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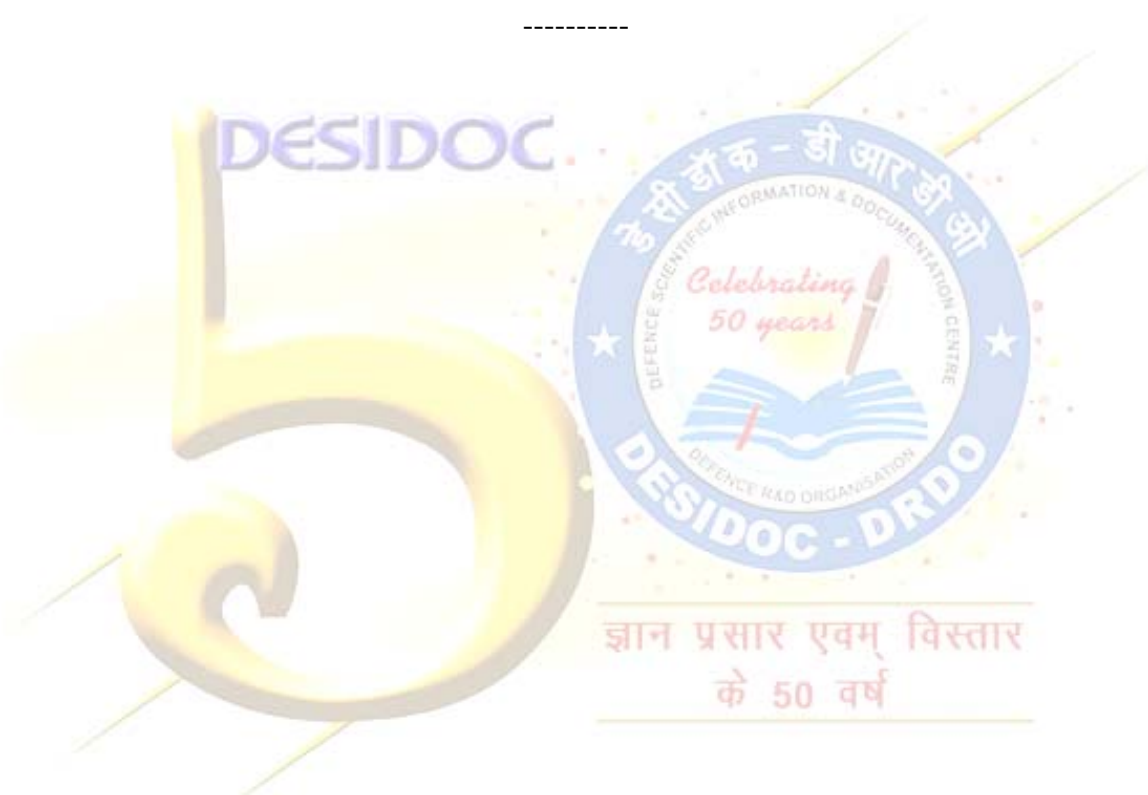


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DRDO establishes COVID-19 testing facility at DIHAR, Leh

DRDO has established a COVID-19 testing facility at the Leh based laboratory Defence Institute of High Altitude Research (DIHAR) to enhance the rate of testing to identify the Corona cases in the Union Territory of Ladakh. The testing facility will also help in keeping close watch of the infected persons. The facility meets the safety standards and guidelines of Indian Council of Medical Research (ICMR). The centre was inaugurated by Lieutenant Governor of Ladakh, Shri RK Mathur on 22nd July 2020.

The testing facility at DIHAR is capable of screening 50 samples per day. The facility can also be utilized for training manpower for COVID testing and will be of great help to address future bio-threats and carrying out R&D activities pertinent to agro-animals diseases.

In his address, LG Shri RK Mathur lauded the efforts of DRDO in fighting Covid 19 and thanked Dr G Satheesh Reddy, Secretary, Department of Defence R&D & Chairman DRDO for making this facility available at DIHAR. He expressed hope that the facility will help in the treatment of infected persons.

The Lieutenant Governor also inspected the testing facility. He was briefed about the bio-safety aspect of the testing facility and precautionary measures to minimize cross-contamination and safety of researcher, health professionals and the environment.

Dr OP Chaurasia Director DIHAR, Brig JB Singh Commandant, Dr Padma Gurmet Director NRISR, Leh, Dr Mutup Dorjey CMO along with his team of doctors from SNM Hospital, Leh and other senior army officials and DRDO scientists were present on the occasion.

DIHAR is one of the life sciences laboratories of DRDO working on cold arid agro-animal technologies. The laboratory is screening and identifying the medicinal and aromatic plants to exploit them for use for defence purposes and also on greenhouse technologies for high altitude and cold desert areas.

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डीआरडीओने उच्च उन्नतांश अनुसंधान रक्षा संस्थान (डीआईएचएआर), लेह में कोविड -19 परीक्षण सुविधा की स्थापना की

डीआरडीओ ने केंद्र शासित प्रदेश लद्दाख में कोरोना मामलों की पहचान के उद्देश्य से परीक्षण की दर को बढ़ाने के लिए लेह स्थित प्रयोगशाला, उच्च उन्नतांश अनुसंधान रक्षा संस्थान (डीआईएचएआर) में कोविड -19 परीक्षण सुविधा की स्थापना की है। परीक्षण सुविधा संक्रमित व्यक्तियों पर निगरानी रखने में भी मदद करेगी। यह सुविधा भारतीय चिकित्सा अनुसंधान परिषद (आईसीएमआर) के सुरक्षा मानकों और दिशानिर्देशों के अनुरूप है। लद्दाख के लेफ्टिनेंट गवर्नर श्री आर के माथुर ने 22 जुलाई 2020 को इस सुविधा केंद्र का उद्घाटन किया।

डीआईएचएआरकी परीक्षण सुविधा, प्रति दिन 50 नमूनों की जांच करने में सक्षम है। इस सुविधा का उपयोग लोगों को कोविड परीक्षण का प्रशिक्षण देने के लिए भी किया जा सकता है। भविष्य के जैव-खतरों से निपटने में और कृषि-पशुओं की बीमारियों के लिए आर एंड डी गतिविधियों को पूरा करने में इस सुविधा से बहुत मदद मिलेगी।

अपने संबोधन में, एलजी श्री आरके माथुर ने कोविड -19 से लड़ने में डीआरडीओ के प्रयासों की सराहना की और डीआईएचएआर में यह सुविधा उपलब्ध कराने के लिए रक्षा विभाग, अनुसंधान एवं विकास के सचिव एवं डीआरडीओ के चेयरमैन डॉ जी सतीश रेड्डी को धन्यवाद दिया। उन्होंने उम्मीद जताई कि इस सुविधा से संक्रमित व्यक्तियों के इलाज में मदद मिलेगी।

उपराज्यपाल ने परीक्षण सुविधा का भी निरीक्षण किया। उन्हें परीक्षण सुविधा के जैव-सुरक्षा पहलू तथा शोधकर्ता, स्वास्थ्य पेशेवरों और पर्यावरण की सुरक्षा और परस्पर-संदूषण को कम करने के एहतियाती उपायों के बारे में भी जानकारी दी गई।

इस अवसर पर डीआईएचएआर के निदेशक डॉ ओपी चौरसिया, कमांडेंट, ब्रिगेडियर जेबीसिंह, एनआरआईएसआर, लेह की निदेशक डॉ पद्मा गुरमीत, एसएनएम अस्पताल, लेह के सीएमओ डॉ मुत्तुप दोरजे व अन्य डॉक्टर, वरिष्ठ सैन्य अधिकारी और डीआरडीओ के वैज्ञानिकों की टीम उपस्थित थी।

डीआईएचएआर, डीआरडीओ की जीवन-विज्ञान प्रयोगशालाओं में से एक है, जो ठंडे शुष्क कृषि-पशु प्रौद्योगिकियों पर काम कर रही है। प्रयोगशाला औषधीय और सुगंधित पौधों की जांच और पहचान कर रही है ताकि उनका उपयोग रक्षा उद्देश्यों के लिए किया जा सके। प्रयोगशाला अधिक ऊंचाई और ठंडे रेगिस्तानी क्षेत्रों के लिए ग्रीनहाउस प्रौद्योगिकियों पर भी काम कर रही है।

एसजी/एम/जेके/एसएस

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లహోలోని 'దిహార్'లో కొవిడ్ నమూనాల పరీక్ష కేంద్రాన్ని ఏర్పాటు చేసిన డీఆర్డీవో

లహోలోని ప్రయోగశాల 'డిపెన్స్ ఇన్స్టిట్యూట్ ఆఫ్ హై ఆల్టిట్యూడ్ రీసెర్చ్' (దిహార్)లో కొవిడ్ నమూనాల పరీక్ష కేంద్రాన్ని డీఆర్డీవో ఏర్పాటు చేసింది. కరోనా కేసుల గుర్తింపు కోసం, పరీక్షల సంఖ్యను పెంచడానికి ఈ కేంద్రాన్ని ఏర్పాటు చేసింది. రోగులను కూడా ఇది పర్యవేక్షిస్తుంది. ఇండియన్ కౌన్సిల్ ఆఫ్ మెడికల్ రీసెర్చ్ (ఐసీఎఆర్) మార్గదర్శకాలకు తగ్గట్లుగా ఈ కేంద్రాన్ని ఏర్పాటు చేశారు. లద్దాఖ్ లెఫ్టినెంట్ గవర్నర్ శ్రీ ఆర్.కె.మాధుర్ పరీక్ష కేంద్రాన్ని ప్రారంభించారు.

దిహార్ పరీక్ష కేంద్రంలో రోజుకు 50 నమూనాలను పరీక్షించవచ్చు. కొవిడ్ పరీక్షల్లో ఇతరులకు శిక్షణ ఇవ్వడానికి, భవిష్యత్తులో వచ్చే వైరస్ ప్రమాదాలను అడ్డుకోవడానికి, వ్యవసాయ పశువులకు వ్యాపించే వ్యాధులపై పరిశోధనలు చేయడానికి ఈ కేంద్రాన్ని ఉపయోగిస్తున్నారు.

కొవిడ్పై డీఆర్డీవో చేస్తున్న యుద్ధంపై లెఫ్టినెంట్ గవర్నర్ శ్రీ ఆర్.కె.మాధుర్ ప్రశంసలు కురిపించారు. దిహార్లో పరీక్ష కేంద్రాన్ని ఏర్పాటు చేసినందుకు డీఆర్డీవో ఛైర్మన్ సతీశ్ రెడ్డికి కృతజ్ఞతలు తెలిపారు. వైరస్ సోకినవారికి చికిత్స అందించడానికి ఈ పరీక్ష కేంద్రం ఉపయోగపడుతుందని ఆశాభావం వ్యక్తం చేశారు.

కొవిడ్ పరీక్ష కేంద్రాన్ని లెఫ్టినెంట్ గవర్నర్ పరీక్షించారు. వైరస్ నుంచి రక్షణకు ఈ కేంద్రంలో ఏర్పాటు చేసిన భద్రత వ్యవస్థను; పరిశోధకులు, ఆరోగ్య నిపుణులు, పర్యావరణ భద్రత చర్యలను ఆయనకు అధికారులు వివరించారు. దిహార్ డైరెక్టర్ ఒ.పి.చౌరాసియా సహా పరిశోధకులు, వైద్యులు ఈ కార్యక్రమంలో పాల్గొన్నారు.

డీఆర్డీవోకు చెందిన లైఫ్ సైన్సెస్ ప్రయోగశాలల్లో దిహార్ ఒకటి. ఇది, శీతల వ్యవసాయ జంతువులపై పరిశోధనలు చేస్తోంది. రక్షణ ప్రయోజనాలకు ఉపయోగపడే ఔషధ, సుగంధ మొక్కలపైన; అత్యంత ఎత్తైన ప్రాంతాలు, మంచు ఎడారులకు సంబంధించిన గ్రీన్ హౌస్ సాంకేతిక పరిజ్ఞానాలపైనా ప్రయోగాలు జరుపుతోంది.

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DRDO's new Covid test centre at Leh may address future bio-threats

The infrastructure can play a pivotal role in enhancing capability to address future bio-threats
By Vijay Mohan

Chandigarh: As fresh cases of COVID-19 continue to emerge, a testing centre for COVID-19 samples has been established at the Defence Institute of High-Altitude Research (DIHAR), Leh.

Apart from a utility during the ongoing pandemic, the infrastructure set up can play a pivotal role in enhancing capability to address future bio-threats and also in research activities pertinent to agro-animal diseases.

The facility was inaugurated by RK Mathur, Lieutenant Governor of Union Territory of Ladakh, on Wednesday. Lauding the efforts put in by the Defence Research and Development Organisation (DRDO) for establishing the centre at DIHAR, Mathur said this would significantly augment the testing capability in Ladakh.

DIHAR is a laboratory under the DRDO based at Leh which is engaged in research on cold arid agro-animal technologies to enhance the production of fresh vegetables and animal-origin food, benefitting not on the armed forces but also the local populace in Ladakh.

Its activities include agro-animal disease investigation and control, up-gradation of native livestock germplasm, semipermafrost-based conservation of elite plant germplasm, nano-materials based technology for improving productivity and developing greenhouse technologies for high altitude and cold desert areas. It is also screening and identifying medicinal and aromatic plants to exploit their use for defence purposes.

Dr OP Chaurasia, director at DIHAR, said: "At present, the facility is capable of screening 50 samples per day which can easily be enhanced with the availability of more trained manpower. Apart from screening, the facility can be utilised for training manpower for COVID testing. Among the different measures, one of the important prerequisites is to efficiently identify the infected individuals followed by isolation and treatment."

In view of their highly contagious nature, proper handling of live virus in these facilities is of paramount importance for the safety of researcher, health professional and the environment. The centre has been designed to ensure a unidirectional workflow for safety. It has dedicated donning and doffing areas along with two validated bio-safety cabinets for virus RNA isolation and neutralisation.



The testing centre for COVID-19 samples established at the Defence Institute of High-Altitude Research (DIHAR) in Leh. Tribune Photo



RK Mathur, Lieutenant Governor of Union Territory of Ladakh, inaugurates the testing centre for COVID-19 samples established at the Defence Institute of High-Altitude Research (DIHAR) in Leh on Wednesday



In accordance with safety standards and advisories issued by the Indian Council of Medical Research, the centre has been equipped with deep freezers, autoclaves for sterilising the bio-waste, automatic disinfectant dispensers and a walk-in cold room for holding human samples.

