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COVID-19: DRDO's Contribution

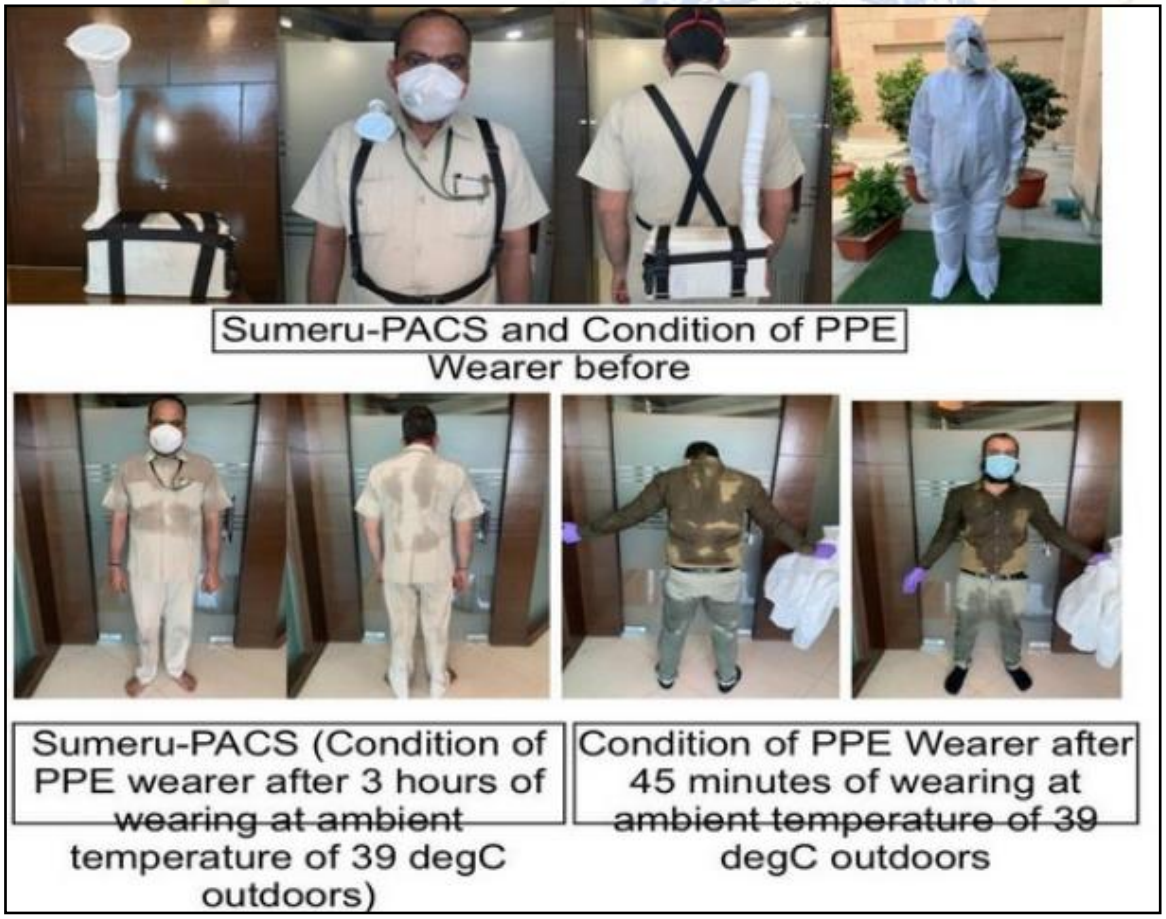
ANI
South Asia's Leading Multimedia News Agency

Thu, 04 June 2020

DRDO develops device to keep PPE wearers comfortable

DRDO Product named SUMERU-PACS draws the outside air with the help of a filter and the moist air goes out from the front face opening thereby, cooling neck and head area

New Delhi: The Defence Research Development Organisation (DRDO) has developed a device -- SUMERU-PACS -- that helps wearers of Personal Protective Equipment (PPE) comfortable without sweating.



DRDO Product named SUMERU-PACS draws the outside air with the help of a filter and the moist air goes out from the front face opening thereby, cooling neck and head area.

The DRDO officials found out, on the basis of the feedback received from doctors and medical staff, that the PPE wearers feel uncomfortable after wearing PPE for more than 30 to 45 minutes and start sweating which makes the situation worse.

After receiving the feedback, DRDO developed a personal air circulation system which can be used inside the PPE as a small backpack of approximately 500 grams weight which works well at an ambient temperature of 39 degrees Celsius and keeps wearer comfortable and cool without sweating.

The system is suitable for indoors especially for doctors and other medical staff wearing PPE cover all six hours in the hospitals. The device draws the outside air with the help of a filter and the moist air goes out from the front face opening thereby, cooling neck and head area.

https://www.aninews.in/news/national/general-news/drdo-develops-device-to-keep-ppe-wearers-comfortable20200604004722/

R. REPUBLICWORLD.COM

Thu, 04 June 2020

Innovative sanitisation mechanism to keep Delhi cops safe from Covid-19

The RK Puram Police Station installed a comprehensive sanitisation mechanism to minimise physical contact and reduce the risk of spreading COVID-19

By Gloria Methri

As Coronavirus fears continue to rise in the national capital, the Delhi Police has stepped up its safety measures to protect the cops from the deadly virus. The RK Puram Police Station on Tuesday installed a comprehensive sanitisation mechanism to minimise physical contact and reduce the risk of spreading the disease. These include a two-way video-audio monitoring system, a DRDO approved sanitising machine for documents, a sanitisation tunnel, an instrument to capture the image and temperature of the visitors.

Credit: ANI

"As coronavirus cases are increasing, our police personnel are in danger. So, we thought of some innovative and out of box ideas to save the police from the virus. We have set up some precautionary measures through which people coming to the police station do not have to come in contact with police personnel," said Rajesh Sharma, Inspector, RK Puram Police Station.

Limiting visits of people

The camera-audio monitoring system installed here captures a picture and temperature of each visitor on the click of a button. The person will be allowed inside the building only after the screening is done. The purpose of the visit is also inquired upon entry, so if the issue can be solved right there, people need not enter the police station.

Along with this, a complaint box has also been installed at the RK Puram Police Station where people can write down their complaints which can later be addressed by the police.

"Further the duty officer decides if people can come inside or not. If it is important for the person to enter the building then the person is fully sanitised with the help of a sanitisation tunnel installed in the station," Sharma said.

Delhi's COVID-19 case count surged to 22,132, with 1,298 new cases reported in the last 24 hours. The city's total death toll stands at 556, the Delhi Health Department informed on Tuesday.

https://www.republicworld.com/india-news/city-news/innovative-sanitisation-mechanism-to-keep-delhi-cops-safe-from-covid.html

Thu, 04 June 2020

कोरोना वायरस: DRDO ने बनाया बैकपैक, अब पीपीई किट में पसीने से मिलेगा छुटकारा

डीआरडीओ (DRDO) की इस पीपीई किट के अंदर 500 ग्राम का छोटा बैकपैक होगा, जो पर्सनल एयर सर्कुलेशन सिस्टम के जरिए पसीने से तर-बतर आदमी को आराम देगा और ठंडा रखेगा।

नई दिल्ली: डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गनाइजेशन (DRDO) ने कोरोना वायरस (Coroavirus) से मेडिकल कर्मचारियों को बचाने के लिए नए तरीके का पीपीई किट (PPE) तैयार किया है। इस पीपीई किट के अंदर 500 ग्राम का छोटा बैकपैक होगा, जो पर्सनल एयर सर्कुलेशन सिस्टम के जरिए पसीने से तर-बतर आदमी को आराम देगा और ठंडा रखेगा।

डीआरडीओ ने बनाई नई तरीके की पीपीई किट (प्रतीकात्मक तस्वीर)

डीआरडीओ के अधिकारी के मुताबिक, SUMERU-PACS नामक ये उत्पाद अस्पतालों में लंबे समय तक पीपीई कवर पहनने वाले मेडिकल कर्मचारियों के लिए उपयोगी है। बता दें कि इससे पहले DRDO ने ऐसी किट बनाई थी, जिसे दस बार इस्तेमाल किया जा सकता है। पहले सिर्फ एक PPE किट को सिर्फ एक बार ही इस्तेमाल किया जा सकता था। गौरतलब है कि भारत में फरवरी-2020 से पहले स्टैंडर्ड PPE किट ही नहीं बनती थी, लेकिन कोरोना वायरस का कहर बढ़ने लगा तो भारत भी इससे मुकाबले की तैयारी में जुट गया। मार्च के महीने में भारत को विश्व स्वास्थ्य संगठन (WHO) से PPE किट बनाने की हरी झंडी मिली थी।

