaccine is a monumental task and no single institution has the facilities to carry out trials on its own. Vaccines trials need to undergo various phases beginning with an animal model trial, progressing to small-scale human clinical trials, and then to more widespread trials that include thousands of participants.

Moreover, once a vaccine is found to be both, effective and safe, it will need to acquire the requisite regulatory approvals. Finally, a cost-effective method to mass-manufacture the vaccine will need to be determined, before it is finally ready for delivery.

All these processes within the vaccine development chain face significant inherent challenges that are likely to arise in the coming months. As such, while the two latest developments are, without a doubt, promising, a fully commercially viable vaccine may still be several months away.

https://www.timesnownews.com/health/article/is-a-coronavirus-cure-around-the-corner-moderna-vaccine-trial-new-chinese-drug-raise-hopes/594226?utm_source=taboola&utm_medium=referral&utm_campaign=en-article-health