<https://www.tribuneindia.com/news/j-k/drdo-new-covid-19-test-centre-at-leh-may-address-future-bio-threats-116913>

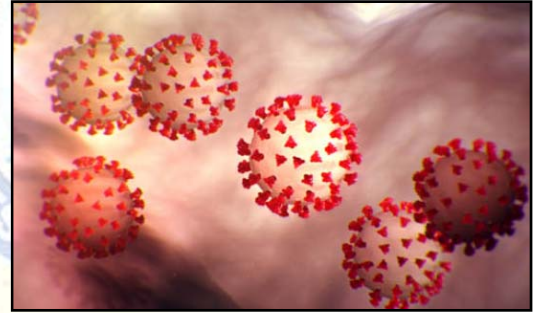


Fri, 24 July 2020

DRDO ने DIHAR, Leh में COVID-19 परीक्षण सुविधा की स्थापना की

डीआरडीओ ने केंद्र शासित प्रदेश लद्दाख में कोरोना मामलों की पहचान करने के लिए परीक्षण की दर को बढ़ाने के लिए लेह आधारित प्रयोगशाला रक्षा उच्च अनुसंधान संस्थान (DIHAR) में एक COVID-19 परीक्षण सुविधा की स्थापना की है। परीक्षण सुविधा संक्रमित व्यक्तियों पर कड़ी नजर रखने में भी मदद करेगी। यह सुविधा भारतीय चिकित्सा अनुसंधान परिषद (ICMR) के सुरक्षा मानकों और दिशानिर्देशों को पूरा करती है। केंद्र का उद्घाटन 22 जुलाई को लद्दाख के लेफ्टिनेंट गवर्नर आरके माथुर ने किया था।

DIHAR में परीक्षण सुविधा प्रति दिन 50 नमूनों की जांच करने में सक्षम है। सुविधा का उपयोग COVID परीक्षण के लिए प्रशिक्षण जनशक्ति के लिए भी किया जा सकता है और भविष्य के जैव-खतरों को संबोधित करने और कृषि-पशुओं की बीमारियों के लिए आर एंड डी गतिविधियों को पूरा करने में बहुत मदद मिलेगी।



अपने संबोधन में, एलजी श्री आरके माथुर ने कोविड 19 से लड़ने में DRDO के प्रयासों की सराहना की और DIHAR में यह सुविधा उपलब्ध कराने के लिए रक्षा अनुसंधान एवं विकास एवं अध्यक्ष DRDO के सचिव डॉ. जी। उन्होंने उम्मीद जताई कि इस सुविधा से संक्रमित व्यक्तियों के इलाज में मदद मिलेगी।

उपराज्यपाल ने परीक्षण सुविधा का भी निरीक्षण किया। उन्होंने शोधकर्ता, स्वास्थ्य पेशेवरों और पर्यावरण के पार-संदूषण और सुरक्षा को कम करने के लिए परीक्षण सुविधा और एहतियाती उपायों के जैव-सुरक्षा पहलू के बारे में जानकारी दी।

इस अवसर पर डॉ. ओपी चौरसिया निदेशक DIHAR, ब्रिगेडियर जेबी सिंह कमांडेंट, डॉ. पद्मा गुरमीत निदेशक NRISR, लेह, डॉ. मुतुप दोरजे CMO के साथ-साथ SNM अस्पताल, लेह और अन्य वरिष्ठ सैन्य अधिकारियों और DRDO के वैज्ञानिकों की टीम मौजूद थी।

DIHAR, DRDO की जीवन विज्ञान प्रयोगशालाओं में से एक है, जो ठंडे शुष्क कृषि-पशु प्रौद्योगिकियों पर काम कर रही है। प्रयोगशाला औषधीय और सुगंधित पौधों की जांच और पहचान कर रही है ताकि उनका उपयोग रक्षा उद्देश्यों के लिए किया जा सके और उच्च ऊंचाई और ठंडे रेगिस्तानी क्षेत्रों के लिए ग्रीनहाउस प्रौद्योगिकियों पर भी उपयोग किया जा सके।

<https://www.dailynews24.in/corona-update/drdo-set-up-covid-19-test-facility-at-dihar-leh/52111/>

Fri, 24 July 2020

DRDO establishes COVID-19 testing facility at Leh based lab DIHAR

The centre was inaugurated by Lieutenant Governor of Ladakh, Shri RK Mathur on 22nd July 2020

DRDO has established a COVID-19 testing facility at the Leh based laboratory Defence Institute of High Altitude Research (DIHAR) to enhance the rate of testing to identify the Corona cases in the Union Territory of Ladakh. The testing facility will also help in keeping close watch of the infected persons. The facility meets the safety standards and guidelines of the Indian Council of Medical Research (ICMR). The centre was inaugurated by Lieutenant Governor of Ladakh, Shri RK Mathur on 22nd July 2020.

The testing facility at DIHAR is capable of screening 50 samples per day. The facility can also be utilized for training manpower for COVID testing and will be of great help to address future bio-threats and carrying out R&D activities pertinent to agro-animals diseases.

In his address, LG Shri RK Mathur lauded the efforts of DRDO in fighting Covid 19 and thanked Dr G Satheesh Reddy, Secretary, Department of Defence R&D & Chairman DRDO for making this facility available at DIHAR. He expressed hope that the facility will help in the treatment of infected persons.

The Lieutenant Governor also inspected the testing facility. He was briefed about the bio-safety aspect of the testing facility and precautionary measures to minimize cross-contamination and safety of researcher, health professionals and the environment.

Dr OP Chaurasia Director DIHAR, Brig JB Singh Commandant, Dr Padma Gurmet Director NRISR, Leh, Dr Mutup Dorjey CMO along with his team of doctors from SNM Hospital, Leh and other senior army officials and DRDO scientists were present on the occasion.

DIHAR is one of the life sciences laboratories of DRDO working on cold arid agro-animal technologies. The laboratory is screening and identifying the medicinal and aromatic plants to exploit them for use for defence purposes and also on greenhouse technologies for high altitude and cold desert areas. (With Inputs from PIB)

<https://www.devdiscourse.com/article/health/1140619-drdo-establishes-covid-19-testing-facility-at-leh-based-lab-dihar>



The facility can also be utilized for training manpower for COVID testing and will be of great help to address future bio-threats and carrying out R&D activities pertinent to agro-animals diseases. Image Credit: Twitter(@SpokespersonMoD)

डीआरडीओ के साथ कोविड-19 पर काम कर रही इजरायली टीम स्पेशल प्लेन से आएगी भारत

Covid-19 rapid testing kit : इजरायली दूतावास की तरफ से जारी बयान में कहा गया है कि आने वाले हफ्तों में इजरायल के विदेश, रक्षा और स्वास्थ्य मंत्रालयों के नेतृत्व में भारत-इजरायल एंटी-कोविड-19 को-ऑपरेशन ऑपरेशन चलाया जाएगा। इजरायली रक्षा मंत्रालय का उच्च श्रेणी का अनुसंधान एवं विकास दल तेल अवीव से स्पेशल फ्लाइट के जरिए नई दिल्ली पहुंचेगा।

Edited By Naveen Kumar Pande

हाइलाइट्स

- DRDO के साथ काम कर रही इजरायली एक्सपर्ट्स की टीम दिल्ली आने वाली है
- इस एक्सपर्ट टीम को लेकर स्पेशल प्लेन तेल अवीव से उड़ान भरेगी
- इजरायली दूतावास ने बयान जारी कर कहा कि इस प्लेन में इजरायली टेक्नॉलजी भी होगी
- कोविड-19 की तुरंत जांच के लिए किट बनाने में इजरायल की टीम मदद कर रही है

नई दिल्ली: भारत में कोरोना वायरस (Coronavirus) के नए मामलों में लगातार तेज वृद्धि दर्ज की जा रही है। ऐसे में जांच को बड़े पैमाने पर ले जाने की जरूरत भी बड़ी शिदत से महसूस की जा रही है। यही वजह है कि कम-से-कम वक्त में जांच का परिणाम देने वाले उपकरण बनाने पर रिसर्च चल रहा है। भारत में 30 सेकंड में रिजल्ट देने वाला रैपिड टेस्टिंग किट (Rapid testing kit) बनाने पर काम हो रहा है जिसमें इजरायल की एक एक्सपर्ट टीम (Israeli expert team) सहयोग कर रही है। यह एक्सपर्ट टीम अब भारत आ रही है। इजरायली दूतावास (Israeli embassy) ने इसकी जानकारी दी।

तेल अवीव से दिल्ली की स्पेशल फ्लाइट इजरायली दूतावास की तरफ से जारी बयान में कहा गया है कि आने वाले हफ्तों में इजरायल के विदेश, रक्षा और स्वास्थ्य मंत्रालयों के नेतृत्व में भारत-इजरायल एंटी-कोविड-19 को-ऑपरेशन ऑपरेशन (Anti-Covid cooperation operation) चलाया जाएगा। इजरायली रक्षा मंत्रालय का उच्च श्रेणी का अनुसंधान एवं विकास दल तेल अवीव से स्पेशल फ्लाइट के जरिए नई दिल्ली पहुंचेगा।

DRDO के साथ काम कर रही है इजरायली टीम

यह टीम भारत के प्रधान वैज्ञानिक सलाहकार के. विजयराघवन (K VijayRaghavan) और रक्षा अनुसंधान एवं विकास संगठन (DRDO) के साथ रैपिड टेस्टिंग किट विकसित करने पर काम कर रही है। बयान में कहा गया है कि भारत के विकास एवं उत्पादन क्षमताओं के साथ इजरायली टेक्नॉलजी (Israeli technologies) की साझेदारी से कोविड-19 महामारी के बीच सामान्य जनजीवन को पटरी पर लाने में मदद करेगी।

स्पेशल प्लेन से आएगी इजरायली टेक्नॉलजी

टीम को ला रही स्पेशल फ्लाइट में कोविड-19 महामारी (Covid-19 pandemic) से निपटने के लिए नई उभरती इजरायली टेक्नॉलजी भी भारत लाई जाएगी जो इजरायली विदेश मंत्रालय और वहां के प्राइवेट सेक्टर कंपनियों की तरफ से भारत को भेंट होगी। बयान में कहा गया है, 'आखिरकार, प्लेन से मैकेनिकल वेंटिलेटर्स (Mechanical ventilations) की डिलीवरी होगी। इजरायल की सरकार ने इसका भारत को निर्यात की विशेष अनुमति दी है।'

Covid-19 के खिलाफ भारत-इजरायल की साझेदारी

पिछले कुछ वर्षों में भारत और इजरायल के बीच सामरिक रिश्तों (Strategic relations between India and Israel) में मजबूती आई है। बयान में कहा गया है कि भारत और इजरायल के प्रधानमंत्रियों ने एक-दूसरे के यहां ऐतिहासिक

दौर किए। कोरोना वायरस का प्रकोप शुरू होने के बाद से अब तक प्रधानमंत्री नरेंद्र मोदी (Narendra Modi) और प्रधानमंत्री बेंजामिन नेतन्याहू (Benjamin Netanyahu) के बीच तीन बार टेलिफोन पर बातचीत हो चुकी है। बयान कहता है कि दोनों प्रधानमंत्रियों की बातचीत में कोविड-19 महामारी के खिलाफ साझा लड़ाई के लिए टेक्नॉलजी और वैज्ञानिक अनुसंधानों के स्तर पर आपसी तालमेल पर सहमति बनी।

<https://navbharattimes.indiatimes.com/india/israeli-team-working-with-drdo-to-develop-rapid-covid-19-testing-to-come-to-india-on-special-plane/articleshow/77131427.cms>

THE TIMES OF INDIA

Fri, 24 July 2020

Israeli team working with DRDO to develop rapid Covid-19 testing to come to India on special plane

New Delhi: In an effort to jointly combat the novel coronavirus, Israel Thursday said it will send to India on board a special flight a research team which has been working with the Indian side to develop a rapid testing kit for Covid-19 which can give a result within 30 seconds.

In the coming weeks, Israel's ministries of foreign affairs, defence and health will lead an unprecedented anti-Covid-19 cooperation operation between India and Israel, an Israel Embassy statement said.

A special planned flight from Tel Aviv to New Delhi is set to carry a high ranking Israeli defence ministry research and development team which has been working with India's chief scientist K VijayRaghavan and Defence Research and Development Organisation to develop rapid testing for Covid-19 in under 30 seconds, it said.



Merging Israeli technology with Indian development and production capabilities aims to allow a swift resumption of normal life alongside the virus, the Israeli Embassy said.

The flight will also bring breakthrough emerging Israeli technologies for combatting Covid-19, which have been donated by Israel's foreign ministry and private sector meant to bolster India's response to the outbreak.

"Finally, the plane will deliver mechanical ventilators which were given special permission by the Government of Israel for export to India," the statement said.

The past few years have cemented the strategic relations between India and Israel and have included two historical visits of the prime ministers in Israel and in India, the Embassy said.

Since the outbreak of the global pandemic, Israeli Prime Minister Benjamin Netanyahu and Prime Minister Narendra Modi have held three telephonic conversations in which they promised mutual assistance in dealing with the virus and committed to joint technological and scientific research between the countries, the statement said.

Noting that India is currently facing over one million Covid-19 positive cases, the Israeli side said India seeks to integrate advanced technologies in its hospitals as they prepare to treat massive waves of Covid-19 patients on an Indian scale.

The Israeli companies chosen by the three ministries to be sent to India are potentially given unique access to one of the largest economies in the world to provide monitoring and treatment technologies while significantly reducing contact between patients and medical staff, the statement said.

By opening the door to India's market with its development and production capabilities, these Israeli technologies can be mass produced at a lower cost and could in future be jointly exported to third countries, it said.

At the outbreak of Covid-19 in Israel, India gave Israel special authorization to acquire medicine, masks and protective gear, the embassy noted.

"Now, Israel is proud to reciprocate this significant gesture and grant authorisation for purchasing of respirators to its great friend in the east," it said.

The unique cooperation between India and Israel has allowed both countries to better deal with the Covid-19 threat and could potentially change the way "we live beside the virus", the Embassy said.

Israeli Ambassador to India Ron Malka said, "I am proud to lead this Israeli delegation to India. It is at times like this that our friendship is tested, and the State of Israel is happy to lend a helping hand to India in this complicated and difficult time."

"I am confident that India and Israel can work together to find innovative and cheap solutions to help the world overcome this crisis." he said.

The Covid-19 pandemic is a global challenge, so it is only right that the solution be a global scientific cooperation between countries, Malka said.

India and Israel's military R&D cooperation is well known for its success, he added.

"I have no doubt the same will be seen in the private sector joined by brilliant scientific minds from both countries to introduce a breakthrough in swift and simple testing procedures." Malka said.

<https://timesofindia.indiatimes.com/india/israeli-team-working-with-drdo-to-develop-rapid-covid-19-testing-to-come-to-india-on-special-plane/articleshow/77130344.cms>

ThePrint

Fri, 24 July 2020

India, Israel collaborate to develop rapid testing for Covid-19 in under 30 seconds

Israel will soon send a high level research delegation to India to conduct a series of 'final stages of testing' as part of the joint effort to develop the rapid testing kits

By Harinder Mishra

Jerusalem: Merging Israel's technological expertise with India's mass production capabilities, experts from the two countries have joined hands to develop rapid testing for COVID-19 in under 30 seconds.

Israel will soon send a high level research delegation to India to conduct a series of "final stages of testing" as part of the joint effort to develop the rapid testing kits for COVID-19.

A high ranking team from the Directorate of Defence Research and Development (DDR&D), in the Ministry of Defense, which has been working with India's DRDO to develop rapid testing for COVID-19 in under 30 seconds, is to leave from Tel Aviv to New Delhi on a special flight in a few days, Israel's Ministry of Defence said in a statement on Thursday.

Israel's Ministry of Foreign Affairs (MFA) and Ministry of Health are also involved in this unprecedented cooperation between the two countries which aims at "merging Israeli technology with Indian development and production capabilities to allow a swift resumption of normal life alongside the virus".

The DDR&D team will conduct a series of "final stages of testing" to determine the effectiveness of a number of rapid diagnostic solutions with their Indian counterparts.

Since the start of the pandemic, the DDR&D has tested dozens of diagnostic technologies. Some of them have matured and passed initial trials in Israel, however in order to complete testing and prove their effectiveness, these must be tested on a wide range of patients, IMoD said.

The four tech systems that will be tested are – voice test, breathalyzer test based on terra-hertz waves, isothermal test, and polyamino acids test.

“What they all have in common is the ability to detect the presence of the virus in the body quickly- usually within minutes. Developing diagnostic capabilities is a goal for the State of Israel and of many additional countries around the world. It is the most effective way to cut off ‘chains of infection’, prevent prolonged quarantine and enable the reopening of the global economy,” the statement said.