रेलवे ने भी बनाई थी पीपीई किट

इससे पहले रेलवे ने Covid- 19 से लड़ने वालों के लिए पीपीई किट (Personal protective equipment) तैयार की थी। उत्तर रेलवे के जगद्धात्री वर्कशॉप में यह पीपीई किट बन कर तैयार हुआ। जगद्धात्री वर्कशॉप रेलवे का पहला वर्कशॉप बन गया है, जहां पर दो पीपीई कवरॉल नमूने वाली पीपीई किट बन कर तैयार हुआ है। रेलवे द्वारा इस निर्मित पीपीई किट को डीआरडीओ (DRDO) ने भी परीक्षण में पारित कर दिया है। रेलवे के जगद्धात्री वर्कशॉप में बना यह पीपीई किट को देश की और एजेंसियों से भी अप्रुवल मिल गया है। अब साफ हो गया है कि यह किट बाजार में आ जाएगा।

डीआरडीओ से मिली मंजूरी

उत्तरी रेलवे का कहना है कि ये भारतीय रेलवे के लिए यह एक बड़ी सफलता है। रेलवे ने कहा, 'इसकी सफलता के बाद रेलवे देश में पीपीई किट की कमी को कम करने के लिए हर संभव योगदान कर सकता है। यह पीपीई किट Covid-19 के खिलाफ युद्ध लड़ने में मददगार साबित होगा। इससे कोरोना के खिलाफ लड़ाई लड़ रहे डॉक्टरों और कर्मचारियों पर से खतरा कम होगा।

https://hindi.news18.com/news/nation/drdo-develops-personal-air-circulation-system-to-be-used-inside-ppe-as-a-small-backpack-3141539.html

Thu, 04 June 2020

PPE किट में पसीने से मिलेगा छुटकारा, DRDO ने बनाया बैकपैक

DRDO ने PPE के अंदर 500 ग्राम का छोटा बैकपैक बनाया है, जो पर्सनल एयर सर्कुलेशन सिस्टम के जरिए पसीने से तर-बतर आदमी को आराम देकर और ठंडा रखता है।

- ***PPE के अंदर 500 ग्राम का छोटा बैकपैक बनाया***
- ***मेडिकल स्टाफ के लिए होगा उपयोगी, रखेगा ठंडा***

देश में कोरोना के खिलाफ जंग जारी है। कोरोना फ्रंट वॉरियर्स के लिए भारत में WHO के स्टैंडर्ड के मुताबिक, करीब 106 मैन्युफैक्चर PPE किट (Personal Protective Equipment) बनाने के काम में जुटे हैं। यही नहीं देश में बेहद कम लागत पर बेहतरीन क्वालिटी के पीपीई किट तैयार किए जा रहे हैं।

फोटो-(पीटीआई)

इस बीच DRDO ने PPE के अंदर 500 ग्राम का छोटा बैकपैक बनाया है, जो पर्सनल एयर सर्कुलेशन सिस्टम के जरिए पसीने से तर-बतर आदमी को आराम देकर और ठंडा रखता है।

DRDO अधिकारी के मुताबिक, SUMERU-PACS नामक ये उत्पाद अस्पतालों में लंबे समय तक PPE कवर पहनने वाले मेडिकल कर्मचारियों के लिए उपयोगी है।

बता दें कि फरवरी-2020 से पहले भारत में स्टैंडर्ड PPE किट नहीं बनता था, लेकिन कोरोना वायरस का कहर बढ़ने लगा तो भारत भी इससे मुकाबले की तैयारी में जुट गया। मार्च के आखिरी हफ्ते में WHO से भारत को PPE किट बनाने की हरी झंडी मिली थी।

डीआरडीओ ने बनायी पहली लैब

अप्रैल में रक्षा मंत्री राजनाथ सिंह ने पहली मोबाइल वायरोलॉजी रिसर्च एंड डायग्नोस्टिक्स लेबोरेटरी (एमवीआरडीएल) का उद्घाटन किया था। कोरोना की जांच के लिए देश में ऐसी पहली लैब तैयार की गई है, जिसे रक्षा से जुड़े रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने बनाया है।

देश में कोरोना के संक्रमण की तेजी को देखते हुए डीआरडीओ ने इसका निर्माण किया था। कोविड-19 की स्क्रीनिंग और इस पर रिसर्च हो सके, इसके लिए यह लैब तैयार की गई है। इस मोबाइल लैब की खासियत यह है कि हर दिन इसमें 1-2 हजार सैंपल की जांच हो सकती है।

https://aajtak.intoday.in/story/drdo-develops-personal-air-circulation-system-to-be-used-inside-ppe-as-a-small-backpack-1-1197217.html

Thu, 04 June 2020

Delhi's RK Puram police station steps up efforts to keep cops safe from Covid-19

In the light of rising coronavirus cases in India, Delhi's RK Puram Police Station has put in place a comprehensive sanitisation mechanism to ensure the safety of cops

New Delhi: In a bid to minimise physical contact between Police and visitors, RK Puram Police Station on Tuesday (June 2) have put in place a comprehensive sanitisation mechanism to ensure the safety of cops amid the rising number of COVID-19 cases in the national capital. Police have installed a two-way video-audio monitoring system, a DRDO approved sanitising machine for documents, a sanitisation tunnel, an instrument to capture image and temperature of the visitor.

"As coronavirus cases are increasing, our police personnel are in danger. So we thought of some innovative and out of box ideas to save the police from the virus. We have set up some precautionary measures through which people coming to the police station do not have to come in contact with police personnel," Rajesh Sharma, Inspector, RK Puram Police Station.

In the process, a camera-audio monitoring system has been installed, through which people visiting the police station have to press a button and then a picture and temperature of the person will be sent to police sitting inside the building. Even the reason for coming to the police station is asked and if the issue can be solved right there, then people need not to enter the police station, he added.

Along with the video-audio monitoring system, a complaint box has also been installed where people can write their complaints and put them inside the box which can later be addressed by the police.

Further the duty officer decides if people can come inside or not. If it is important for the person to enter the building then the person is fully sanitised with the help of a sanitisation tunnel installed in the station," Mr Sharma said.

https://swachhindia.ndtv.com/delhis-rk-puram-police-station-steps-up-efforts-to-keep-cops-safe-from-covid-19-45553/

Defence News

Defence Strategic: National/International

The Tribune

Thu, 04 June 2020

IAF indigenising Russian night vision goggles for use in helicopters

IAF's No 3 Base Repair Depot in Chandigarh, that is responsible for the maintenance and overhaul of Russian-origin helicopters, has been tasked to execute the project

By Vijay Mohan

Chandigarh: The Indian Air Force (IAF) is indigenising Russian night vision goggles that are used by pilots flying the Mi-17 medium lift helicopter. IAF's No. 3 Base Repair Depot here, that is responsible for the maintenance and overhaul of Russian-origin helicopters, has been tasked to execute the project.

"The design and development of the NL-93 night vision goggle (NVG) variant will be done in collaboration with the Indian industry, for which the public and the private sector is being approached," an officer said. "NVG is categorised as a critical equipment and it has to be compatible with the Mi-17's cockpit and operating parameters," he added.

NVG is a helmet-mounted electro-optical device based on image intensifier technology that allows images to be produced in levels of light approaching total darkness. NVGs can intensify ambient light to over a thousand times and can function effectively in minimal moonlight conditions or even starlight.

By increasing the air crew's situational awareness due to improved visibility in the dark, NVGs enhance manoeuvrability and navigation, thereby facilitating better air-to-ground tactics and thereby enhancing mission effectiveness.

The essential features of NVG vision include monochromatic image in a field of view reduced to a cone of 40 deg with diminished visualacuity as compared to daytime vision. Consequently, pilots have to continually turn their heads to see to the sides.

The use of NVGs, however, also has medical and physiological implications. It adds to the weight of the helmet, causing increased stress on the neck and spine. Given the device's limited field of view of about 40 degrees, the pilots have to constantly rotate their heads for wider arc of vision. Air crew are also required to undergo brief training capsules on the use of NVGs.

The IAF began using NVGs in helicopters in 2002 for operation flying such as special heli-borne operations, troop deployment, search and rescue and communication. It carried out its first NVG-assisted rescue in 2007, when it evacuated two injured soldiers, one of them with a serious head injury, in the north-east.

According to IAF sources, once the indigenous NVG for the Mi-17 is certified for use, it would be adapted for other helicopters in the IAF's inventory such as the Hindustan Aeronautics Limited-developed Dhruv and Rudra as well as the upcoming Light Combat Helicopter.

https://www.tribuneindia.com/news/chandigarh/iaf-indigenising-russian-night-vision-goggles-for-use-in-helicopters-93917

Thu, 04 June 2020

Indian Air Force begins construction of new runway in IOK

Srinagar: In occupied Kashmir, the Indian Air Force (IAF) has started construction of a 3-kilometer long runway adjacent to the Srinagar-Jammu Highway in Bijbehara area of South Kashmir.

According to Kashmir Media Service, the construction of the emergency landing facility comes at a time when there is military standoff along Line of Actual Control (LAC) between Indian Army and Peoples Liberation Army of China.

The work on the runway started two days ago on war footing and an official said that it would be three kilometer long and would act as emergency runway facility for fighter jets in case of any emergency.

The passes for the construction of the runway to the trucks and workers were issued by the district administration.

The runway being built on the Srinagar-Jammu Highway near Sangam in Islamabad district is nearly 3.5-km-long and currently the level of the strip is being regularized.

Reports said that the work was being done under the dark of the night after labourers were given special passes to work. KMS—10M

https://www.defenceaviationpost.com/2020/06/indian-air-force-begins-construction-of-new-runway-in-iok/

Thu, 04 June 2020

Northern Commander in Ladakh, reviews LAC situation amid standoff with China

The Chief of the Northern Army Command is camping in Leh to review the situation amid growing tensions with China at the Line of Actual Control (LAC) in Eastern Ladakh. Sources said Lt Gen YK Joshi, Commander of the Udhampur-based Northern Command, will be camping in Leh till Thursday. He was scheduled to reach Leh on Tuesday but was unable to do so. The visit comes ahead of the talks between the senior level officers of the Indian Army and the People's Liberation Army to resolve the ongoing standoff.

Lt Gen Joshi was earlier heading the 14 Corps, the Army division that looks after Ladakh and now engaged with the PLA soldiers at the standoff points. His visit to Leh assumes significance keeping in mind his understanding of the area and knowledge on LAC.

Indian Army and China's People's Liberation Army held several meetings to resolve the face-off. However, no breakthrough has taken place. The Major

General level commanders from Indian and Chinese sides had met at the LAC in Ladakh on June 2 in a bid to defuse tension along the border.

The soldiers of India and China are in a month-long faceoff position in Ladakh which was first reported by this paper. The Chinese soldiers are said to have reached the positions claimed by India.

In the meantime, China has sent a large number of troops to the LAC as reinforcements. Seeing this, Indian Army has also deployed forces accordingly.

There are four places where there is an eyeball-to-eyeball situation since May 5 along LAC. Both sides have deployed over 1,000 troops and sending reinforcements.

https://idrw.org/northern-commander-in-ladakh-reviews-lac-situation-amid-standoff-with-china/#more-228543

THE TIMES OF INDIA

Thu, 04 June 2020

India to bring specific proposals during military talks with China on June 6: Sources

New Delhi: Indian and Chinese military will hold high-level talks on June 6 at the level of lieutenant general and both sides are expected to deliberate on specific proposals to ease tension in the sensitive areas in eastern Ladakh, official sources said on Wednesday.

The general officer commanding of Leh-based 14 Corps, Lt Gen Harinder Singh, is set to represent India at the talks which is scheduled to be held at one of the border meeting points, they said.

The Indian side is expected to present specific proposals at the talks to deescalate tension in Pangong Tso, Galwan Valley and Demchok - the three areas in eastern Ladakh where the two sides have been on a bitter standoff for last one month, the sources said.

It is not immediately known what will be the proposals that the Indian military will take to the negotiating table but it is understood that it will insist on return to status quo in all the areas.

The two sides have already held at least 10 rounds of negotiations between local commanders as well as major general-rank officials of the two armies but the talks did not yield any positive result, they said.

It is learnt that two sides are also engaged in diplomatic talks to find a solution to the face-off which is turning out to be the most serious military standoff between the two armies after the Doklam episode of 2017.

"We hope the Chinese side also brings to table specific workable suggestion to ease tension," said a senior military official on condition of anonymity.

After the standoff began early last month, Indian military leadership decided that Indian troops will adopt a firm approach dealing with the aggressive posturing by the Chinese troops in all disputed areas of Pangong Tso, Galwan Valley, Demchok and Daulat Beg Oldie.

The Chinese army is learnt to have deployed around 2,500 troops in Pangong Tso and Galwan Valley besides gradually enhancing temporary infrastructure and weaponry.

Official sources said satellite images have captured significant ramping up of defence infrastructure by China on its side of the de-facto border including construction activities at a military airbase around 180 km from the Pangong Tso area.

India has also been bolstering its presence by sending additional troops and artillery guns, they said.

The trigger for the face-off was China's stiff opposition to India laying a key road in the Finger area around the Pangong Tso Lake besides construction of another road connecting the Darbuk-Shayok-Daulat Beg Oldie road in Galwan Valley.

Government sources said military reinforcements including troops, vehicles and artillery guns were sent to eastern Ladakh by the Indian Army to shore up its presence in the areas where Chinese soldiers were resorting to aggressive posturing.

The situation in eastern Ladakh deteriorated after around 250 Chinese and Indian soldiers were engaged in a violent face-off on the evening of May 5 which spilled over to the next day before the two sides agreed to "disengage".

However, the standoff continued.

The incident in Pangong Tso was followed by a similar incident in north Sikkim on May 9.

The troops of India and China were engaged in a 73-day stand-off in Doklam tri-junction in 2017 which even triggered fears of a war between the two nuclear-armed neighbours.

The India-China border dispute covers the 3,488-km-long LAC. China claims Arunachal Pradesh as part of southern Tibet while India contests it.

Both sides have been asserting that pending the final resolution of the boundary issue, it is necessary to maintain peace and tranquillity in the border areas.

https://timesofindia.indiatimes.com/india/india-to-bring-specific-proposals-to-military-talks-with-china-on-june-6-sources/articleshow/76183536.cms

THE HINDU

Thu, 04 June 2020

Border tension more serious than in the past, say former Generals

Former Generals point out multiple face-offs and the geographical spread of the conflict

By Ananth Krishnan

Chennai: The ongoing border tension with China at multiple points along the Line of Actual Control (LAC) is more serious than past incidents, indicating China's planning and the likelihood of a protracted stand-off, two senior former generals said on Wednesday.

Unlike previous LAC incidents that were localised, the current stand-offs were spread over at least four points along the LAC and involved more troops than before, which complicated the possibility of an early disengagement and return to status quo, they said.

On guard: An Army patrol team in Ladakh along the Line of Actual Control with China. File

"The fact of the matter is some kind of planning has gone through before these multiple face-offs," said Lt. Gen. (retd) S. L. Narasimhan, Member, National Security Advisory Board. "Earlier, they used to take place in one place. This time there have been multiple face-offs and geographically spaced out, in Sikkim, Pangong Tso and Galwan. The kind of numbers we see is also not what we saw earlier, and the aggression has been more than normal."

"Normal face-offs happen every year, they don't lead to these kind of incidents," added Lt. Gen. (retd) D.S. Hooda, former Northern Army Commander. "This is much more serious. They have come completely well prepared and prepared to do things by force. We have never seen this level of violence," he added. Both were speaking at a webinar organised by the Institute of Chinese Studies.

Stand-offs in at least four locations along the LAC remain unresolved, with reports of a build-up in Galwan valley, Pangong Tso and Hot Springs in Ladakh, and Naku La in Sikkim, with Chinese troops present on India's side of the LAC in some of these spots. Talks at the level of Lieutenant Generals are set for June 6.