“We hope that the research and development led by the DDR&D together with our excellent industries and academic institutions, will lead to a breakthrough that will change the way we diagnose and fight the virus, while giving the boost necessary to ‘restart’ our economy,” Defense Minister Benny Gantz said.

Foreign Minister Gabi Ashkenazi noted that this cooperation provides a unique opportunity for scientific and technological cooperation that can assist Israel, India and the world in coping both with the pandemic and with the economic crisis that came with it.

The cooperation between Israel and India will enable the delegation and its Indian counterparts, to collect tens of thousands of samples in just ten days, and analyze them using computer systems based on artificial intelligence. This massive sampling will shorten processes and advance the approval of effective technology. All tests will be validated using PCR tests.

“The cooperation between India and Israel on COVID-19 is a good example of harnessing the scientific and technological strengths that the two countries have for larger, common good. It will also further deepen our strategic ties, India’s Ambassador Sanjeev Singla told PTI.

The flight will be carrying some breakthrough emerging Israeli technologies for combatting COVID-19, which have been donated by the Israeli foreign ministry and the private sector, in order to bolster India’s response to the virus outbreak.

The plane will also deliver mechanical ventilators which were given special permission by Israel for export to India.

Prime Minister Narendra Modi and his Israeli counterpart Benjamin Netanyahu have held three telephonic conversations since the outbreak of the pandemic and promised mutual assistance in dealing with the virus, committing to joint technological and scientific research between the countries.

The Israeli media widely reported that Modi lifted a ban on the export of Hydroxychloroquine at Netanyahu’s request.

“The past few years have cemented the strategic relations between India and Israel and have included two historical visits of the Prime Ministers in Israel and in India,” a press statement from the ministry of defence said.

“India seeks to integrate advanced technologies in its hospitals as they prepare to treat massive waves of COVID-19 patients on an Indian scale. The Israeli companies chosen by the MFA, MOD and Israel Defence Forces to be sent to India are potentially given unique access to one of the largest economies in the world to provide monitoring and treatment technologies while significantly reducing contact between the patients and the medical staff,” it said.

“By opening the door to India’s market with its development and production capabilities, these Israeli technologies can be mass produced at a lower cost and could in future be jointly exported to third countries,” it said.

“The COVID-19 pandemic is a global challenge, so it is only right that the solution be a global scientific cooperation between countries. India and Israel’s military R&D cooperation is well known for its success. I have no doubt the same will be seen in the private sector joined by brilliant scientific minds from both countries to introduce a breakthrough in swift and simple testing procedures, said Prof. Nati Keller, an infectious diseases specialist from Sheba Medical Center, who is leading the medical side of the delegation.-PTI

<https://theprint.in/diplomacy/india-israel-collaborate-to-develop-rapid-testing-for-covid-19-in-under-30-seconds/467043/>

India and Israel join hands to develop rapid testing for Covid-19 in under 30 seconds

By Indrani Bagchi

New Delhi: Israel and India will work together to develop a new generation set of Covid-19 tests that aim to bring the entire testing process down to a few seconds, be widely available, and ultimately help to open economies. Using artificial intelligence and machine learning, these breakthrough technologies will be tested in India, and if successful, be manufactured in India, and marketed jointly by Israel and India to the world.

A special flight will be dispatched from Israel in the coming week which will include Israeli military R&D scientists and tech specialists who will work with a corresponding Indian team under the Prime minister's principal scientific adviser Dr K. Vijayaraghavan at AIIMS for about two weeks.

Briefing journalists from Israel, Dani Gold, the head of the Directorate of Defense Research and Development, Israeli ministry of defense, said the "breakthrough technologies" that would be tested in India include a voice test, a breathalyser test and an isothermal test. Gold said there has been "comprehensive research cooperation between the DDRD and India's PSA."

A readout from the Israel embassy here said, "A special planned flight from Tel Aviv to New Delhi is set to carry a high ranking MOD R&D team which has been working with India's chief scientist and DRDO to develop rapid testing for Covid-19 in under 30 seconds. Merging Israeli technology with Indian development and production capabilities aims to allow a swift resumption of normal life alongside the virus."

While Israel has a global edge in early stage development of breakthrough technologies and therapeutics, India brings to the table massive data and global manufacturing capability.

Modi and Netanyahu have spoken about three times since the outbreak of the pandemic — "in which they promised mutual assistance in dealing with the virus and committed to joint technological and scientific research between the countries."

The special flight will also include representatives from some Israeli companies chosen by their defense ministry and IDF and "given unique access to one of the largest economies in the world to provide monitoring and treatment technologies while significantly reducing contact between the patients and the medical staff."

India aims to manufacture these Israeli technologies on a mass scale for the huge Indian demand as well as for third countries.

Israel will also be sending mechanical ventilators for use in Indian hospitals. India now has over a million Covid patients and ranks third in the world after the US and Brazil.

Ron Malka, Israel ambassador to India, said, "The Covid-19 pandemic is a global challenge, so it is only right that the solution be a global scientific cooperation between countries. India and Israel's military R&D cooperation is well known for its success. I have no doubt the same will be seen in the private sector joined by brilliant scientific minds from both countries to introduce a breakthrough in swift and simple testing procedures."

Additional information on the new testing technologies:

1. Voice Test: This online voice test is based on artificial intelligence. The test analyzes the recording of a human voice and aims to identify changes in the patient's voice and/or deterioration in the condition of his/her respiratory system.
2. Breathalyzer test - detection based on terra-hertz waves: As part of an R&D program, officials developed a system of detecting the virus using THZ waves. The patient must breathe into a sterile sampling kit, after which his/her sample is analyzed using artificial intelligence.

3. Isothermal testing: This is a biochemical testing method that enables the detection of the virus in a saliva sample. An inexpensive sample kit has been developed, which detects the presence of the virus with the help of a chemical reaction that takes place once the content is heated at about 60 degrees Celsius. The kit is suitable for at-home use and produces a result within 30 minutes.
4. Testing using Polyamino acids: This is a biochemical method that enables the detection of Corona virus proteins collected in a saliva sample. Using the appropriate instrumentation, a sample may be analyzed in several minutes.

<https://timesofindia.indiatimes.com/india/india-and-israel-join-hands-to-develop-rapid-testing-for-covid-19-in-under-30-seconds/articleshow/77131847.cms>



Fri, 24 July 2020

DRDO establishes COVID-19 testing facility at DIHAR in Leh

New Delhi: DRDO has established a COVID-19 testing facility at the Leh based laboratory Defence Institute of High Altitude Research (DIHAR) to enhance the rate of testing to identify the Corona cases in the Union Territory of Ladakh, officials said.

The testing facility will also help in keeping close watch of the infected persons. The facility meets the safety standards and guidelines of Indian Council of Medical Research (ICMR). The centre was inaugurated by Lieutenant Governor of Ladakh, RK Mathur on Wednesday.



The testing facility at DIHAR is capable of screening 50 samples per day. The facility can also be utilized for training manpower for COVID testing and will be of great help to address future bio-threats and carrying out R&D activities pertinent to agro-animals diseases.

In his address, LG RK Mathur lauded the efforts of DRDO in fighting Covid 19 and thanked Dr G Satheesh Reddy, Secretary, Department of Defence R&D & Chairman DRDO for making this facility available at DIHAR. He expressed hope that the facility will help in the treatment of infected persons.

The Lieutenant Governor also inspected the testing facility. He was briefed about the bio-safety aspect of the testing facility and precautionary measures to minimize cross-contamination and safety of researcher, health professionals and the environment.

Dr OP Chaurasia Director DIHAR, Brig JB Singh Commandant, Dr Padma Gurmet Director NRISR, Leh, Dr Mutup Dorjey CMO along with his team of doctors from SNM Hospital, Leh and other senior army officials and DRDO scientists were present on the occasion.

DIHAR is one of the life sciences laboratories of DRDO working on cold arid agro-animal technologies. The laboratory is screening and identifying the medicinal and aromatic plants to exploit them for use for defence purposes and also on greenhouse technologies for high altitude and cold desert areas.

<https://kalingatv.com/nation/drdo-establishes-covid-19-testing-facility-at-dihar-in-leh/>

DRDO establishes COVID-19 testing facility in Leh

New Delhi: The Defence Research and Development Organisation (DRDO) has established a COVID-19 testing facility at the Leh-based laboratory – Defence Institute of High Altitude Research (DIHAR), according to an official statement.

“DRDO has established a COVID-19 testing facility at the Leh based laboratory Defence Institute of High Altitude Research (DIHAR) to enhance the rate of testing to identify the Corona cases in the Union Territory of Ladakh,” said a press release from the Ministry of Defence.



The press release said that the testing facility will also help in keeping a close watch of the infected persons. The facility meets the safety standards and guidelines of the Indian Council of Medical Research (ICMR). The centre was inaugurated by Lieutenant Governor of Ladakh, R K Mathur on July 22.

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The press release further said, “Dr OP Chaurasia Director DIHAR, Brig J B Singh Commandant, Dr Padma Gurmet Director NRISR, Leh, Dr Mutup Dorjey CMO along with his team of doctors from SNM Hospital, Leh and other senior Army officials and DRDO scientists were present on the occasion.”

“DIHAR is one of the life sciences laboratories of DRDO working on cold arid agro-animal technologies. The laboratory is screening and identifying the medicinal and aromatic plants to exploit them for use for defence purposes and also on greenhouse technologies for high altitude and cold desert areas,” it added. Source: ANI

<https://www.siasat.com/drdo-establishes-covid-19-testing-facility-in-leh-1928096/amp/>

Bharat ek khoj: The significance DRDO's new light, powerful drone 'Bharat' for surveillance at LAC

Among the special features of the drone are its unibody biomimetic design and advance release tech. Despite its small size, it packs in a lot of power and can work with high levels of accuracy across locations

Key Highlights

- *With thousands of Chinese troops and hi-tech weaponry also amassed on the other side of the LAC, the tense stalemate continues*
- *In such a situation, the danger of a miscalculation or a small incident spiralling out of control cannot be completely ruled out*
- *For all these reasons, the Indian military will have to up its surveillance game along the long border*

New Delhi: The crisis at the Line of Actual Control (LAC) in Ladakh could drag on for weeks if not months as there has been no further disengagement along the border.

Accordingly, the build-up on the Indian side of the LAC may have to continue as the People's Liberation Army seems to be in no mood to go back to the position it was in April.

With thousands of Chinese troops and hi-tech weaponry also amassed on the other side of the LAC, the tense stalemate continues. In such a situation, the danger of a miscalculation or a small incident spiralling out of control cannot be completely ruled out.

Meanwhile, as the rainy season gives way to autumn, it will turn quite cold in these parts in the treacherous Himalayan ranges through which the LAC passes.

For all these reasons, the Indian military will have to up its surveillance game along the long border.

This is where modern drone technology can come in very handy. Surveillance drones together with a range of other tools and gadgets can give the Indian army real-time intelligence about what the PLA is up to near the border.

Bharat – eyes in the skies

The Bharat drone has been designed by the Defence Research and Development Organisation's (DRDO) lab in Chandigarh. Defence sources were quoted as telling news agency ANI that the drone was among the "most agile and lightest surveillance drone" in the world to have been developed by the DRDO.

A series of these drones is being deployed in eastern Ladakh, which is the site of the ongoing dispute with China.

Among the cutting-edge features of the drone are its "unibody biomimetic design" and advance release tech. Despite its small size, it packs in a lot of power and has the ability to work with a high level of accuracy at any location.



Thanks to its Artificial Intelligence, it has the ability to detect both friend and foe and take relevant action.

It can survive the extreme temperatures of upper Ladkakh, has state of the art night vision tech, and can escape the watchful eyes of a radar.

The drone can provide real-time video feed and its AI tools can analyse data on the spot.

Bharat was designed by the DRDO's Terminal Ballistics Research Laboratory.

The Chandigarh-based lab's mission is to develop technologies and products related to warheads; provide state-of-the-art diagnostics facilities for test and evaluation of armaments systems; and boost India's technology base in armaments by providing requisite infrastructures and quality manpower.

<https://www.timesnownews.com/india/article/bharat-ek-khoj-the-significance-drdo-s-new-light-powerful-drone-bharat-for-surveillance-at-lac/625564>

WWW.ECONOMICTIMES.COM
THE ECONOMIC TIMES

Fri, 24 July 2020

Successful trials of 'Dhruvastra' show India's ability to take on China, Pakistan

1/5 The genesis

HELINA (Helicopter based NAG) is a third generation fire and forget class anti-tank guided missile (ATGM) system mounted on the Advanced Light Helicopter (ALH). A variant of HELINA Weapon System called DHRUVASTRA is being inducted into the Indian Air Force.

2/5 Successful trials

According to a report by ANI, trials of 'Dhruvastra' were conducted on July 15 and July 16 at Integrated Test Range (ITR) in Balasore. The trails were conducted without a helicopter in direct and top attack mode.



3/5 Infrared capabilities

The ATGM is guided by an infrared imaging seeker (IIS) operating in the lock-on before-launch mode and helps in further strengthening the defence capabilities of the country. (Representative)

4/5 The China connect

These trials come in the backdrop of ongoing disengagement process between India-China at the friction points between the two armies in eastern Ladakh.

5/5 Realising history

In July 2019, Defence Research and Development Organisation (DRDO) had carried out three successful test firings of the Nag missiles in the Pokhran firing ranges. Nag was one of the first five strategic missiles planned to be developed under the Integrated Missile Development Programme initiated in the 1980s.

<https://economictimes.indiatimes.com/news/defence/successful-trials-of-dhruvastra-show-indias-ability-to-take-on-china-pakistan/realising-history/slideshow/77124442.cms>

India arming itself to remain compelling deterrent against attack by neighbours

Edited By Palki Sharma

Story highlights

New Delhi might be recognising this fact by stepping up its defences by deploying the ultimate weapon: the nuclear bomb.

Experts have argued for long that China and not Pakistan is India's biggest threat.

New Delhi might be recognising this fact by stepping up its defences by deploying the ultimate weapon: the nuclear bomb.

India's nuclear weapons are pointing towards China now with Beijing within the range of Indian missiles.

Three years ago, India tested the Agni-5 missile. Its success was a boost for India's defence capability.

In response, Chinese state media outlet The Global Times said "India needs to cool its missile fever".

"India has broken the UN Limits on its development of nuclear weapons and long-range ballistic missile"

The article goes on to argue that Pakistan should have the "same privileges" in nuclear development that India has.

The whole article appears like a defence of Chinese ally Pakistan.

China is worried about India's missile capabilities because the Agni-4, as well as the Agni-5 can hit targets within mainland China, including its capital Beijing.

Experts who have closely studied India's nuclear program have confirmed that Pakistan is not the country only focus now.

India is now developing capabilities to deploy nuclear weapons against China.

All three branches of India's defence forces have a role to play in this new strategy.

On the air front, three or four squadrons of the Mirage 2000h and the Jaguar have been assigned nuclear strike missions against Pakistan and China.

India is also set to induct the Rafale aircraft, a fighter jet that can be used for nuclear missions.

On land, the Agni-4, which if deployed in northeast India, can hit targets like Beijing and Shanghai.

The Agni-5 is much more capable as it can hit targets in China from bases in central and southern India.

On the high seas, India is developing a submarine-launched ballistic missile which will allow Indian submarines to target all of Asia.

To back the new strategy, India is increasing its nuclear arsenal. Reportedly, India has developed 150 nuclear warheads.

48 nuclear bombs have been assigned to aircraft with the Indian Airforce.

While India maintains the no-first use policy, it is arming itself to remain a compelling deterrent for any kind of adventurism from the neighbours.

<https://www.wionews.com/india-news/india-arming-itself-to-remain-compelling-deterrent-against-attack-by-neighbours-315496>



Rajnath Singh in Leh Photograph: (Twitter)

Next India-China military talks to have officials from Foreign, Defence and Home Ministries

The meeting of the Working Mechanism for Consultation and Coordination on India-China border affairs is likely to be held on Friday

Key Highlights

- *The Chinese military has shown reluctance to push back from Finger 5 area and return to their permanent position at Sirijap since they are planning to set up an observation post in the Finger area*
- *The PLA has also set up vast infrastructure in the Hot Springs and Gogra post areas – the two major*

New Delhi: The military-level talks between India and China have been going on for a month now after bilateral ties worsened following a bloody clash between both militaries in Galwan Valley area of Ladakh on the intervening night of June 15-16 where around 20 Indian Army soldiers were killed in action.

The military talks between the two countries have been going on to de-escalate the situation and according to the latest development, officials from the External Affairs, Defence and Home Ministries are also going to attend the next meeting.

The meeting of the Working Mechanism for Consultation and Coordination (WMCC) on India-China border affairs is likely to be held on Friday.

Along with clashing with Indian border troops, the Chinese army has also been encroaching upon Indian territory along the Line of Actual Control, much to the Centre's chagrin.

However, the Chinese People's Liberation Army (PLA) seems to be disinterested in de-escalation even after global pressure and condemnation over the LAC standoff with India, as recent reports claim Beijing has continued deploying around 40,000 frontline troops in areas near Eastern Ladakh.

"The Chinese have not shown any signs of de-escalation as they continue to maintain their heavy troop deployment of almost 40,000 troops supported by heavy weaponry like air defence systems, armoured personnel carriers and long-range artillery in front and depth areas," sources said, according to news agency ANI.

China is also not also honouring their commitment on disengagement at friction points in Eastern Ladakh and not pushing back on mutually agreed terms that were put forth during talks at the government and Army levels, which included intervention even by National Security Advisor Ajit Doval a couple of weeks ago.

The Chinese military has shown reluctance to push back from Finger 5 area and return to their permanent position at Sirijap since they are planning to set up an observation post in the Finger area. Additionally, the PLA has also set up vast infrastructure in the Hot Springs and Gogra post areas – the two major friction points in Eastern Ladakh.

<https://www.timesnownews.com/india/article/next-india-china-military-talks-to-have-officials-from-foreign-defence-and-home-ministries/625874>

Increasing LAC deployment this winter will be an expensive affair for Indian Army

The deployment entails creating vast infrastructure, where none presently exist, for 25,000-30,000 additional troops

By Rahul Bedi

Chandigarh: The Indian Army's impending winter deployment along the disputed Line of Actual Control (LAC) in eastern Ladakh promises to be a precipitous Himalayan replay of the ten-month-long Operation Parakaram against Pakistan that ended in October 2002.

The only difference, however, between the two deployments is that the Indian Army will not, for the foreseeable future, be able to pull back from the LAC like it did in Operation Parakaram, launched in December 2001 in response to the attack on India's parliament by five Pakistan-backed gunmen.



Indian army soldiers rest next to artillery guns at a makeshift transit camp before heading to Ladakh, near Baltal, southeast of Srinagar, June 16, 2020. Photo: Reuters/Stringer

Perforce, the army will need to remain deployed for long in large numbers at heights above 14,000 feet, even during the unforgiving winter, to deter China's People's Liberation Army (PLA) that is refusing to pull back from Indian territory it invaded in May.

"It's almost certain at this point that the LAC in Ladakh will mirror the 747km-long long line of control (LoC) with Pakistan with regard to army deployment," said former army deputy chief of staff Lieutenant General J.P. Singh.

But the LAC deployment, he warned, will financially bleed India as it entails creating vast infrastructure, where none presently exist, for 25,000-30,000 additional troops. This will impose a recurring expense that will result in an exponential rise in the army's revenue expenditure, severely impacting its long-delayed modernisation, he added.

In fiscal year 2020-21, even before the LAC impasse occurred, the division of the army's capital expenditure for force modernisation and revenue outlay, that includes salaries and operating expenses, was 17% and 83%, respectively. The desired ideal between revenue and capital costs, according to successive parliament defence committees, is 60% and 40%, respectively.

This former amount is now poised to soar, as the army has to create habitats along the LAC spread across 250-300 km and stock them with tens of thousands of tonnes of food and fuel for warmth for over 25,000 personnel for six months, October onwards. The cost this will entail will sizeably depreciate the army's already minuscule capital outlay, and could even end up poaching the budgets of the other two services.

In response, the resource-strapped federal government, facing galloping recession and an economic downturn due to the coronavirus pandemic, would have little choice but to exponentially hike the defence budget at the expense of other commitments, to deal with the Chinese threat in Ladakh. "This is a zero sum game which has never been played well by any government," said Amit Cowshish, former defence ministry financial advisor on acquisitions. Better planning could have obviated the impending financial crisis, he added.

Additionally, the army will have to hastily import arctic tents and other high-altitude equipment like clothing for the six-month winter deployment, acquiring it off the shelf from European suppliers at high costs. Furthermore, the army's defensive posture will necessitate the erection of specialised temperature-controlled fuel, ammunition and missile storage depots and centrally

heated garages, workshops and maintenance centres for assorted trucks and vehicles, main battle tanks and howitzers.

The staple materials to construct and stock all these facilities are sourced from the plains, and transported to Leh and beyond by an endless convoy of trucks between April and October, as part of the army's Advanced Winter Stocking (AWS) logistic exercise. Except this year, the AWS will be hugely magnified as the October deadline looms.

Heavier engineering and other related equipment will need to be ferried by the Indian Air Force's (IAF's) C-17 and C-130J-30 transport aircraft that are hugely expensive to operate. Besides, as one senior army officer pointed out, frequent sorties by both these aircraft – as have also been executed in recent weeks and with more in the offing – would render both platforms ready for servicing.

This servicing, in keeping with the End User Monitoring Agreement (EUMA) that India signed with the US in 2009, would mandatorily be effected in the US, further draining the military's limited budget. The EUMA restricts India from getting US-origin defence equipment serviced by any another country; all spares too are required to be sourced exclusively from the US.

Meanwhile, the LAC deployment is certain to stymie chief of defence staff General Bipin Rawat's recently announced plans to reduce the 1.25-million-strong army's manpower by some 100,000 troops and revamp the forces' basic structure by creating leaner and more flexible integrated battle groups or IBGs.

As army chief, General Rawat had declared that the army spends 83% of its budget on salaries and pensions, leaving a paltry 17% for modernisation and equipment upgrades. "We have to cut down on manpower to make way more for equipment," he had declared in late 2018.

But the PLA, it seems, will stymie General Rawat's schemes.

Over two decades earlier, then army chief General V.P. Malik too had similarly announced that he would reduce his forces strength by 50,000 personnel. The ensuing conflict Kargil War in May 1999 abruptly ended his plans, as the LoC needed physical manning that could only be achieved by augmented force levels, but at a price that continues to be extracted.

Regrettably, an even higher cost is being imposed, but this time by China, necessitating the hasty re-deployment of formations from other parts of India to the LAC. This, in turn, has imposed a major reorganisation in the army in other regions that could potentially pose a security risk, officers said.

In the meantime, it is worth recalling that since 1984 till late 2019, some 869 soldiers had died on the Siachen Glacier spread across 76 km at heights above 17,700 feet due to climatic conditions, analogous to portions of the LAC stretch along which the imminent deployment is planned.

It is also instructive to recall that Operation Prakaram, executed largely in the Punjab plains and the desert regions, claimed more lives during deployment than the number killed in the Kargil War.

In July 2003, then defence minister George Fernandes had told parliament that 798 army personnel suffered fatal casualties during Operation Prakaram. In comparison, 527 soldiers had died in the 11-week-long Kargil conflict, fiercely fighting their way uphill on snowy slopes against the tactically better ensconced Pakistan Army.

The LAC face-off has so far claimed 20 Indian Army lives. Hopefully, it will stop there.

<https://thewire.in/security/indian-army-lac-china-deployment-expensive>

Augmenting air defence in Ladakh with Navy

Let us not forget that there are chances of any conflagration escalating to the maritime domain around our sea domain and the Malacca Straits, where the carrier-borne MiG-29s would find better employability. In fact, the Vikramaditya could see a potent deployment in coordination with our assets in the waters around Andaman and Nicobar

Group Captain Murli Menon (retd)

Defence Analyst

For the tri-services, fighting a war is essentially about integrating the assets of one service gainfully into the operations of another to further the overall war aims. Historically, smart-thinking commanders in the IAF have not shied away from exploiting the capabilities existing in the Army and Navy to augment their own air campaigns and plans. The integration of the Navy, and the civil and Army radars into the IAF's air defence order of battle (ORBAT) has been one such example in the past.

Naval maritime commandos (MARCOS) or the Army special forces could thus find employability within the IAF's counter-air, counter-terror or suppression of enemy air defence (SEAD) campaigns. The induction of the Indian Navy's Poseidon P8-I in Ladakh is, therefore, something to be lauded. Its inverted synthetic aperture radar capabilities (high resolution of the order of one metre) would definitely enable a joint surveillance target attack radar system (JSTARS) kind of exploitation of the P-8, as was apparently achieved during the Doklam standoff.



Unfamiliar terrain: Naval pilots are not trained for valley-flying or ground attack missions in high altitude regions.

But the decision to deploy the MiG-29Ks in the sector, if media reports are to be believed, is perplexing indeed. Now, the integration of assets does not mean throwing everything you have at the enemy, even if operational viability is suspect. The MiG-29K is essentially meant for carrier-borne air defence or limited maritime and ground attack roles.

But to use it to augment air defence and strike capabilities in totally unfamiliar terrain and air bases is another matter altogether. Naval pilots are not trained for valley-flying or ground-attack missions in high-altitude regions, unlike their IAF counterparts. Technical challenges such as engine start at high-altitude bases are another matter to contend with, which the IAF has mastered over time and the Indian Navy has no experience with. In any case, what is the real operational urgency for such a deployment, one wonders.

And let us not forget that there are chances of any conflagration escalating to the maritime domain around our sea domain and the Malacca Straits, where the carrier-borne MiG-29s would find better employability. In fact, the Vikramaditya could see a much more potent deployment in coordination with our assets in Andaman and Nicobar to dominate the sea lines of communication (SLOC) in the Indian Ocean.

In any event, at present, only posturing is being indulged in by both the parties. Should there be a reason to fire a shot in anger, what type of air operations could be envisaged?

Possibly, counter-surface force operations along the high valleys against Chinese troop deployments or formation headquarters, some SEAD missions against the air defence radars or missile batteries or some strategic strikes against the logistic and communication hubs? All such missions could well be handled by the Sukhois, Mirages and Jaguars. Strike options in the mountainous terrain could also be exercised through our Hawk and Pilatus trainers, AH-64 Apaches or MI-17V.

The biggest worry, of course, would be the ground-based missile threat to our strike aircraft. So also for the P-8 I which could mainly be employed in a border surveillance role, as any deep ingress beyond the LAC could open up the threat spectrum of the Chinese S-300 HQ-9 class. In such a scenario, where does the IN-MiG-29K fit in? Surely, we have enough SU-30 MKIs, MiG-29UPGs and Mirages to take care of the air defence of the vital areas and vital points in this sector?

Also, there could be issues with aerial refuelling for the P-8 and MiG-29Ks which I understand are not compatible with the IAF tanker probe and drogue systems. If the intent is only to psyche the adversary by showing the number of aircraft deployed, that would be counter-productive as the aim should be to achieve combat-efficiency for all fleets deployed and not show doubtful capability. The doubtful aircraft availability of the MiG-29 K — around 52 per cent — as brought out by the CAG, would be another operational milestone for this fleet.

Another media hype has been about the yet-to-arrive Rafale. The highly successful air raid earlier this month by the Egyptian or French Rafale over the Al Watiya Turkish airbase in Tripoli could not have been timed better. Besides, with the limited number of Rafale expected in the country this month, we are talking of may be half a dozen or so available over the next three months.

So, against the current China border standoff, the induction of the Rafale would be a bonus if at all they could be operationalised in time. Once again, we have capabilities in place to prosecute an air war effectively with our existing assets.

The aim now should be to optimise air defence in the Ladakh region, integrate assets such as radars, AWACS and SAGW and give the operators confidence in round-the-clock operations. The emphasis should be on accurate delivery of weapons over tricky targets in the mountains, peculiarities in terrain-masking and its impact on sensor ranges, air defence etc.

It needs recalling that Kargil was a one-sided air battle and yet it took us long to get used to the altered operating domain. Now, if there is going to be another capable Air Force attempting to play spoilsport for you, the challenges are clear. So, my advice to our air warriors would be to keep it simple: hone your marksmanship and outwit the opposition through superior flying and associated aerial tactics.

Given the relative distances of the tactical battle area from the launch bases being in our favour, the enemy is going to be operating at the extremities of his ranges, looking for quick tactical solutions in weapon delivery and air combat.

Let us not be on the defensive, therefore, and put our superior training and proven weapon platforms to good use.

<https://www.tribuneindia.com/news/comment/augmenting-air-defence-in-ladakh-with-navy-117152>

To Beijing, a message from the seas

India and the US have sent a clear signal to China in the domain where it is vulnerable

By C Uday Bhaskar

A new low has been reached in the simmering United States (US)-China discord with the Donald Trump administration forcing the closure of the Chinese consulate in Houston, and Beijing vowing to retaliate at what it described as an “unprecedented escalation”. The foreign ministry in Beijing announced on July 22 that China planned to “react with firm countermeasures” if the Trump administration did not “revoke this erroneous decision.”

This unexpected US decision to raise the diplomatic heat on China comes in the wake of a US carrier strike group led by the nuclear-powered *USS Nimitz* exercising with warships of the Indian Navy’s eastern fleet on July 20 in the Indian Ocean. While this has been described as a routine “passex” (basic naval exercises when warships of two navies pass by each other in the oceans), the subtext points to a subtle demonstration of US-India partnership even as India and China are engaged in a slow disengagement process — which now appears to have hit a roadblock — after the Galwan incident.



An aerial view of USS Nimitz, one of world's largest air craft carriers. USS Nimitz's joint exercise with the Indian Navy and the possible expansion of Malabar naval exercises will add to India's strength(PTI)

As is now well-recognised, the altercation at Galwan in the Ladakh region of the Line of Actual Control (LAC), where the People’s Liberation Army (PLA) troops ambushed and killed 20 Indian soldiers, marked a different low point in the bilateral relationship between India and China. The template that framed Sino-Indian relations since 1993 and ensured an extended period of guarded “peace and stability” is no longer valid. Delhi is now exploring a new level of diplomatic mediation with layered military messaging.

The immediate objective for India is a return to the pre-Galwan status quo along LAC. It appears that PLA is unlikely to withdraw from the locations it has occupied and fortified in a swift and consensual manner. In reviewing other options, Delhi has revived certain naval/maritime possibilities and these include the likelihood of inviting Australia to join the India-US-Japan trilateral Malabar naval exercises towards the end of the year. This points to reviving the Quad — a group of four nations that came under one umbrella for the first time in the aftermath of the December 2004 tsunami.

It may be recalled that when India had mounted a Quad-plus Singapore five-nation naval exercise in 2007, China bristled at what it considered to be a latent threat. Delhi, then, chose to placate Beijing’s concerns by reverting to a bilateral Malabar with the US.

The abiding anxiety for China is what is referred to as the Malacca dilemma. This refers to Beijing’s perceived vulnerability in the Indo-Pacific given its enormous dependence on unimpeded merchant shipping, which is predicated on the freedom of the oceans and the sea-lines of communication.