Gen. Hooda said a key difference was that past incidents, including in Depsang in 2013, Chumar in 2014 and Doklam in 2017, were localised, triggered by road-building activity. "We were absolutely clear of the red lines and demands of two sides. One wanted to build, the other said no. Therefore, we knew the steps towards resolution. I am not sure we know that in this case. What is it the Chinese want, and why [are there incidents] in so many areas? Will they ease off and go back having invested so much and come into these areas? That adds to risk and possible difficulty in resolving it. We are in for tough hard negotiations and maybe a protracted stand off."

Also new in this instance is the stand-off at Galwan valley, which is not one of the points on the LAC where there have been differing perceptions of alignment. In Pangong lake, face-offs had occurred in the past, as India has been patrolling up to its LAC at Finger 8 while China would come up to Finger 2 — the "fingers" from 1 to 8, running from west to east, refer to mountain spurs on the lake's northern banks. Here also the stand-off is different, as Chinese troops are now present in the area between Fingers 4 and 8 and are preventing India from patrolling up to Finger 8, effectively altering the status quo.

Gen. Hooda suggested that clarifying the LAC in all key areas needed to be done "on an urgent basis" to prevent recurring incidents.

He suggested following the example of Chumar in 2014, where the stand-off was resolved on the basis of a moratorium in patrolling into contested areas for a certain number of days, which was observed for almost two years with transgressions coming down to zero. A similar arrangement could be considered, he said, as "the current protocols are not working". The solution to the current stand-offs would be to return to the status quo as of May 3, before the first incidents were reported, he added.

The former Northern Army Commander said reports suggesting China had over the recent years "nibbled away" at parts of Indian territory were incorrect, and that the Indian Army had ensured it had continued access to patrolling points on the LAC. "In the past 15-20 years, there has been no real change in what we felt was the alignment of the LAC. Those [points] are sacrosanct to the Indian Army."

Gen. Narasimhan said if it was not possible to clarify the entire LAC — the process has been stalled since 2002 after China objected to exchanging maps in the western sector — both could at least start doing so in the disputed and sensitive areas. "This would go a large way in reducing face-offs in the border," he said. While enough protocols were in place — from 1993, 1996, 2005 and 2012 — to regulate patrolling, the problem was ensuring they were followed, he said. "If LAC can be clarified, [we] can work on modality to address face-offs."

He said one possible reason for the current stand-off is that the Chinese "aren't clear why infrastructure is coming up" on the Indian side. "They are unsure of what we are doing in our area," he said. With continued engagement through both military and diplomatic channels, he hoped "there will be a disengagement". "I have the feeling this will get resolved amicably over a period of time," he added.

https://www.thehindu.com/news/national/border-tension-more-serious-than-in-the-past-say-former-generals/article31743030.ece

The Indian EXPRESS

Thu, 04 June 2020

De-escalation process underway: 2 LAC flashpoints are not in list of identified areas still contested

The areas of Galwan and Hot Spring, sites for the current tensions between the two armies, do not figure in this list of 23.

By Sushant Singh

Chinese transgressions across the **Line of Actual Control** in Galwan and Hot Spring in eastern Ladakh surprised India because these areas, unlike Pangong Tso, did not figure among the 23 contested areas identified by the government through various mechanisms since India first accepted the concept of LAC in 1993.

Eleven of the 23 contested areas on the LAC were identified in **Ladakh** under the western sector, four in the middle sector and eight in the eastern sector.

A majority of these areas were identified during **interactions between the two sides** over multiple meetings of India-China joint working groups (JWG) in the 1990s, during exchange of maps for the middle sector in 2000, and comparison of maps for the western sector in 2002.

Six areas were identified over a period by actions of the Chinese army on the ground, **their transgressions** recorded by the Indian side.

The areas of Galwan and Hot Spring, sites for the current tensions between the two armies, do not figure in this list of 23.

"Both sides have taken Galwan and Hot Spring to be 'settled areas' and, therefore, there was a bit of a surprise element in the Chinese action," an official said.

"Had our exercise schedule not been disrupted by the Covid-19 pandemic, we would have been better prepared to respond in the initial stages."

The official also said that because it was never identified as a contested area, the "Hot Spring sector has been an ITBP sector". In 2015, when "a couple of Chinese dozers were seen on our side making a track near PP14, we confiscated them and dug the track using a JCB. The Chinese came to us, agreed that they were on our side and we then returned their equipment," he said.

The 11 areas on the LAC in Ladakh include Trig Heights (Points 5459 and 5495) and Demchok, which were identified during the JWG meetings held between the two sides between July 1991 and October 1995. In Trig Heights, documents state that the Chinese claim is over 972 sq km of area while the contested area in Demchok is another 180 sq km.

During the meeting of the Expert Group in October 2002, when maps for the LAC on the western sector pertaining to eastern Ladakh were to be exchanged, six more areas of difference – North Samar Lungpa, east of Point 6556, north of Kugrang river, area of Kongka La, Spanggur Gap and east of Mount Sajum opposite Dumchele – were identified when the Indian side compared its maps with those of the Chinese.

The Chinese side refused to formally exchange the maps, effectively stalling the process of clarifying the LAC mentioned in the 1993 agreement for peace and tranquility on the border that was signed between Prime Minister P V Narasimha Rao and Chinese Premier Li Peng.

Before 1993, India had refused to formally accept the concept of LAC, and even then, left it unqualified to make it clear that it was not referring to the LAC proposed by the Chinese in either 1959 or 1962 but to the LAC at the time when the agreement was signed.

Based on the record of transgressions by Chinese military patrols and their actions on the ground, the government identified another three additional areas of difference: North bank of Pangong Tso, southern bank of Pangong Tso and Chumar. One of the sites for the current tensions

is in Pangong Tso, including the northern bank of the lake where Chinese soldiers have moved to their perception of the LAC.

https://indianexpress.com/article/india/india-china-ladakh-border-lac-galwan-6441494/

THE TIMES OF INDIA

Thu, 04 June 2020

China building high-security compound at Gwadar to establish naval base

GWADAR: China is secretly building a high-security compound near Gwadar Port in Pakistan's Balochistan province which it will probably use for naval base.

According to Forbes, a leading Aerospace and Defense magagine, analysts have been watching for the first signs of a long-expected Chinese naval base at Gwadar.

"The base, to complement the one at Djibouti, would strengthen China's foothold in the Indian Ocean. Recent satellite images appear to show that several new complexes have been built in the last few years. One of them, identified as a Chinese company involved in port development, has unusually high security," said Forbes.

Located at the western end of Pakistan's coast, Gwadar is expected to be a major port in China's Belt and Road Initiative.

This will allow Chinese goods to shortcut through Pakistan, instead of sailing all the way around South Asia. China was first reported to be planning a naval base there in January 2018.

While the plan has never been confirmed officially, it would be a natural path.

"The high-security compound has been identified as being used by the China Communications Construction Company (CCCC Ltd). This is a majority state-owned company which is heavily involved in many Chinese civil engineering projects. While some degree of security is normal in the region, the level of security seen here is extensive," the magazine read.

It added, "It has anti-vehicle berms, security fences and a high wall. Sentry posts and elevated guard towers cover the perimeter between the fence and the inner wall. This suggests armed guards with rifles".

The high security compound is not alone. There are also two smaller sites built in the last year with rows of blue-roofed buildings. It has been suggested that these might be barracks for a Chinese Marine Corps garrison.

China was reported to be deploying marines there back in March 2017. But the sites lack the level of security that would be expected. Whatever their exact purpose, their location and timing suggests that they are connected to the port expansion.

Forbes said, "Until now the commercial port at Gwadar appears to have been under-used. But Gwadar's luck as a port is already changing, and not because of the Chinese base. A deal was recently made to allow Afghanistan-bound trade to use the port. The first large merchant ship, the MV Manet, landed 17,600 tons of wheat there last week. But the economic benefit of the Chinese port and potential naval base could be much larger".

Whether the Chinese naval base materialises remain to be seen. But these new sites, including the heavily defended compound, may indicate that the next phase of port construction is imminent.