One strand of this dependence is illustrated by the fact that in 2019, China imported an average of 10.1 million barrels of crude oil per day and most of this passes through the Malacca Strait. The vulnerability-leverage matrix can be suitably calibrated depending on the prevailing geopolitical context and Beijing is sensitive to this factor.

Consequently, Beijing has been seeking to mitigate this dilemma in various ways and an ambitious China-Iran strategic partnership is the latest initiative. It envisions a \$400-billion Chinese investment in return for long-term hydrocarbon supplies and access to the Chabahar port. Along with Gwadar in Pakistan, this maritime connectivity and access, while ostensibly being part

of the Chinese Belt and Road Initiative project, will enhance Beijing's footprint in a strategic location near the Persian Gulf. In summary, the Indian Ocean is being differently animated by China and the US in the main. India has to evolve a short-term and long-term maritime orientation that will enable Delhi to protect and advance core national interests.

This is where the presence of the *USS Nimitz* offers an insight into the suasive nature of the naval capability and the spectrum of options it can provide in managing the relationship with a bellicose China. The US, in recent days, has upped the ante against China in relation to the South China Sea (SCS), and termed Beijing's actions as "unlawful" and reiterated its commitment to a "free and open Indo-Pacific".

It is instructive that the *USS Nimitz* carried out a freedom of navigation patrol in the SCS before exercising with the Indian Navy and Beijing would be reading the tea leaves carefully. Astute application of military/naval capability can enhance diplomatic efficacy and India needs to acquire the requisite material capability and the partnership with the US has been useful. In an innovative use of naval platforms, the US-supplied *P-8I* maritime recce aircraft have been deployed along LAC for surveillance and points to maximising limited assets in unexpected exigencies.

India's predicament is resource allocation for the military when the GDP is expected to shrink dramatically due to Covid-19. A focused strategic dialogue with the US and other Indo-Pacific nations that share both anxiety about China's bellicosity, and an aspiration to realise a rule-based maritime order, may offer some policy options that could be pursued both individually and collectively.

For now, how Beijing will "retaliate" against the US whether in relation to the Houston consulate, or the joint naval exercise in the Indian Ocean, will offer some cues about the nature of the India-China relationship in its post-Galwan phase.

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

<https://www.hindustantimes.com/analysis/to-beijing-a-message-from-the-seas/story-ROAhv6uVaRmrVgM7GWCFBN.html>



Fri, 24 July 2020

Synergy between armed forces under Theatre Commands gives India edge over China on LAC

India's upper hand in the difficult terrain has been possible due to a synergy between armed forces and theatre commands

Edited By Arun Kumar Chaubey

Highlights

- 1. The Indian Air Force and Army carried out a joint operation in Ladakh. The exercise was conducted in close coordination on-ground operations**
- 2. For enhancing joint collaboration among the three services, special forces of the Army, Navy, and Air Force have been deployed in the Kashmir Valley**
- 3. The Army's Para units, Navy's Marine Commandos, and IAF's Garud special forces are being deployed in the Kashmir Valley under the newly-raised Armed Forces Special Operations Division**

New Delhi: India-China standoff on the Line of Actual Control (LAC) in the wake of clashes between the Indian Army and Chinese troops in the Galwan valley in Eastern Ladakh on June 15 night has shown confidence as well as the resilience of the Indian armed forces. India's upper hand in the difficult terrain has been possible due to a synergy between armed forces and theatre commands.

This synergy has also provided several successful moments for the Indian Armed forces. The highlights of this success are given below:

June 2020:

The Indian Air Force and Army carried out a joint operation in Ladakh. The exercise was conducted in close coordination on-ground operations.

November 2019:

In a major step towards enhancing joint collaboration among the three services, special forces of the Army, Navy, and Air Force have been deployed in the Kashmir Valley to carry out joint counter-terrorism operations. The Army's Para (special forces) units, Navy's Marine Commandos (MARCOS), and Indian Air Force's Garud special forces are being deployed in the Kashmir Valley under the Defence Ministry's newly-raised Armed Forces Special Operations Division (AFSOD).

September 2019:

With an eye on China, the IAF reopened its Vijaynagar ALG (advance landing ground) in Arunachal Pradesh for military aircraft on Wednesday, even as the Army wrapped up an operational alert exercise in eastern Ladakh near the Line of Actual Control (LAC).

The "all-arms integrated" exercise, termed as "Changthang Prahar (assault)", in a "super high-altitude" area near Chushul in eastern Ladakh, witnessed the participation of tanks, artillery guns, drones, helicopters, and troops as well as para-drops by IAF aircraft.

April 2018:

The Operational Commands of the IAF planned and executed Inter Valley Troop Transfer (IVTT) in coordination with affiliated Indian Army Commands. IVTT, a major Joint Operation, was conducted in the high hills of Northern and North-Eastern Sector.

The aim of the exercise was to validate the capability of the Indian Air Force and the Indian Army to quickly transfer and redeploy acclimatized troops, in the simulated objective area. These operations are conducted to reposition troops from one valley to another, to counter any evolving threat, and to surprise or offensively exploit the weakness of the adversary.

July 2018:

A "joint doctrine" providing for deeper operational synergies among the Army, Navy, and Air Force was unveiled with an aim to coherently deal with all possible security threats facing India including conventional and proxy wars.

The joint doctrine proposes joint training of personnel, unified command, and control structure besides pushing for a tri-service approach for the modernisation of the three forces.

The doctrine will facilitate the establishment of a broad framework of concepts and principles for joint planning and conduct of operations across all the domains such as land, air, sea, space, and cyber-space. The document was released by the chairman of the chiefs of staff committee (COSC) and Navy Chief Admiral Sunil Lanba in presence of the then Army Chief Gen Bipin Rawat and the then IAF Chief BS Dhanoa.

<https://zeenews.india.com/india/synergy-between-armed-forces-under-theatre-commands-gives-india-edge-over-china-on-lac-2297807.html>

IAF eyes new smart weapon for Rafale jets amid border row with China

The IAF will induct its first batch of five Rafale jets imported from France at the Ambala air base on July 29. The air force could deploy the new fighters in the Ladakh sector as part of India's overarching plan to strengthen its military posture in the region, officials previously indicated to Hindustan Times

By Rahul Singh

New Delhi: Stuck in a seemingly intractable border dispute with China in eastern Ladakh, India is looking at arming its new Rafale fighter jets with an all-weather smart weapon of French origin that will allow combat pilots to engage ground targets from a standoff range of up to 60 km, people familiar with the developments said on Thursday, speaking on condition of anonymity.

The Indian Air Force is likely to initiate the purchase of Hammer (Highly Agile Modular Munition Extended Range) using emergency financial powers granted to the military by the government at a time of heightened military tensions with China, said one of the officials cited above.

The IAF will induct its first batch of five Rafale jets imported from France at the Ambala air base on July 29. The air force could deploy the new fighters in the Ladakh sector as part of India's overarching plan to strengthen its military posture in the region, officials previously indicated to Hindustan Times.

The Hammer, consisting of a guidance kit and a range extension kit fitted on a standard bomb of the Mk80 series, is manufactured by French defence firm Safran. The Hammer purchase will necessitate the import of Mk80 series bombs that can later be manufactured in India, said a second official.

The other weapons that the Rafale jets will be armed with include Meteor beyond visual range air-to-air missiles, Mica multi-mission air-to-air missiles and Scalp deep-strike cruise missiles.

While India initiated discussions with France to buy Hammer two to three years ago, the current border tensions with China have lent fresh urgency to the procurement, said a third official.

"Enhancement of capability, especially under the present circumstances, will serve the IAF well. Efforts should be made to fast-track the purchase," said Air Chief Marshal Fali H Major (retd), a former IAF Chief.

India ordered 36 Rafale jets from France in a deal worth Rs 59,000 crore in September 2016 as an emergency purchase to plug gaps in the IAF's combat capabilities. The jets have been specially tailored for IAF.

India-specific enhancements on the jets include cold engine start capability to operate from high-altitude bases including Leh, radar warning receivers, flight data recorders with storage for 10 hours of data, infrared search and track systems, jammers and towed decoys to ward off incoming missiles.

The twin-engine jet is capable of carrying out a variety of missions – ground and sea attack, air defence and air superiority, reconnaissance and nuclear strike deterrence. It can carry more than nine tonnes of weapons on as many as 14 hard-points.

The two Rafale squadrons will be based at Ambala in Haryana and Hasimara in West Bengal, covering the western and eastern fronts.



French defence firm Safran's Hammer, an air-to-ground weapon, on display at Yelahanka air base during Aero India-2017. (RAHUL SINGH/HT PHOTO.)

Acting on a special request by the IAF, France has accelerated the deliveries of Rafale fighters to India --- five jets are coming to Ambala instead of four that were originally planned to be delivered in the first batch.

According to the original delivery schedule, the first 18 jets (including the four in the first batch) were to be delivered to the IAF by February 2021, with the rest expected by April-May 2022. Future deliveries will also be expedited.

<https://www.hindustantimes.com/india-news/iaf-eyes-new-smart-weapon-for-rafale-jets-amid-border-row/story-zbUjRqL6bjXGdagWPswaOM.html>

राफेल की ताकत और बढ़ेगी: राफेल के लिए हैमर मिसाइल का इमरजेंसी ऑर्डर, लद्दाख जैसे इलाके में 70 किमी रेंज में बंकरों को भी तबाह कर सकती है ये मिसाइल

- फ्रांस की वायुसेना के लिए बनी हैमर मिसाइल से 60 से 70 किलोमीटर रेंज तक किसी भी तरह के टारगेट को तबाह किया जा सकता है
- 5 राफेल का पहला बैच जुलाई के आखिर तक भारत आ सकता है, इन्हें अंबाला एयरफोर्स स्टेशन पर वायुसेना में शामिल किया जाएगा

इस महीने के आखिर में मिलने वाले राफेल फाइटर जेट को और ज्यादा पावरफुल बनाया जा रहा है। वायुसेना इसे हैमर मिसाइल से लैस करेगी। इसके लिए फ्रांस से बातचीत हुई है और हैमर मिसाइल के लिए इमरजेंसी ऑर्डर कर दिए गए हैं।

न्यूज एजेंसी ने सूत्रों के हवाले से बताया कि फ्रांस राफेल के लिए जल्द से जल्द हैमर मिसाइल सप्लाई करने के लिए तैयार है। वायुसेना की जरूरत को देखते हुए फ्रांस के अधिकारियों ने किसी और के लिए तैयार किए गए स्टॉक में से भारत को हैमर देने का फैसला किया है।

हैमर मिसाइल की खासियत

- हैमर (हाइली एजाइल मॉड्यूलर म्यूनिशन एक्सटेंडेड रेंज) मीडियम रेंज मिसाइल है, जिसे फ्रांस की वायुसेना और नेवी के लिए बनाया गया था। ये आसमान से जमीन पर वार करती है।
- हैमर लद्दाख जैसे पहाड़ी इलाकों में भी मजबूत से मजबूत शेल्टर और बंकरों को तबाह कर सकती है।
- हैमर से 60 से 70 किलोमीटर रेंज तक किसी भी तरह के टारगेट को तबाह किया जा सकता है।

**मीडियम रेंज हैमर मिसाइल का
फ्रांस की एयरफोर्स और नेवी भी इस्तेमाल करती है**

रेंज: **60 से 70** किमी.

काबिलियत
लद्दाख जैसे पहाड़ी इलाकों में भी टारगेट को निशाना बना सकती है।

ताकत
बंकरों और मजबूत शेल्टरों को भी तबाह कर सकती है।

हैमर यानी हाइली एजाइल मॉड्यूलर म्यूनिशन एक्सटेंडेड रेंज।



राफेल मीटियर और स्काल्प जैसी मिसाइलों से भी लैस होगा

5 राफेल 29 जुलाई को फ्रांस से भारत आ रहे हैं, वहीं मीटियर और लॉन्ग रेंज स्काल्प जैसी अत्याधुनिक मिसाइल इससे पहले ही भारत पहुंच गई होंगी। मीटियर विजुअल रेंज के पार भी अपना टारगेट हिट करने वाली अत्याधुनिक मिसाइल है। उसे अपनी इसी खासियत के लिए दुनिया में जाना जाता है। मीटियर की रेंज 150 किमी है।

स्काल्प डीप रेंज में टारगेट हिट कर सकती है। स्काल्प करीब 300 किलोमीटर तक अपने टारगेट पर सटीक निशाना लगाकर उसे तबाह कर सकती है।

29 जुलाई को वायुसेना में शामिल हो सकता है राफेल

भारतीय वायुसेना ने के मुताबिक, 5 राफेल का पहला बैच जुलाई के अंत तक भारत आ सकता है। इन्हें 29 जुलाई को अंबाला एयरफोर्स स्टेशन पर वायुसेना में शामिल किया जाएगा। फाइनल इंडक्शन सेरेमनी 20 अगस्त को होगी।

भारत ने फ्रांस के साथ 2016 में 58 हजार करोड़ में 36 राफेल फाइटर जेट की डील की थी। 36 में से 30 फाइटर जेट्स होंगे और 6 ट्रेनिंग एयरक्राफ्ट होंगे। ट्रेनर जेट्स टू सीटर होंगे और इनमें भी फाइटर जेट्स जैसे सभी फीचर होंगे।

<https://www.bhaskar.com/national/news/rafale-fighter-aircraft-news-updates-indian-air-force-boost-rafale-capabilities-with-hammer-missiles-127543276.html>

The Indian EXPRESS

Fri, 24 July 2020

Explained: maintaining troops on LAC

The Army is preparing for extra provisions for additional troops who have been moved to the LAC amid the standoff with the Chinese. What does it take to keep a soldier battle-fit in such harsh conditions?

By Krishn Kaushik

New Delhi: With three extra Army divisions having moved to the Line of Actual Control in Ladakh to mirror the Chinese build-up (The Indian Express, July 22), the Army has started preparing for extra provisions for the additional troops who will remain deployed through the winter.

The Army does not share specifics about what will be required and is being transported. A look at what it takes to maintain a soldier in such harsh conditions:

Why is it so challenging?

The eastern Ladakh region is a high-altitude desert, where temperatures can drop to -20°C. The thinner air at high altitudes also makes breathing tougher.

Major General A P Singh, who served during 2011-13 as the head of logistical operations of XIV Corps that is responsible for the China-facing LAC, explained that on such terrain the soldier is “fighting three elements: the enemy, the weather and his own health”.

What is the cost?

“Cost of keeping one soldier there, starting from buying of matches to his condiments, to his food, to his fuel for warming to his shelter to everything, for one turnaround year is easily at least to the tune of Rs 10 lakh,” Singh said. “I am just talking about keeping a soldier there, equipping him, feeding him, keeping him fighting fit, providing him with all the wherewithal.” Then there are a lot of “untold costs that nobody will tell you” because of the sensitive nature of the information.

“Mirror deployment through the winter will be a huge trade-off,” Singh said.

Other officers who have served in the region agreed with the assessment; one former senior commander said the cost may be even higher.

How are the supplies transported?

By road transport or through aerial trips. Land supply routes are open only during the summer, with high-altitude passes covered in snow from around November to March-April.

There are two road accesses to Ladakh from Srinagar: Rohtang Pass and Zoji La. But neither is open round the year. With Rohtang tunnel likely to open later in the year, it can potentially solve the problem, but there are two more passes on that route, Baralacha La and Thanglang La, both of which are at a higher altitude than Rohtang, and may be snowed in during the winter.

Singh said one round trip between Srinagar and Leh for a truck that can carry 10 tonnes of supplies costs around Rs 1 lakh. A C-17 Globemaster military aircraft, Singh said, can carry up to 50 tonnes and an hour-long flight costs roughly Rs 24 lakh.