And if the Chinese Navy does begin using the port it will strengthen their capabilities in the Indian Ocean.

https://timesofindia.indiatimes.com/world/pakistan/china-building-high-security-compound-at-gwadar-to-establish-naval-base/articleshow/76175780.cms

The Statesman

Thu, 04 June 2020

Fauji's tour of duty

The need today is to go in for niche defence modernization and technology development in the field of Artificial Intelligence (AI), Cyber Warfare, Space based systems, robotics, drones, Electronic Warfare (EW), Quantum Computing, high end communication technology. These requirements need big money if we have to cater for a two and half front commitment

By Dushyant Singh

New Delhi: The Indian Army is crying out for modernisation and assistance primarily for two major reasons. The Defence budget falls drastically short of meeting the needs of capability development of the Armed Forces in general and the Army in particular. Its revenue to capital expenditure ratio is around 87:13. Despite the Defence budget is grossly inadequate to meet the needs of the Defence Forces, it is four times the education budget and seven times the health budget.

The pie being the same other sectors get sacrificed too. We are paying a huge price for such low allocation in the health sector in the current COVID-9 pandemic which has been further heightened by the Amphan cyclone in Bengal, Odisha and Bihar. The Defence budget has grown upwards of 65 per cent in the last five years whereas salaries which includes defence civilians has grown by 75 per cent; but it is the pensions budget that has grown phenomenally high by about 140 per cent.

Our pension budget is almost twice the Pakistani Defence Budget. A silver lining of reduction in pension budget once Defence Civilian Personnel inducted from 2004 start retiring due to their pension coming under the National Pension Scheme may also not help as the number of Armed Forces Personnel will continue to grow due to better life expectancy and OROP commitment.

High revenue liability leaves the Indian Army with very little for capital procurement. The need today is to go in for niche defence modernization and technology development in the field of Artificial Intelligence (AI), Cyber Warfare, Space based systems, robotics, drones, Electronic Warfare (EW), Quantum Computing, high end communication technology.

These requirements need big money if we have to cater for a two and half front commitment. But where do we get the money if we are going to increase our revenue expenditure year on year by 15 to 16 per cent? Unless we save our big ticket expenditure of salaries by rightsizing and some out of the box innovation we are going to get reduced to a low end technology equipped army. Is this desirable? I am afraid not. The idea of Tour of Duty (ToD) seems to be an outof- the-box solution and we need to make it work without losing our operational effectiveness and preparedness.

The second issue confronting the Indian Army is career progression. ToD (Tour of Duty) to some extent may address this issue. Due to our pyramid shaped organisational structure career progression in the officer cadre is a humongous challenge. As per estimates the strength of nonempaneled officers (overlooked for promotion) in the Army is going to touch around 14,000 by 2030.

Criticism of ToD and to some extent rightly so is coming from many defence experts and retired senior officers on the grounds of lack of motivation of ToD officers due to their limited tenure and uncertain future after completion of ToD. In matters of war fighting and CT operations inadequately motivated officers will definitely affect the operational effectiveness.

But what is the current state of the Indian Army? Can we imagine what will be the state of the Army with 14,000 non-empaneled officers? It is a reality that barring a few, most of the non – empaneled officers perform suboptimally. We also must consider that against the ideal ratio between permanent and support cadre officers for better upward mobility of 1:1.1 the ratio stands at 3.7: 1.

Should this idea succeed we could order an internal study and come up with an ideal ratio of officers between permanent cadre: SSCO (Short Service Commission Officers) : ToD. If the experiment fails we are at liberty to junk the plan. In any case the ToD officers will only fill up the deficient billets which are in the junior service bracket.

We must keep in mind that unit commanders as such are functioning with major deficiencies to the tune of 8 to 12 officers in respect of major combat and combat support unit depending on where the unit is located. So it may be worth trying young blood (ToD officers) and give them to young and dynamic COs to extract work out of them who as such are functioning with major deficiencies.

There is no harm in at least giving the idea a chance as a pilot project. If it succeeds we may look at setting right the permanent versus the support cadre ratio for better promotion avenues in the Army. Major benefits of the ToD will accrue essentially in savings in the defence budget and availability of officers in junior ranks in various units. These are two major issues confronting the Indian Army and by extension the country.

By rough estimates if we were to just induct 1000 soldiers on ToD we would end up saving more than Rs 20,000 crore. Likewise if we replace 1500 SSCOs with ToD (subject to success of pilot project say on 100 ToD officers) the net saving to the defence exchequer would be to the tune of 35 to 40,000 crore. These savings would further increase if we were to take the fitment factor of 2.5 and calculations for 40 years of pension for permanent cadre (50 to 60 per cent officers are awarded permanent commission).

In terms of savings this is a substantial amount and would definitely ease our constraints of modernizing the Indian Army. Criticism of the proposal on the grounds of inadequate training and professional skills do appear justified. But before rejecting the idea if we do an environment scan we would find that short three-year tenures have been very successful in the Israeli Defence Forces, South Korea, Russia and even the US although the conscription is not mandatory in the case of the US now.

The Russian tenure has over time been reduced from three years to just one year. Likewise South Korea has tenures ranging from 1 to 1.5 years. Israel has tenure of 32 months for men and 24 months for women. All these nations have achieved a fair amount of operational effectiveness with short tenures. In the case of India there would be a voluntary induction of personnel for ToD. As compared to a compulsory conscription, which is the case in most of the countries, voluntary service personnel should be better motivated.

This is likely to pay better dividends in operational effectiveness. Even if we look at the performance during the Kargil war, most of the officers who excelled were less than 3 years of service bracket. Finally, from what one has gathered, if ToD officers are facilitated better avenues for second career prospects by corporate houses (Mahindras have already offered to do so), given some good financial handshake package and tie-ups for preference through MoUs for category A MBA and Engineering institutions they will definitely be better motivated and serve to the best of their capability.

It is also learnt that there will be no compromise on the training of such officers. The duration and expenditure on training of SSCOs and ToD will be same i.e. 44 weeks. We need not shoot the idea even before it is born, let's for once give a good idea a chance.

(The writer, a retired Lieutenant-General (PVSM, AVSM), is former Chief of Staff, Eastern Command, former Corps Commander, former Commandant, Army War College, ex-IG Ops NSG, and former member of various National Level Emergency Response Committees)

https://www.thestatesman.com/opinion/faujis-tour-duty-1502895778.html

THE POLICY TIMES
People's Voice for Policy Change

Thu, 04 June 2020

Lives of Indian soldiers are at risk as the Chinese materials find way to the Indian Army bulletproof vests

The Company SMPP is the vendor which supplies the bulletproof jackets to the Indian Army

By Kanupriya

Lives of 1, 86,318 Indian armies personal are at risk. The protective armor which helps them to save their life has now become a threat to them as the raw materials of the bulletproof jackets are taken from China. Although it was clarified by the officials of the manufacturing company that the quality of the vests is not compromised and the vests made up of Chinese raw material also meet quality standards, whereas, army officials choose to remain silent on this matter.

What Report Says;

According to The Economic Times, Chinese materials have found their way to the Indian Army armors and bulletproof vests. It said that 40% of the jacket material fabric and boron carbon white powder are being imported from China. Quoting the executive director of SMPP Mr. Ashish Kansal, during the selection process SMPP presented jackets that contain raw material imported from other countries like the Netherlands but it changed the supplier later on.

The company SMPP is the vendor which supplies the bulletproof jackets to the Indian Army. Initially, it took the raw material from the USA and Netherlands, but then it shifted to China in order to cut the cost as the USA and Netherlands have also started buying their raw material from China. The Chinese company has got a great project of 68 crores for bulletproof jackets from the Indian army. Officials of the Indian Army have said that the first lots of 10,000 jackets are being accepted after a series of firing tests to check for quality.

Clarification of SMPP

In the interview given by SMPP to the Economics Times, they said "yes, we have changes the suppliers' ad have informed the army about it. There is no change of quality and the jackets are of the same standard that was tested". He also said that this changing of suppliers has driven down the costs by going directly to the manufactures, of the material instead of western suppliers that were getting it from the same.

Mr. VK Saraswat, who is a former DRDO Chief, told India Today, "It is a market force; we cannot do much about this. The only thing is if we find that the bulletproof jackets produced by the Chinese material are not up to the mark, then we will have to say, as of now there is no such report". He further added that they have done standardization of bulletproof jackets. The standards have been already laid by the Bureau of Indian Standards.

Our Take on This

The question which arises here is that are we not capable to manufacture the armor within our country? What is the issue which is becoming stymie in the path of Indian manufactures to manufacture armor for our own army? The idea of manufacturing lightweight bulletproof jackets in India was mooted, for a mere reason of cost. They choose Chinese companies because of their lower cost.