Aircraft usually carry about 200-250 tonnes a day; heavy material has to go by road.

What happens after a truck reaches Leh?

Even to reach Leh, the Army has to build transit shelters for the crew of the trucks. But bringing the supplies to Leh is just the first stop. Nearly 70% of all these supplies has to be taken to forward bases such as Siachen or Kargil.

As the terrain gets tougher, the Army uses the help of locals and mules to carry some of the materials. They walk around 10 km and back every day through the summer months so that the troops are stocked for the winters.

What will be the additional cost this time?

With the usual deployment, the Army starts the process of Advance Winter Stocking in April-May. Aircraft are usually used for emergency requirements.

“In normal course you have about 2 lakh tonnes of supplies, food, equipment etc for XIV Corps for being stocked for the 6-7 months,” Singh said. With the new troops retained for winters, “it may not double everything, but close to 3 lakh tonnes of essentials will be needed now”.

With Rs 1 lakh for transporting ten tonnes through road, and the high price of air transport, the total additional transportation cost can be calculated, he said. The government will have to buy everything “at a higher rate now in the open market, compared to what we would have provisioned earlier”.

What specialised equipment do the soldiers require?

For high altitudes, the Army procures specialised equipment to keep troops warm and ready for possible health issues. “Most troops will be there for their first winter. It will be very difficult for them as they will also have to be combat-trained in these excruciating conditions,” Singh said.

Anything above 14,000 feet is considered super-high altitude. Of the four friction points in the standoff, Galwan Valley, Hot Springs and Gogra Post are higher than 14,000 feet. Depsang Plains — where troops were not involved in a faceoff but where India’s access to traditional patrol points has been blocked by China — is higher than 17,000 feet.

For such altitudes, the Army provisions for Special Clothing and Mountaineering Equipment (SCME). It includes ropes, special helmets, snow boots, jackets etc. Singh said each soldier posted to Siachen is issued two sets, each costing over Rs 2 lakh.

“We requisition for about 30,000 soldiers, including 5,000 in reserve,” he said, and added that at least a third of the additional deployment will need SCME as they will be posted in Galwan Valley, Gogra Post and Depsang Plains.

In a report for 2015-18 tabled in Parliament in February this year, the Comptroller & Auditor General noted “delays in procurement of high-altitude clothing and equipment items up to four years leading to acute shortage...”. The Army later dismissed the report, saying it pertained to an earlier period and the issue has been addressed since.

What other challenges are involved?

The forces have to fight against time. The turnaround time from Srinagar to Leh and back is 15-20 days. It takes even longer from Rohtang Pass. With nearly twice the supplies to be taken before the passes close in the winter, “now you are trying to pump in more”, Singh said.

Additionally, the forces have to stock up for the infrastructure work going on near the forward areas, including on the Durbuk-Shyok-Daulat Beg Oldie road.

Another important aspect is building new shelters. “With the strength doubling, you can imagine the amount of stuff that has to be built, including heat-proof shelters or at least liveable for the -20°C temperatures,” Singh said. The cement does not set after September, he said, so the Army “only has the month of August left”.

<https://indianexpress.com/article/explained/india-army-lac-troops-china-ladakh-6520663/>



Fri, 24 July 2020

IAF top commanders to review defence system

Top commanders of the Indian Air Force will carry out an in-depth review of the country's air defence system at a three-day conference which began on Wednesday

By Manjeet Singh Negi

New Delhi: Top commanders of the Indian Air Force will carry out an in-depth review of the country's air defence system at a three-day conference which began on Wednesday in view of the bitter border row with China in eastern Ladakh as well as evolving regional security scenario.

The Air Force Commanders Conference (AFCC) was inaugurated by Defence Minister Rajnath Singh on Wednesday at the Air Headquarters.

Chief of the Air Staff, Air Chief Marshal RKS Bhadauria received Rajnath Singh and other senior officials from the MoD.

In his address to the Air Force Commanders, Rajnath Singh appreciated the proactive response by the IAF in bolstering its operational capabilities over the past few months.

He stated that the professional manner in which IAF conducted the airstrikes in Balakot as well as rapid deployment of IAF assets at forward locations in response to the prevailing situation in Eastern Ladakh has sent a strong message to the adversaries.

Rajnath Singh said that the nation's resolve to defend its sovereignty stands firm on the faith its people have in the capability of its Armed Forces. He alluded to the ongoing efforts for de-escalation on LAC and urged the IAF to stand ready to handle any eventuality.

He praised the stellar contribution by IAF in supporting the nation's response to Covid-19 pandemic and the role played during several HADR missions. He highlighted the need to achieve self-reliance in defence production and noted that the theme chosen for this AFCC - 'IAF in the Next Decade' - was very apt for enhancing efforts towards indigenisation in the days to come.

<https://www.indiatoday.in/mail-today/story/iaf-indian-air-force-top-commanders-rajnath-singh-defence-system-1703427-2020-07-23>



Air Chief Marshal Rakesh Kumar Singh Bhadauria (PTI File Photo)

India must allow armed forces to raise own finances. Defence budget will never be enough

India needs every penny during the Covid crisis. So, defence bureaucracy must let armed forces raise their own money and not divert all resources when events like Galwan occur

By Tara Kartha

Ever since the confrontation with China in the mountains of Ladakh, and the threat of escalation to war, retired armed forces officers have been calling for an increase in capabilities of their respective Services, and advocating new strategies to ward off an aggressive enemy. The Narendra Modi government reacted with the usual firefighting tactics by approving arms procurement worth \$5.5 billion, including new aircraft from Russia, and fast-tracking decision-making to allow each Service to purchase systems it requires urgently. All these are welcome moves, at a critical time. But the point is this — China may or may not have encroached on Indian territory, however it has certainly succeeded in driving New Delhi to allocate scarce resources towards defence at a time when it needs every penny to bring a pandemic-hit economy back on track.

The truth is that India's defence budget has never been able to keep up with actual expenditures. The game of catch up has got worse with domain experts pointing out that this gap between allocations and requirements has risen steadily to about 30 per cent in the last seven years. The coronavirus pushed the Centre to further impose cuts across ministries, with the defence ministry – which consumes just one-seventh of the budget — also asked to further limit expenditures; all this when the Report of the Standing Committee on Defence had warned in 2019 that 'huge deficiencies and obsolescence of equipment' did not augur well for a two-front war, or indeed, any war at all.



Representational image| Defence Minister Rajnath Singh poses with officers at a forward base in Ladakh, 17 July | PTI

In this and the coming years, any sustained increase in spending on defence is not just unlikely, but also criminal given the other huge requirements needed to kickstart the Indian economy.

Given this reality, it may be time for the Indian armed forces to be allowed to raise their own finances, even while increasing their technical exposure and capabilities.

Bringing in own money

One way for the Services to raise their own monetary power is to alter the practise of reimbursement for Services in 'aid to civil power' – for instance, helicopters for ongoing floods in Assam or landslides and road clearing in Uttarakhand. As of now, the state governments reimburse the money to the Centre in the Consolidated Fund of India. For instance, the Indian Air Force billed the Kerala government Rs 113 crore for the 2018 flood rescue operations, with the Army having its own accounts. This could be repatriated back to the Service concerned to utilise for equipment purchase or refurbishing. However, that still remains a 'book transfer' within the government, and doesn't go far enough.

So, ways have to be found to monetise Service capabilities in certain areas. For instance, the Border Roads Organisation and the Army Corps of Engineers could be contracted to build expressways and bridges in India on a profit basis. The latter has already done so by building an overbridge in Delhi in record time, which had collapsed days after a private firm hired by the Public Works Department (PWD) had finished it just before the start of the Commonwealth Games in 2010.

The Air Force could get into the maintenance and repair business of both small civil aircraft and military aircraft, with this clause built into new contracts as well. It could also lease out some of its

less sensitive airfields for private airline operations, an industry that is rapidly gaining traction in the Covid era, as businessmen opt for this safer option. The versatile Force could also get involved in the technology intense logistics business (think Amazon) using those aircraft that are already flying almost constantly, to provide logistical support to certain vital industries.

The Navy has a 'ready to use' option, with its shipyards in Visakhapatnam, Karwar, Mumbai and Kochi capable of utilising idle capacity to repair or otherwise service foreign ships belonging to oil drilling companies out of Mumbai, or neighbours, or even commercial shipping, essentially taking the load off the Port Trust of India to deliver faster and more efficient turnaround time.

Defence innovation

Another moneymaker that could bring billions of rupees to the Service concerned is defence innovation. In the 1980s, a naval officer once suggested key innovation in the field of wireless communication technology, only to be laughed out of the Service. That technology (MIMO or 'multiple input, multiple output') went on to make billions outside India, with the former officer, Arogyaswami J. Paulraj, now in Stanford University. India belatedly offered him a Padma Bhushan, for an innovation that could have been marketed in India.

India has since signed on to expedite defence innovation with the US, but it is doubtful if anyone knows much about this initiative within the Services or the 'how to' of it. Much also depends on whether we can shed a Brahminical dislike of recognising talent when we see it.

Bureaucracy, for better or worse

There's more, but before bureaucrats throw up their hands in horror, there is a catch to all this. The horror arises justifiably from the fear that India could go the Pakistan or China way, where the Services were more interested in their military businesses rather than national security. None of the above is to even remotely suggest that the Indian Army go the Pakistani way in creating malls and operating civil airlines, or the earlier Chinese practises, which created a culture of toxic and all-pervasive corruption.

Instead, each proposal has to be vetted to prove that the project will add significantly to modernising and adding tech capability to the Service concerned.

India also has something that is quite unique – and in some ways, unfortunate – which is a large defence bureaucracy who's probing and questioning largely prevents corruption. Conversely, this model of monetising capability to build efficiency will only work if the multiple bureaucratic tiers are minimised and simple legislative measures brought in to override a spiders web of British-era laws.

The 'Aid to Civil Power', for instance, not only involves a multiplicity of laws but also state governments, the home ministry, the defence ministry, and in the current instance of Covid management, the National Disaster Management Authority. This bureaucratic maze is what prevents even private players from making a foray into defence, and the Narendra Modi government is best placed to apply a pair of secateurs to it. In sum, the defence experts calling for new strategies are right. Now to find the money and the expertise required for launching the defence of India.

(The author is former director, National Security Council Secretariat. Views are personal. Views are personal.)

<https://theprint.in/opinion/india-must-allow-armed-forces-to-raise-finances-defence-budget-not-enough/466309/>

Govt issues order for permanent commission of women officers in Army

The case was first filed in the Delhi High Court by women officers in 2003, and had received a favourable order in 2010

New Delhi: Five months after the Supreme Court called for a “change in mindsets” regarding women officers of the Indian Army, the government on Thursday issued an order for permanent commission of women officers in the force, the Army said.

Army Spokesperson Col Aman Anand said the order “paved the way for empowering of women officers to shoulder larger roles in the Army”. “The order specifies grant of permanent commission to Short Service Commissioned (SSC) women officers in all 10 streams of the Indian Army,” he added.



While male SSC officers could opt for permanent commission at the end of 10 years of service, this option was not available to women officers. (File)

The spokesperson said the 10 streams where a permanent commission of women officers were being made available include army air defence, signals, engineers, army aviation, electronics and mechanical engineers, army service corps and Intelligence corps in addition to the existing streams of judge and advocate general and army educational corps.

“Their selection board will be scheduled as soon as all affected SSC women officers exercise their option and complete requisite documentation,” he added.

While male SSC officers could opt for permanent commission at the end of 10 years of service, this option was not available to women officers. They were, thus, kept out of any command appointment, and could not qualify for government pension, which starts only after 20 years of service as an officer.

Last year, the defence ministry had taken an in-principle decision to allow permanent commissioning of women in streams like signals, engineering, army aviation, army air defence and electronics and mechanical. It was decided that the SSC women officers will be considered for grant of permanent commission based on the availability of vacancies and subject to willingness, suitability, performance, medical fitness and competitive merit of the aspirants.

On February 17, the Supreme Court directed that women officers of the Indian Army, serving under Short Service Commission, be considered for grant of a Permanent Commission, irrespective of tenure of service, and also for command posts in non-combat areas since “an absolute bar on women seeking criteria or command appointments would not comport with the guarantee of equality under Article 14”.

Referring to the stellar roles of women officers, the bench said “to cast aspersion on their abilities on the ground of gender is an affront not only to their dignity as women but to the dignity of the members of the Indian Army — men and women — who serve as equal citizens in a common mission”.

The case was first filed in the Delhi High Court by women officers in 2003, and had received a favourable order in 2010. But the order was never implemented and was challenged in the Supreme Court by the government.

On July 7, the top court gave the Centre one more month to implement its direction. Allowing the extra time, a bench headed by Justices D Y Chandrachud said the Centre must ensure complete compliance with its directions.

In March, the SC cleared way for permanent commission to women in Indian Navy, saying “the battle for gender equality is about confronting the battles of the mind”. If granted Permanent Commission, women naval officers can serve till the age of retirement and will be entitled to pension.

The three services have allowed permanent recruitment of women in select streams including medical, education, legal, signals, logistics and engineering. The women officers recruited through the SSC in the IAF have the option of seeking permanent commission in all streams except the flying branch. The Navy has allowed permanent commission of women in a host of departments such as logistics, naval designing, air traffic control, engineering and legal.

<https://indianexpress.com/article/india/govt-issues-order-for-permanent-commission-of-women-officers-in-army-6519988/>

Science & Technology News

ScienceDaily®

Fri, 24 July 2020

Chemists make tough plastics recyclable

New method for producing thermoset plastics allows them to be broken down more easily after use

Summary:

Chemists have developed a way to modify thermoset plastics with a chemical linker that makes it much easier to recycle them, but still allows them to retain their mechanical strength.

Thermosets, which include epoxies, polyurethanes, and rubber used for tires, are found in many products that have to be durable and heat-resistant, such as cars or electrical appliances. One drawback to these materials is that they typically cannot be easily recycled or broken down after use, because the chemical bonds holding them together are stronger than those found in other materials such as thermoplastics.

MIT chemists have now developed a way to modify thermoset plastics with a chemical linker that makes the materials much easier to break down, but still allows them to retain the mechanical strength that makes them so useful.

In a study appearing today in *Nature*, the researchers showed that they could produce a degradable version of a thermoset plastic called pDCPD, break it down into a powder, and use the powder to create more pDCPD. They also proposed a theoretical model suggesting that their approach could be applicable to a wide range of plastics and other polymers, such as rubber.

"This work unveils a fundamental design principle that we believe is general to any kind of thermoset with this basic architecture," says Jeremiah Johnson, an professor of chemistry at MIT and the senior author of the study.

Peyton Shieh, an American Cancer Society Postdoctoral Fellow at MIT, is the first author of the paper.

Hard to recycle

Thermosets are one of the two major classes of plastics, along with thermoplastics. Thermoplastics include polyethylene and polypropylene, which are used for plastic bags and other single-use plastics like food wrappers. These materials are made by heating up small pellets of plastic until they melt, then molding them into the desired shape and letting them cool back into a solid.

Thermoplastics, which make up about 75 percent of worldwide plastic production, can be recycled by heating them again until they become liquid, so they can be remolded into a new shape.

Thermoset plastics are made by a similar process, but once they are cooled from a liquid into a solid, it is very difficult to return them to a liquid state. That's because the bonds that form between the polymer molecules are strong chemical attachments called covalent bonds, which are very difficult to break. When heated, thermoset plastics will typically burn before they can be remolded, Johnson says.

"Once they are set in a given shape, they're in that shape for their lifetime," he says. "There is often no easy way to recycle them."

The MIT team wanted to develop a way to retain the positive attributes of thermoset plastics -- their strength and durability -- while making them easier to break down after use.

In a paper published last year, with Shieh as the lead author, Johnson's group reported a way to create degradable polymers for drug delivery, by incorporating a building block, or monomer, containing a silyl ether group. This monomer is randomly distributed throughout the material, and when the material is exposed to acids, bases, or ions such as fluoride, the silyl ether bonds break.

The same type of chemical reaction used to synthesize those polymers is also used to make some thermoset plastics, including polydicyclopentadiene (pDCPD), which is used for body panels in trucks and buses.

Using the same strategy from their 2019 paper, the researchers added silyl ether monomers to the liquid precursors that form pDCPD. They found that if the silyl ether monomer made up between 7.5 and 10 percent of the overall material, pDCPD would retain its mechanical strength but could be broken down into a soluble powder upon exposure to fluoride ions.

"That was the first exciting thing we found," Johnson says. "We can make pDCPD degradable while not hurting its useful mechanical properties."

New materials

In the second phase of the study, the researchers tried to reuse the resulting powder to form a new pDCPD material. After dissolving the powder in the precursor solution used to make pDCPD, they were able to make new pDCPD thermosets from the recycled powder.

"That new material has nearly indistinguishable, and in some ways improved, mechanical properties compared to the original material," Johnson says. "Showing that you can take the degradation products and remake the same thermoset again using the same process is exciting."

The researchers believe that this general approach could be applied to other types of thermoset chemistry as well. In this study, they showed that using degradable monomers to form the individual strands of the polymers is much more effective than using degradable bonds to "cross-link" the strands together, which has been tried before. They believe that this cleavable strand approach could be used to generate many other kinds of degradable materials.

If the right kinds of degradable monomers can be found for other types of polymerization reactions, this approach could be used to make degradable versions of other thermoset materials such as acrylics, epoxies, silicones, or vulcanized rubber, Johnson says.

The researchers are now hoping to form a company to license and commercialize the technology. MIT has also granted Millipore Sigma a non-exclusive license to manufacture and sell the silyl ether monomers for research purposes.

Patrick Casey, a new product consultant at SP Insight and a mentor with MIT's Deshpande Center for Technological Innovation, has been working with Johnson and Shieh to evaluate the technology, including performing some preliminary economic modeling and secondary market research.

"We have discussed this technology with some leading industry players, who tell us it promises to be good for stakeholders throughout the value chain," Casey says. "Parts fabricators get a stream of low-cost recycled materials; equipment manufacturers, such as automotive companies, can meet

their sustainability objectives; and recyclers get a new revenue stream from thermoset plastics. The consumers see a cost saving, and all of us get a cleaner environment."

The research was funded by the National Science Foundation and the National Institutes of Health.

Story Source:

[Materials](#) provided by [Massachusetts Institute of Technology](#). Original written by Anne Trafton. *Note: Content may be edited for style and length.*

Journal Reference:

1. Shieh, P., Zhang, W., Husted, K.E.L. et al. **Cleavable comonomers enable degradable, recyclable thermoset plastics.** *Nature*, 2020 DOI: [10.1038/s41586-020-2495-2](https://doi.org/10.1038/s41586-020-2495-2)
<https://www.sciencedaily.com/releases/2020/07/200722112703.htm>



Fri, 24 July 2020

Physicists develop technology to transform information from microwaves to optical light

By Katie Wills

Physicists at the University of Alberta have developed technology that can translate data from microwaves to optical light—an advance that has promising applications in the next generation of super-fast quantum computers and secure fiber-optic telecommunications.

"Many quantum computer technologies work in the microwave regime, while many quantum communications channels, such as fiber and satellite, work with optical light," explained Lindsay LeBlanc, who holds the Canada Research Chair in Ultracold Gasses for Quantum Simulation. "We hope that this platform can be used in the future to transduce quantum signals between these two regimes."



Credit: CC0 Public Domain

The new technology works by introducing a strong interaction between microwave radiation and atomic gas. The microwaves are then modulated with an audio signal, encoding information into the microwave. This modulation is passed through the gas atoms, which are then probed with optical light to encode the signal into the light.

"This transfer of information from the microwave domain to the optical domain is the key result," said LeBlanc. "The wavelengths of these two carrier signals differ by a factor of 50,000. It is not easy to transduce the signal between these regimes, but this transfer proves this is possible."

LeBlanc and researchers in her lab, including graduate student Andrei Tretiakov and undergraduate student Timothy Lee, worked closely with physicist John P. Davis and his research group, including graduate student Clinton Potts, to develop the technology.

LeBlanc and Davis are part of Quanta, an NSERC CREATE program designed to train graduate students in emerging quantum technologies.

"This idea arose by having talks and meeting within the Quanta group—and it turned out to work as well or better than we first expected," said LeBlanc.

"This sort of discovery-led research can be very fruitful, and lead us to new possibilities."

The study, "Atomic Microwave-to-Optical Signal Transduction via Magnetic-Field Coupling in a Resonant Microwave Cavity," was published in *Applied Physics Letters*.

More information: A. Tretiakov et al. Atomic microwave-to-optical signal transduction via magnetic-field coupling in a resonant microwave cavity, *Applied Physics Letters* (2020). DOI: [10.1063/1.5144616](https://doi.org/10.1063/1.5144616)



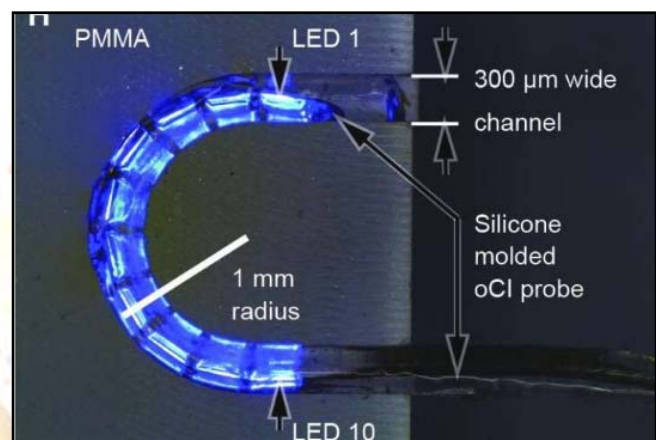
Fri, 24 July 2020

Using light instead of electricity in cochlear implants

By Bob Yirka

A team of researchers affiliated with multiple institutions in Germany has developed a cochlear implant that converts sound waves to light signals instead of electrical signals. In their paper published in the journal *Science Translational Medicine*, the group describes their new hearing aid and how well it worked in test rats.

Cochlear implants work by converting sound waves into electrical signals that are sent to nerve cells in the ear. The idea is to bypass damaged hair cells inside the cochlea to restore hearing. But because the fluid in the ear also conducts electricity, the electrical signals that are generated can cross, leading to a loss of resolution. The result is difficulty hearing in some situations, such as crowded rooms, or when listening to music with a lot of instruments. In this new effort, the researchers sought to replace the electrical signals in such devices with light signals, which would not be muddled by the fluid in the ear, and thereby improve hearing.



In all types of cochlear devices, sound entering the ear is directed to a computer chip that processes the sound it detects. After processing, the chip directs another device to create signals that are sent to the neurons. With the new device, the researchers developed a device that would generate light using LED chips and send it through fiber cable directly to the nerve cells.

In order for such a system to work, the nerve cells inside the ear would have to be modified in some way to allow them to respond to light instead of electricity. For testing purposes, the researchers genetically modified lab rats to grow nerve cells in their ears that would respond to light. In their device, they used an implant with 10 LED chips. They also trained the rats to respond to different sounds before disabling their hair cells and implanting the cochlear devices. The implants worked as hoped, as the rats were able to respond in similar ways to the same generated sounds.

The researchers suggest that in people, such a device would use 64 LED or other light source channels. They also plan to conduct more research with the device and hope to start clinical trials by 2025.

More information: Daniel Keppeler et al. Multichannel optogenetic stimulation of the auditory pathway using microfabricated LED cochlear implants in rodents, *Science Translational Medicine* (2020). DOI: [10.1126/scitranslmed.abb8086](https://doi.org/10.1126/scitranslmed.abb8086)

Journal information: [Science Translational Medicine](#)

<https://medicalxpress.com/news/2020-07-electricity-cochlear-implants.html>

Scientists discover a topological magnet that exhibits exotic quantum effects

An international team led by researchers at Princeton University has uncovered a new class of magnet that exhibits novel quantum effects that extend to room temperature.

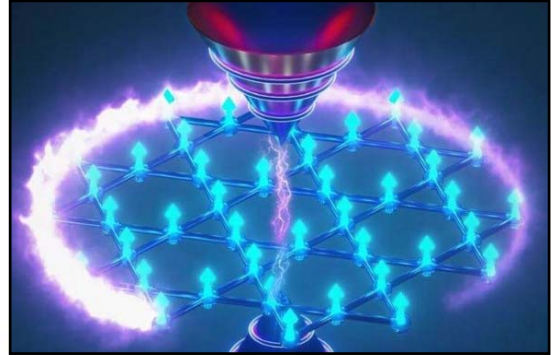
The researchers discovered a quantized topological phase in a pristine magnet. Their findings provide insights into a 30-year-old theory of how electrons spontaneously quantize and demonstrate a proof-of-principle method to discover new topological magnets. Quantum magnets are promising platforms for dissipationless current, high storage capacity and future green technologies. The study was published in the journal *Nature* this week.

The discovery's roots lie in the workings of the quantum Hall effect— a form of topological effect which was the subject of the Nobel Prize in Physics in 1985. This was the first time that a branch of theoretical mathematics, called topology, would start to fundamentally change how we describe and classify matter that makes up the world around us. Ever since, topological phases have been intensely studied in science and engineering. Many new classes of quantum materials with topological electronic structures have been found, including topological insulators and Weyl semimetals. However, while some of the most exciting theoretical ideas require magnetism, most materials explored have been nonmagnetic and show no quantization, leaving many tantalizing possibilities unfulfilled.

"The discovery of a magnetic topological material with quantized behavior is a major step forward that could unlock new horizons in harnessing quantum topology for future fundamental physics and next-generation device research" said M. Zahid Hasan, the Eugene Higgins Professor of Physics at Princeton University, who led the research team.

While experimental discoveries were rapidly being made, theoretical physics excelled at developing ideas leading to new measurements. Important theoretical concepts on 2-D topological insulators were put forward in 1988 by F. Duncan Haldane, the Thomas D. Jones Professor of Mathematical Physics and the Sherman Fairchild University Professor of Physics at Princeton, who in 2016 was awarded the Nobel Prize in Physics for theoretical discoveries of topological phase transitions and topological phases of matter. Subsequent theoretical developments showed that topological insulator-hosting magnetism in a special atomic arrangement known as a kagome lattice can host some of the most bizarre quantum effects.

Hasan and his team has been on a decade-long search for a topological magnetic quantum state that may also operate at room temperature since their discovery of the first examples of three dimensional topological insulators. Recently, they found a materials solution to Haldane's conjecture in a kagome lattice magnet that is capable of operating at room temperature, which also exhibits the much desired quantization. "The kagome lattice can be designed to possess relativistic band crossings and strong electron-electron interactions. Both are essential for novel magnetism. Therefore, we realized that kagome magnets are a promising system in which to search for



The arrows represent the electron spins pointing up from a kagome lattice. The chirality is represented by the counterclockwise circle of fire, which represents the propagating electrons/current on the edge of the magnet. The two cones demonstrate that the bulk of the magnet contains Dirac fermions (linear or conical dispersion of bands) with an energy gap (Chern gap), making it topological. Credit: M. Zahid Hasan group, Princeton University

topological magnet phases as they are like the topological insulators that we studied before," said Hasan.

For so long, direct material and experimental visualization of this phenomenon has remained elusive. The team found that most of the kagome magnets were too difficult to synthesize, the magnetism was not sufficiently well understood, no decisive experimental signatures of the topology or quantization could be observed, or they operate only at very low temperatures.

"A suitable atomic chemistry and magnetic structure design coupled to first-principles theory is the crucial step to make Duncan Haldane's speculative prediction realistic in a high-temperature setting," said Hasan. "There are hundreds of kagome magnets, and we need both intuition, experience, materials-specific calculations, and intense experimental efforts to eventually find the right material for in-depth exploration. And that took us on a decade-long journey."

Through several years of intense research on several families of topological magnets (Nature 562, 91 (2018); Nature Phys 15, 443 (2019), Phys. Rev. Lett. 123, 196604 (2019), Nature Commun. 11, 559 (2020), Phys. Rev. Lett. 125, 046401 (2020)), the team gradually realized that a material made of the elements terbium, magnesium and tin (TbMn_6Sn_6) has the ideal crystal structure with chemically pristine, quantum mechanical properties and spatially segregated kagome lattice layers. Moreover, it uniquely features a strong out-of-plane magnetization. With this ideal kagome magnet successfully synthesized at the large single crystal level by collaborators from Shuang Jia's group at Peking University, Hasan's group began systematic state-of-the-art measurements to check whether the crystals are topological and, more important, feature the desired exotic quantum magnetic state.

The Princeton team of researchers used an advanced technique known as scanning tunneling microscopy, which is capable of probing the electronic and spin wavefunctions of a material at the sub-atomic scale with sub-millivolt energy resolution. Under these fine-tuned conditions, the researchers identified the magnetic kagome lattice atoms in the crystal, findings that were further confirmed by state-of-the-art angle-resolved photoemission spectroscopy with momentum resolution.

"The first surprise was that the magnetic kagome lattice in this material is super clean in our scanning tunneling microscopy," said Songtian Sonia Zhang, a co-author of the study who earned her Ph.D. at Princeton earlier this year. "The experimental visualization of such a defect-free magnetic kagome lattice offers an unprecedented opportunity to explore its intrinsic topological quantum properties."

The real magical moment was when the researchers turned on a magnetic field. They found that the electronic states of the kagome lattice modulate dramatically, forming quantized energy levels in a way that is consistent with Dirac topology. By gradually raising the magnetic field to 9 Tesla, which is hundreds of thousands of times higher than the earth's magnetic field, they systematically mapped out the complete quantization of this magnet. "It is extremely rare—there has not been one found yet—to find a topological magnetic system featuring the quantized diagram. It requires a nearly defect-free magnetic material design, fine-tuned theory and cutting-edge spectroscopic measurements" said Nana Shumiya, a graduate student and co-author of the study.

The quantized diagram that the team measured provides precise information revealing that the electronic phase matches a variant of the Haldane model. It confirms that the crystal features a spin-polarized Dirac dispersion with a large Chern gap, as expected by the theory for topological magnets. However, one piece of the puzzle was still missing. "If this is truly a Chern gap, then based on the fundamental topological bulk-boundary principle, we should observe chiral (one-way traffic) states at the edge of the crystal," Hasan said.

The final piece fell into place when the researchers scanned the boundary or the edge of the magnet. They found a clear signature of an edge state only within the Chern energy gap. Propagating along the side of the crystal without apparent scattering (which reveals its dissipationless character), the state was confirmed to be the chiral topological edge state. Imaging of this state was unprecedented in any previous study of topological magnets.