Indian companies like Kanpur based MKU and Tata Advanced Materials exports body armor to armed forces of different countries but not India. Why so?

China, a country which claims our territory to be its own, a country which is trying to put pressure on Indian army, a country whose major source of foreign revenue in India and in turn uses that money make weapons against us. Is it wise of us to buy the armor for our soldiers from that country?

It has shown its wrong intention by again starting the face-offs near LAC in Sikkim and also by breaking out and setting up the bunkers in the Indian Territory. They have also started the preparations of the war by enhancing the ammunitions at the border and deploying the aircraft. We should stop trading with China, especially when it comes to buying the armor. The lives of our soldiers are invaluable and we cannot put them at risk for a mere amount of money.

https://thepolicytimes.com/lives-of-indian-soldiers-are-at-risk-as-the-chinese-materials-find-way-to-the-indian-army-bulletproof-vests/

Thu, 04 June 2020

No impact on anti-militancy ops in Kashmir due to Ladakh LAC tension: Army

A senior Army official on Wednesday said that there was no impact on anti-militancy operations being carried out by security forces in Kashmir valley due to tension with China along Line of Actual Control (LAC) in Ladakh. Meanwhile, as the standoff between the Indian and Chinese armies continued along the LAC in Eastern Ladakh, an "emergency landing and runway strip" is being constructed along the Srinagar-Jammu national highway in south Kashmir district of Anantnag.

"As the tension with Chinese army is in another region, there will be no effect on the anti-militancy operations by security forces in Kashmir valley because of it," General Operation Commanding (GOC) Victor Force, A Sengupta said while answering a question during a press conference here on Wednesday.Refusing to answer a question related the airstrip, he said that it is an Indian Army Force initiative and he would not be able to comment on that. Official sources said that the 3.5-km-long airstrip on the Srinagar-Banihal highway is being constructed on war footing. "Currently, the earth filling work is being done on the stretch," they added.

The construction of the 'emergency airstrip' in south Kashmir comes in the backdrop of standoff between the two armies along LAC in Ladakh. Tensions have been intensifying with both countries building up troops on either side of the border. However, the border dispute between India and China is set to turn a new page with negotiations to be hosted between senior military officers on June 6.

Defence Minister Rajnath Singh on Tuesday told a news channel that a 'large number of Chinese are present in the disputed area and our troops are also holding ground'."In the recent crisis, the Chinese have been claiming that in their perception their border is at a particular place. We are saying it is at another place and because of this, there is a difference of opinion. Their forces have come in, in good number and we have sent our troops there in sufficient numbers too," Singh said.

Troops of both countries have been engaged in a standoff in Ladakh for over three weeks at Pangong Tso, Galwan Valley, Demchok, and Daulat Beg Oldie.

https://idrw.org/no-impact-on-anti-militancy-ops-in-kashmir-due-to-ladakh-lac-tension-army/#more-228547

THE HINDU

Thu, 04 June 2020

India open to including Australia in Malabar naval exercise

By Dinakar Peri, Subhasini Haidar

India is prepared to expand the Malabar trilateral naval exercise involving India, the U.S. and Japan, to also include Australia, defence officials told *The Hindu*. While a decision on whether to extend the invitation is expected "soon", the officials said, it was unlikely to be announced during Thursday's "virtual summit" between Prime Minister Narendra Modi and his Australian counterpart Scott Morrison.

Cooperation in the 'Indo-Pacific' and the strengthening of defence ties would be at the top of the agenda for the talks, and India and Australia are expected to conclude the long pending Mutual Logistics Support Agreement (MLSA) as part of measures to elevate the strategic partnership.

"We have a shared approach to a free, open, inclusive and prosperous Indo-Pacific," said a Ministry of External Affairs (MEA) official, speaking on the condition of anonymity. "This has led to a convergence of mutual interest in many areas," the official said, stressing that as "two democratic nations", the two countries had a better understanding of regional and global issues.

Despite regular requests from Australia in the last few years, India has resisted issuing the invitation to the Malabar exercise, ostensibly over concerns that it would give the appearance of a "quadrilateral military alliance" aimed at China. However, the recent India-China tensions over the situation at the Line of Actual Control may have brought more flexibility to the decision making process, and the Prime Minister's Office and MEA are expected to take a final decision in consultation with the Ministry of Defence.

When asked about Malabar earlier this week, Australian High Commissioner Barry O'Farrell said he could not confirm whether India would decide to invite Australia.

"The issue of Malabar is obviously an issue for the partners (India-U.S.-Japan) to decide; we would be delighted to participate in Malabar, but I do think that at times the focus on Malabar gets in the way of the underappreciated growth and significance of defence ties between Australia and India," Mr. O'Farrell said, adding that bilateral defence cooperation had "quadrupled in the last six years".

The announcement of the MLSA, which would allow reciprocal use of each other's military bases for exchange of fuel and provisions to simplify logistical support and improve operational turnaround would mark another step in that direction. Australia was the first country to submit a draft MLSA after India signed the first such agreement with the U.S. in 2016. It was to be signed last year during the scheduled visit of Defence Minister Rajnath Singh to Canberra but the trip was cancelled due to his domestic engagements. It was then expected to be part of the announcements at the Modi-Morrison summit in January 2020, which had to be postponed due to Australian forest fires, and put off again in May because of the COVID-19 pandemic. Rather than putting it off any further, the two leaders "decided to continue the engagement even though it was in the form of a virtual meeting," officials said.

A broader maritime cooperation agreement with a focus on Maritime Domain Awareness (MDA) is also in the works and Australia has agreed to post a Liaison Officer at the Indian Navy's Information Fusion Centre - Indian Ocean Region (IFC-IOR) at Gurugram. The two countries also have increasingly common military platforms as India's defence purchases from the U.S. continue to grow.

The inclusion of Australia in the Malabar exercise would be a major shift from the past for India's Indo-Pacific plans. Malabar began as a bilateral naval exercise between India and the U.S. in 1992 and was expanded into a trilateral format with the inclusion of Japan in 2015. Since 2016,

Australia has made repeated requests to join the exercises, and in January 2018, the then Australian PM Malcolm Turnbull had said the talks on Malabar were "progressing well". However, India did not include Australia in the exercises in 2018 and 2019, continuing instead to grow the bilateral AUSINDEX naval and other military exercises.

https://www.thehindu.com/news/national/india-open-to-including-australia-in-malabar-naval-exercise/article31740876.ece

Science & Technology News

The Indian EXPRESS

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Space tech start-ups need more government nurturing, resources

We must trust and support early-stage innovations through "adventure" capital, not just risk-averse venture capital. We also need "patient" capital, as the lead times are long in this sector

By Raghunath Mashelkar

On May 16, Finance Minister Nirmala Sitharaman announced a ground-breaking initiative by opening up space and atomic energy to private players, referring to them as "fellow travellers". And, on May 30, history was created by SpaceX when NASA astronauts were launched into orbit by the first-ever commercially-built rocket and spacecraft. "NewSpace" is a rapidly growing market that will be worth hundreds of billions of dollars in the next decade. Can India take advantage?

A SpaceX Falcon 9 rocket carrying the company's Crew Dragon spacecraft is launched from Launch Complex 39A on NASA's SpaceX Demo-2 mission to the International Space Station with NASA astronauts Robert Behnken and Douglas Hurley onboard, Saturday, May 30

The welcome reforms announced by the FM include the levelling of the playing field for private companies in satellites, launches and space-based services by introducing a predictable policy and regulatory environment to private players and providing access to geospatial data and facilities of the Indian Space Research Organisation (ISRO).

Many doors of opportunity are opening in this sector. Reportedly, more than 17,000 small satellites will be launched in Low Earth Orbit by 2030. Exciting Indian space-tech startups are emerging in this area.

For instance, Prixxels, founded by two BITS Pilani graduates, is building a constellation of nano-satellites to provide global, real-time and affordable satellite imagery services. Bengaluru-based startup, Bellatrix Aerospace offers novel "electric propulsion" systems, which have applications in the field of nano and micro-satellite propulsion. And Mumbai-based startup Manastu Space has developed a "green propulsion" system using hydrogen peroxide as fuel. So, what can we do to help such young "co-travellers"?