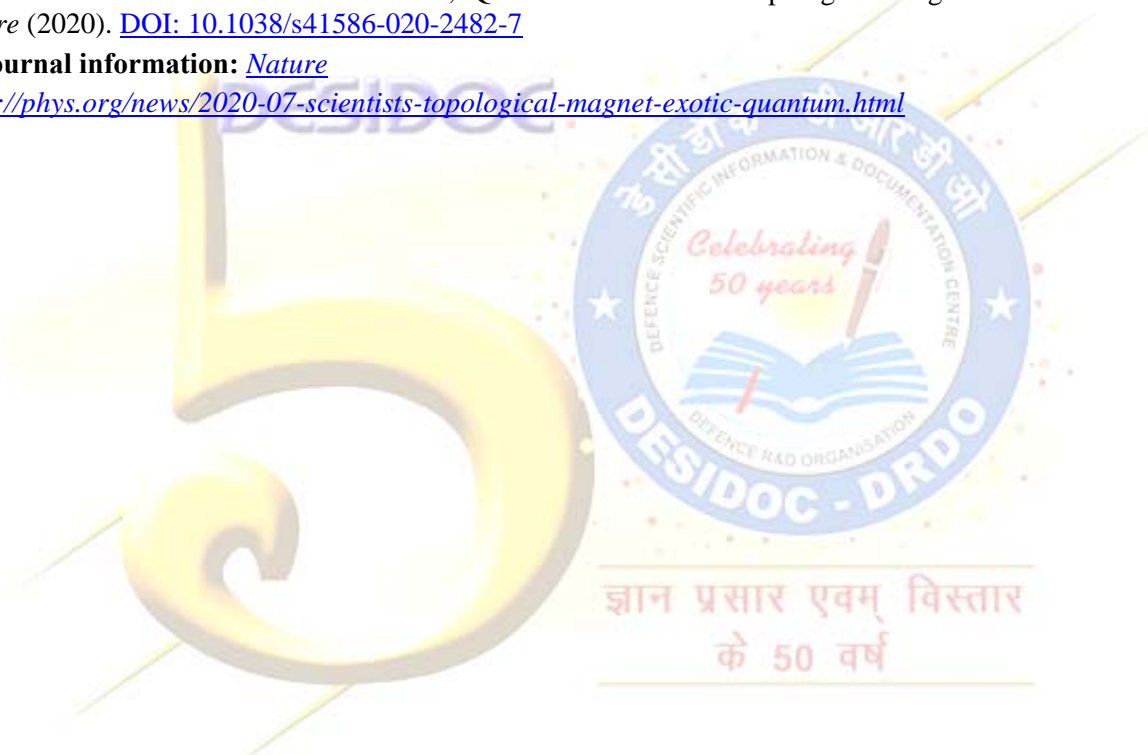
The researchers further used other tools to check and reconfirm their findings of the Chern gapped Dirac fermions, including electrical transport measurements of anomalous Hall scaling, angle-resolved photoemission spectroscopy of the Dirac dispersion in momentum space, and first-principles calculations of the topological order in the material family. The data provided a complete spectrum of inter-linked evidence all pointing to the realization of a quantum-limit Chern phase in this kagome magnet. "All the pieces fit together into a textbook demonstration of the physics of Chern-gapped magnetic Dirac fermions," said Tyler A. Cochran, a graduate student and co-first author of the study.

Now the theoretical and experimental focus of the group is shifting to the dozens of compounds with similar structures to TbMn_6Sn_6 that host kagome lattices with a variety of magnetic structures, each with its individual quantum topology. "Our experimental visualization of the quantum limit Chern phase demonstrates a proof-of-principle methodology to discover new topological magnets," said Jia-Xin Yin, a senior postdoctoral researcher and another co-first author of the study.

"This is like discovering water in an exoplanet—it opens up a new frontier of topological quantum matter research our laboratory at Princeton has been optimized for," Hasan said.

More information: Jia-Xin Yin et al, Quantum-limit Chern topological magnetism in TbMn_6Sn_6 , *Nature* (2020). DOI: [10.1038/s41586-020-2482-7](https://doi.org/10.1038/s41586-020-2482-7)

Journal information: [Nature](https://www.nature.com)
<https://phys.org/news/2020-07-scientists-topological-magnet-exotic-quantum.html>





Fri, 24 July 2020

Scientists decode how coronavirus is mutating, say findings may aid vaccine development

- *The scientists assessed over 15,000 virus genomes from all of the sequencing efforts around the world, and identified over 6,000 mutations.*
- *They looked at how much the sequence of four basic molecules that make up the virus' genetic code -- Adenine (A), Cytosine (C), Uracil (U), and Guanine (G) -- was mutating.*

While some mutations in the novel coronavirus are directed by the human immune system proteins which degrade it, a new study says the virus is able to bounce back, findings that may help in the design of new vaccines against COVID-19.

According to the researchers, including Alan Rice from the University of Bath in the UK, while all organisms mutate, the process is usually random, often owing to mistakes made when the genetic material is copied.

In the case of the novel coronavirus SARS-CoV-2, the study, published in the journal *Molecular Biology and Evolution*, noted that the process may not be random, and that humans are mutating it as part of a defence mechanism to degrade the virus.

The scientists assessed over 15,000 virus genomes from all of the sequencing efforts around the world, and identified over 6,000 mutations. They looked at how much the sequence of four basic molecules that make up the virus' genetic code -- Adenine (A), Cytosine (C), Uracil (U), and Guanine (G) -- was mutating.

The researchers discovered that the virus genome sample data they analysed had a very high rate of mutations generating U residues. "I have looked at mutational profiles for many organisms and they all show some sort of bias, but I've never seen one as strong and strange as this," said study senior author Laurence Hurst, Director of the Milner Centre for Evolution at the University of Bath.

In particular, the scientists found that mutation very commonly generated UU neighbouring pairs, changing from the original sequence of CU and UC.

They said this is a fingerprint of the mutational profile of a human protein called APOBEC that can mutate viruses. "It looks like mutation isn't random, but instead we are attacking the virus by mutating it," Hurst said.

By looking at the actual composition of the virus, and by comparing between different sorts of sites within the virus, the researchers found evidence that natural selection, or the 'survival of the fittest' process of evolution, is allowing the virus to fight back against the mutational process.

They said copies of the virus which are able to resist the human immune system's efforts to mutate it in a specific way could be differentially surviving and reproducing better.

From the mutational profile of the virus, the scientists predicted that 65 percent of the residues should be a U and 40 percent should be UU pairs, but in practice, they said the U content is much lower, and UU content is just about a quarter of that predicted.



"This could be because the viruses that have too much U in them simply don't survive well enough to reproduce. We estimate that for every 10 mutations that we see, there are another six we never get to see because those mutant viruses are too poor at propagating," Hurst explained.

According to the scientists, one of the reasons for this could be that the U rich versions of the viruses' genes, as the team found, were less stable, and are seen at lower levels.

"Humans also have other proteins that attack sequences that are rich in U residues that might also force destruction of some versions of the virus," the researchers said in a statement to the press.

Based on these findings, the scientists said humans are attacking the virus to mutate it in a manner that degrades the virus, adding that this has implications for some vaccine designs.

The researchers noted that several research groups across the world are currently trying to make synthetic versions of the virus in a manner that enables the virus to be viable, but only just, so called attenuated viruses.

"Knowing what selection favours and disfavours in the virus is really helpful in understanding what an attenuated version should look like," Hurst said. "We suggest for example that increasing U content, as APOBEC does within our cells, would be a sensible strategy," he added.

<https://www.cnbctv18.com/healthcare/scientists-decode-how-coronavirus-is-mutating-say-findings-may-aid-vaccine-development-6423021.htm>

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THE TIMES OF INDIA

Fri, 24 July 2020

Covaxin: Human clinical trials of indigenous Covid-19 vaccine begin in Chennai hospital

By U Tejonmayam

Chennai: The first phase of human clinical trials of the indigenous Covid-19 vaccine, called Covaxin, began in SRM Medical College Hospital and Research Centre in Chennai on Thursday. Dr Satyajit Mohapatra, who is the principal investigator for the clinical trials at the hospital, confirmed the commencement of the human trials.

SRM is one of the 12 institutions chosen by the Indian Council of Medical Research (ICMR) to conduct the trials for the vaccine developed by Hyderabad-based Bharat Biotech in collaboration with ICMR and the National Institute of Virology.

Bharat Biotech, on its website, said "the vaccine received DCGI approval for phase-1 and 2 human clinical trials and the trials will commence across India from July 2020."

Earlier this month, in a letter to the institutions, the ICMR it wanted to launch the vaccine for public use by August 15 and advised the institutions to fast track all clinical trial approvals and ensure that the subject enrolment was initiated no later than July 7.

SRM Research Centre was earlier involved in clinical trials for Rotavirus vaccine, administered for protection against rotavirus infections which causes severe diarrhoea, and Pentavalent vaccine, administered to protect children from five diseases including hepatitis B and diphtheria, pertussis and tetanus.

<https://timesofindia.indiatimes.com/city/chennai/covaxin-human-clinical-trials-for-indigenous-covid-19-vaccine-begins-in-chennai-hospital/articleshow/77123194.cms>

Scientists develop safe, rapid Covid-19 antibody test

According to the scientists, the current gold standard assay for detecting neutralising antibodies requires the handling of live SARS-CoV-2 in a biosafety level three laboratory containment facility, and is time-consuming, taking two-four days to complete

Singapore: Scientists have developed a rapid test to detect antibodies in COVID-19 patients that specifically block the novel coronavirus, an advance that may lead to faster methods for estimating the population level infection rate of the disease.

According to the study, published in the journal Nature Biotechnology, a rapid test to detect neutralising antibodies — capable of blocking the novel coronavirus SARS-CoV-2 — is urgently needed to facilitate monitoring of infection rates, as well as to determine vaccine efficacy during clinical trials.

In order to facilitate this, the researchers, including those from the Duke-NUS Medical School in Singapore, developed a new assay which is much faster than conventional tests for neutralising antibodies, taking only one or two hours to complete. They said the new method, validated in two groups of patients who had COVID-19 from Singapore and Nanjing, China, does not require the use of the live virus.

According to the scientists, the current gold standard assay for detecting neutralising antibodies requires the handling of live SARS-CoV-2 in a biosafety level three laboratory containment facility, and is time-consuming, taking two-four days to complete.

Another method involving a pseudovirus-based neutralisation test to detect such antibodies can be done in a biosafety level two laboratory, they said, but added that this too requires the use of live viruses and cells.

In the current research, the scientists Lin-Fa Wang, Danielle Anderson, and their colleagues designed a surrogate virus neutralisation test that does not require the use of any live virus or cells. “The surrogate virus neutralisation test does not require biosafety level three containment, making it broadly accessible to the wider community for both research and clinical applications,” the researchers wrote in the study.

They said the new test takes only one to two hours to complete, and can be conducted in a biosafety level two laboratory.

The researchers used the purified part of the viral spike protein which binds to the host cell’s surface receptor ACE2 to mimic the virus-host interaction.

According to the scientists, this interaction can be blocked by specific neutralising antibodies in patient or animal sera in a similar manner to the conventional virus neutralisation and pseudovirus-based tests.

The study noted that this assay can also differentiate neutralising antibodies from those which bind to the spike protein, but do not block the virus. Following the lab findings, the scientists validated the new assay with two separate groups of patients recovering from COVID-19: 175 patients who had COVID-19 and 200 healthy controls in Singapore, and 50 patients who had COVID-19, and 200 healthy controls in Nanjing. They said the test can distinguish between antibody responses to COVID-19, and to other human coronavirus infections such as the one causing common cold.

According to the study, the assay achieves 99.93 per cent specificity and 95-100 per cent sensitivity.

When the researchers studied the specificity of their test for SARS-CoV-2, versus the 2002-03 SARS pandemic virus using serum collected from patients who had recovered from the earlier

coronavirus outbreak, they noted that SARS-neutralising antibodies were still detectable 17 years later.

Although the surrogate virus neutralisation assay may never be able to completely replace the conventional virus assay, they said it performs well, and in some cases may be easier to use for many aspects of COVID-19 research.

<https://indianexpress.com/article/world/scientists-develop-safe-rapid-covid-19-antibody-test-6520251/>



Fri, 24 July 2020

Coronavirus vaccine: Oxford-Astrazeneca COVID-19 vaccine is winning praises, but here's why we should refrain from building false hopes

01/9 Is it right to pin our hopes on Oxford COVID-19 vaccine?

The world over rejoiced when data from Oxford University-British Swedish firm AstraZeneca's phase I/II study of their novel COVID-19 vaccine was released a fortnight ago. The group was one of the first ones to kickstart clinical trials in late April, and ever since, a lot more developments have been taking place.

02/9 Oxford-Astrazeneca's vaccine is undergoing phase III trials

While the vaccine is still undergoing phase III of its trials, preliminary results from the observatory data confirmed that the vaccine elicits a strong immune response in the host bodies and gave encouraging results. AstraZeneca also announced plans to speed up production to meet the promise of delivering a billion doses. However, not everybody's impressed. WHO, in its latest briefing praised the move but said that it still is unrealistic to have a vaccine deployed before early months of 2021.



03/9 Is the vaccine safe to be deployed?

While we did have a lot of important takeaways from the data, there remain some broad safety concerns. Will we really have a vaccine ready before 2020?

04/9 Can it provide immunity for long?

The data published in the scientific journal, The Lancet showed that participants who were administered a double dosage of the vaccine show strong immune response and spiked up production of antibodies to fight against the infection. However, it still remains unclear as to how long will the vaccine be able to provide immunity against the infection, with experts saying that coronavirus might remain here for decades to come. Earlier reports also pointed to evidence that the vaccine may only be able to provide immunity for a year's time. A separate study by King's College, London also observed that the level of antibodies may fall in patients temporarily immune to the infection.

05/9 Can lab results be fully relied on?

Early-stage evidence may have shown encouraging results but there's one doubt which remains- lab results do not always correlate to real-world results. All the vaccines under development right now are new, and there's not a lot of evidence we know about the novel coronavirus. What may work in the lab may not actually work with a crowd of seven billion people. The vaccine is also not also one-size-fits-all. It may be possible that if the vaccine works for a small group, it might not work for everyone.

The same concerns were raised when researchers started pre-clinical studies on monkeys, exposing them to a higher load of viruses than humans would generally be. There's still a lot more research which is needed before we consider this novel vaccine as the holy grail for all of our ailments.

06/9 The scale of study is still bleak

The data has been inferred from phase I/II of the clinical trials, which involved a small pool of candidates, wherein half was administered the dosage and half were given a placebo drug. It is still far-fetched to think that a vaccine which was tested on a small batch of volunteers will work on everyone. The first phase of testing is done to root out safety and efficacy problems. The data made available right now is still minuscule to peg it ahead of other vaccines. Other groups, including Moderna, Pfizer and CanSino Biologics have also released data from early-stage trials.

07/9 Does it work across all age groups?

There's another concern which cloud observatory data- is the vaccine capable of working on everyone or not.

In the early phase of the study, healthy volunteers between the ages of 18-55 were selected to be dosed with the vaccine. Pregnant women, those with pre-existing medical conditions and elderlies were excluded from the trial. The study also excluded participants from diverse backgrounds. There were early reports of the vaccine being tested on children as well, but we don't know much about that. For a vaccine to be deemed truly effective and safe, candidates from a broad population, including those belonging to the high-risk category have to be tested too. Hence, it is too early to fully rely on clinical results from this phase of the study.

08/9 Will it be fairly distributed?

AstraZeneca has signed pacts with several vaccine producers globally to ramp up production facilities to meet the demand. In a recent briefing, WHO head noted the progress made by several companies but said that it would be still unrealistic to expect a vaccine before 2021.

"We're making good progress...Realistically it is going to be the first part of next year before we start seeing people getting vaccinated,"

However, a lot more study is needed before we consider this fact- how affordable the vaccine will be, will it reach all people and whether everyone will have fair access to it. These concerns have to be taken care of as well.

09/9 Conclusion

Remember, we should be treating the vaccine as just another approach to fight the pandemic, not the best approach. A lot more measures and non-pharmaceutical interventions are the key to restraining the spread of the virus.

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