First, the crucial issue of funding. We must trust and support early-stage innovations through "adventure" capital, not just risk-averse venture capital. We also need "patient" capital, as the lead times are long in this sector.

The government can be the provider of such adventure and patient capital. It did so in 2000, when we at CSIR launched the New Millennium Indian Technology Leadership Initiative. CSIR

gave very low-interest soft loans to early-stage startups, who explored radical ideas. After proof of concept, other financial instruments, including venture capital, became available. So, the public-private partnership that the FM is referring to should be in financing too, not just in development.

Second, startups need a head start in the market and the current public procurement system is heavily loaded against them. The lowest-cost-selection approach must change to lower total cost of ownership. Path Ahead: Transformative Ideas for India, edited by Amitabh Kant, carries my chapter on creating an innovative public procurement policy for startups. Perhaps, it is worth revisiting.

Third, we need to create a robust space tech-startup national innovation ecosystem comprising incubators, accelerators, scalerators and mentors. ISRO has a pivotal role in anchoring this initiative. Just as important will be the synergy with the government's flagship programmes such as Digital India, Startup India, Make in India, Smart Cities Mission, etc.

Fourth, we urgently need a law that allows private players to participate across the space value chain, not just bits of it, as is the case today. The draft Space Activities Bill, introduced in 2017, has lapsed. This is an opportunity to rewrite it with a bold perspective.

Fifth, the nation needs a new mantra. On May 26, in an interview about actioning the recent initiatives announced by the finance minister, Chief of Defence Staff General Bipin Rawat, offered it. Referring to the principal idea from my recent book on the subject, he said that we must move our aspirations from leapfrogging to pole vaulting. Can India pole vault to a 10 per cent share of the global space economy within a decade?

Yes, we can. Prime Minister Narendra Modi has given us an inspiring agenda of Atmanirbhar Bharat Abhiyan. To achieve this, we need "aatmavishwas" — self-belief, and trust. If we build this atmavishwas with bold policies coupled with determined actions, then we can certainly pole vault to a great new future, and sooner rather than later.

(This article first appeared in the print edition on June 3, 2020 under the title 'A new frontier'. The writer is former DG, Council of Scientific & Industrial Research.)

https://indianexpress.com/article/opinion/columns/a-new-frontier-spacex-isro-6439685/

ThePrint

Thu, 04 June 2020

Modi govt wants private sector in global space race, but it's up to ISRO to make it happen

Right now, private players can only boast of delivering low-cost products and services to ISRO, but it needs to widen its customer base and develop more design capabilities

By Narayan Prasad

Berlin: The recent announcement of the Government of India to support the rise of the private sector in the space industry is signalling that policymakers are keen to see the Indian private companies capture a share of the global space market.

Is the private sector ready and capable of it? If not, how can the Indian Space Research Organisation (ISRO) help?

The present role of private sector

The involvement of the private sector in India's space programme received impetus during the leadership of Professor Satish Dhawan. The engagement model drawn up was on the basis that ISRO would share the know-how and also buy back the product/service from the private sector partner. This meant that scientists at ISRO could offload some of their routine work after establishing the initial Intellectual Property (IP).

From the private player's perspective, ISRO did not have the volume of business where they could heavily invest in creating their own IP base and this engagement of technology transfer and buy back meant that the access to the know how came cheap and assured a customer.

This engagement model has been around for perhaps 50 years now and the one thing that has really changed over the course of time is the volume of satellites and rockets.

Statements by ISRO management share that there are a core group of about 150 companies that supply parts and services to the space programme.

If one has to understand the ability for the private sector to capture a share of the global market, one has to look under the hood at a company's design knowledge and capabilities, which constitute its IP, and the engagement model so far.

IP is the basis for exports

The legacy model of transfer of IP and buy back from ISRO meant that the private sector has mostly absorbed the processes that go into producing space hardware, the quality control and the facilities for it. The critical piece that seems to be missing in the majority of the vendors serving the space programme is design knowledge and the ability to create their own IP and roll out products in the market.

This is one of the results of the mechanism of the industry involvement in the space programme not having changed much in the last five decades.

Yes, there has been some movement in the private sector to assemble satellites and rockets. But this again has been about simply removing ISRO personnel and adding labour from the private sector rather than having the private space sector contribute their own IPs.

ISRO has done a great job in training many of these vendors to match space standards and qualities. This model of engagement means that the lack of incentives to create IPs and incentives to only manufacture/provide labour/facilities make it extremely challenging for any of these legacy industry actors to sell in the global space market.

When these players try to sell globally, their primary proposition is mostly then low-cost production/service rather than strong IP-based product exports.

Therefore, the fundamental shift needed in the next decade is looking at changing the 50-year-old model of industry engagement with ISRO to incentivise the private sector in investing in IP creation and development.

Incentivising IP investments and development

To contrast what happens when right incentives are set to IP development, we could look at comparing the private space sector of South Africa and India.

The private space sector in South Africa exports over 90 per cent of the products they produce to the US, Europe and Asia. In contrast, the overwhelming majority of the private space players in India solely depend on ISRO for their business.

The government in South Africa has limited space capabilities and some of the university satellite programs have existed for decades in the country. This meant that the commercialisation happens on the basis of original IP that sees export as a primary market. South African companies also benefit from the lower cost of operations in the country (much like India). However, combining the control over the IP and the lower cost of operations makes their products extremely competitive in the international space market. This is where India's private sector should look for inspiration.

The incentive for IP development goes hand in hand with the change in the procurement. Instead of constructing contracts on the basis of procuring labour or just production facilities, procurement can be on the basis of creating competition in IP development.

For example, stating that ISRO is willing to procure imagery from the private sector and publishing the image standards/coverage to be met can incentivise the private sector to use both ISRO IPs and create their own to build and operate their own satellites.

This would mean a win-win to both ISRO and the private sector. While ISRO can focus on long term technology and scientific developments, routine requirements can be met by the private sector. This will enable the private sector to use the developed space structures and capabilities to sell both the satellites and the imagery-based services in the global markets to add to their customer base.

The question though remains — whose job will it be to coordinate all of this and if leaderships in both ISRO and the legacy private sector are ready for such changes. Such risks are being taken by some of the emerging space startups but without much support from ISRO. If they succeed, they can stand as inspiration for much of these legacy models to change.

(Narayan Prasad is the Chief Operations Officer of satsearch.co, a global marketplace for space supported by the European Space Agency and the host of the NewSpace India podcast.)

https://theprint.in/tech/modi-govt-wants-private-sector-in-global-space-race-but-its-up-to-isro-to-make-it-happen/434469/

EurekAlert!

Thu, 04 June 2020

Breaking the mold: An unusual choice of material yields incredibly long-lasting batteries

Non-conductive silica could be key to realizing next-generation lithium-sulfur batteries

The tremendous increase in the use of mobile technology, wearable electronics, and a wide range of portable devices in general over the past few decades, has driven scientists worldwide to seek out the next breakthrough in rechargeable batteries. Lithium-sulfur batteries (LSBs)--composed of a sulfur-based cathode and lithium anode submerged in a liquid electrolyte--are promising candidates to replace the ubiquitous lithium-ion battery because of their low cost and the non-toxicity and abundance of sulfur.

Image: Silica, one of the most abundant metal oxides, is low-cost, easy to process, and could become a key component of next-generation rechargeable batteries.

However, using sulfur in batteries is tricky for two reasons. First, during the "discharge" cycle, soluble lithium polysulfides (LiPS) form at the cathode, diffuse into the electrolyte, and easily reach the anode, where they progressively degrade the capacity of the battery. Second, sulfur is non-conducting. Thus, a conductive and porous host material is required to accommodate sulfur and simultaneously trap LiPS at the cathode. In the recent past, carbon-based host structures have been explored because of their conductivity. However, carbon-based hosts cannot trap LiPS.

In a recent study published in *Advanced Energy Materials*, scientists from the Daegu Gyeongbuk Institute of Science and Technology proposed a novel host structure called "platelet ordered mesoporous silica (pOMS)." What is unusual about their choice is that silica, a low-cost metal oxide, is actually non-conducting. However, silica is highly polar and attracts other polar molecules such as LiPS.

Upon application of a conductive carbon-based agent to the pOMS structure, the initial solid sulfur in the pores of the structure dissolves into the electrolyte, from where it then diffuses towards the conductive carbon-based agent to be reduced to generate LiPS. In this manner, the sulfur effectively participates in the necessary electrochemical reactions despite the silica's non-conductivity. Meanwhile, the polar nature of the pOMS ensures that the LiPS remains close to the cathode and away from the anode.

The scientists also constructed an analogous non-polar, highly conductive conventional porous-carbon host structure to run comparative experiments with the pOMS structure. Prof Jong-Sung Yu, who led the study, remarks: "The battery with the carbon host exhibits high initial capacity that soon drops due to the weak interaction between non-polar carbon and LiPS. The silica structure clearly retains much more sulfur during continuous cycles; this results in much greater capacity retention and stability over as many as 2000 cycles."

Yet, all this considered, perhaps the most important insight to derive from this study is that host structures for LSBs need not be as conductive as was previously thought. Prof Yu comments: "Our results are surprising, as no one might have ever thought that non-conductive silica could be a highly efficient sulfur host and even outperform state-of-the-art carbon hosts." This study broadens the selection of host materials for LSBs and could lead to a paradigm shift in realizing next-generation sulfur batteries.

Reference

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About Daegu Gyeongbuk Institute of Science and Technology (DGIST)

Daegu Gyeongbuk Institute of Science and Technology (DGIST) is a well-known and respected research institute located in Daegu, Republic of Korea. Established in 2004 by the Korean Government, the main aim of DGIST is to promote national science and technology, as well as to boost the local economy.

With a vision of "Changing the world through convergence", DGIST has undertaken a wide range of research in various fields of science and technology. DGIST has embraced a multidisciplinary approach to research and undertaken intensive studies in some of today's most vital fields. DGIST also has state-of-the-art-infrastructure to enable cutting-edge research in materials science, robotics, cognitive sciences, and communication engineering.

Website: https://www.dgist.ac.kr/en/html/sub01/010204.html

About the authors

The first author of this work is Byong-June Lee, currently a 5th year PhD student at the Department of Energy Science & Engineering at DGIST, South Korea. This study was conducted under the supervision of Prof Jong-Sung Yu, currently a full Professor at DGIST, who received his PhD in chemistry from Houston University, USA, in 1990. Prof Yu followed his PhD by postdoctoral work at Ohio State University, Pennsylvania State University, and Northwestern University, USA, before obtaining a position at DGIST. His research interests include the design and development of new materials for batteries, fuel cells, and water electrolysis. This work was also carried out in cooperation with Dr. Khalil Amine's team at the Argonne National Laboratory, USA.

https://www.eurekalert.org/pub_releases/2020-06/dgi-btm060320.php

EP&T
ELECTRONIC PRODUCTS & TECHNOLOGY

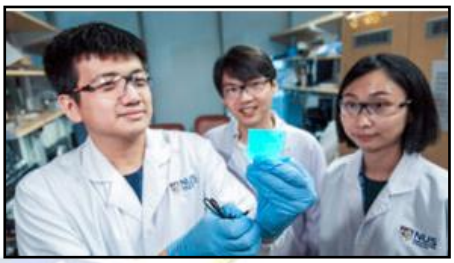
Thu, 04 June 2020

Researchers discover new electronic material for wearables

Stretchable material enables highly visible illumination at much lower operating voltages

Imagine a flexible digital screen that heals itself when it cracks, or a light-emitting robot that locates survivors in dark, dangerous environments or carries out farming and space exploration tasks. A novel material developed by a team of researchers at the National University of Singapore (NUS) could turn these ideas into reality.

The new stretchable material, when used in light-emitting capacitor devices, enables highly visible illumination at much lower operating voltages, and is also resilient to damage due to its self-healing properties.



The NUS research team behind the novel electronic material is led by Assistant Professor Benjamin Tee (centre). With him are two team members: Mr Wang Guanxiang (left), who is holding a sample of the illuminated material, and Dr Tan Yu Jun (right).

This innovation, called the HELIOS (which stands for Healable, Low-field Illuminating Optoelectronic Stretchable) device, was achieved by assistant professor Benjamin Tee and his team from the NUS Institute for Health Innovation & Technology and NUS Materials Science and Engineering. The results of the research were first reported in prestigious scientific journal *Nature Materials* on 16 December 2019.

Durable, low-power material

"Conventional stretchable optoelectronic materials require high voltage and high frequencies to achieve visible brightness, which limits portability and operating lifetimes. Such materials are also difficult to apply safely and quietly on human-machine interfaces," explained Tee, who is also from NUS Electrical and Computer Engineering, N.1 Institute for Health and the Hybrid Integrated Flexible Electronic Systems program.

To overcome these challenges, the team of five NUS researchers began studying and experimenting with possible solutions in 2018, and eventually developed HELIOS after a year.

In order to lower the electronic operating conditions of stretchable optoelectronic materials, the team developed a material which has very high dielectric permittivity and self-healing properties. The material is a transparent, elastic rubber sheet made up of a unique blend of fluoroelastomer and surfactant. The high dielectric permittivity enables it to store more electronic charges at lower voltages, enabling a higher brightness when used in a light-emitting capacitor device.

Next-gen electronic wearables

Unlike existing stretchable light-emitting capacitors, HELIOS enabled devices can turn on at voltages that are four times lower, and achieve illumination that is more than 20 times brighter. It also achieved an illumination of 1460 cd/m^2 at 2.5 V/µm, the brightest attained by stretchable light-emitting capacitors to date, and is now comparable to the brightness of mobile phone screens. Due to the low power consumption, HELIOS can achieve a longer operating lifetime, be utilised safely in human-machine interfaces, and be powered wirelessly to improve portability.

HELIOS is also resistant to tears and punctures. The reversible bonds between the molecules of the material can be broken and reformed, thereby allowing the material to self-heal under ambient environmental conditions.

"Light is an essential mode of communication between humans and machines. As humans become increasingly dependent on machines and robots, there is huge value in using HELIOS to create 'invincible' light-emitting devices or displays that are not only durable but also energy-efficient," Tee said, describing the potential impact of HELIOS. "This could generate long-term

cost savings for manufacturers and consumers, reduce electronic waste and energy consumption, and in turn, enable advanced display technologies to become both wallet and environmentally friendly."

For example, HELIOS can be used to fabricate long-lasting wireless displays that are damage-proof. It can also function as an illuminating electronic skin for autonomous soft robots to be deployed for smart indoor farming, space missions or disaster zones. Having a low-power, self-repairing illuminating skin will provide safety lighting for the robot to manoeuvre in the dark while remaining operational for prolonged periods.

Next steps

The NUS team has filed for a patent for the new material, and is looking to scale up the technology for specialty packaging, safety lights, wearable devices, automotive and robotics applications.

https://www.ept.ca/2020/06/nus-researchers-discover-new-electronic-material-for-wearables-soft-robots/

EurekAlert!

Thu, 04 June 2020

New technique takes 3D imaging an octave higher

A collaboration between researchers at the University of Illinois at Urbana-Champaign and Colorado State University resulted in a new 3D imaging technique called harmonic optical tomography that facilitates the visualization of tissues and other biological samples on a microscopic scale.

The technique can potentially be used to assist with diagnosing cancer and other diseases. The technique is based on using holographic information, which measures light patterns, to generate 3D images of a sample. Three-dimensional imaging that can peer into the interior of an object provides critical information for a diverse range of applications, such as medical diagnostics, finding cracks in oil wells and airplane wings, using tomographic X-ray, and ultrasound methods.

The paper "Harmonic optical tomography of nonlinear structures" was published in *Nature Photonics*.

"Our lab specializes in using holographic data to investigate live cells and tissues," said Gabriel Popescu, a professor of electrical and computer engineering and the director of the Quantitative Light Imaging Laboratory at the Beckman Institute for Advanced Science and Technology. "We wanted to extend this technique to nonlinear samples by combining the holographic data and new physics models."

"This work started out as an interesting theoretical project I worked on with Popescu as a part of his graduate level microscopy course in my first year of grad school. I am excited to see it mature into a functioning experimental prototype," said Varun Kelkar, a graduate student who is a member of Mark Anastasio's Computational Imaging Science Lab.

The researchers developed theoretical models to describe how to image the tissue and discovered a unique capability for 3D imaging that arises, counterintuitively, by illuminating the sample with blurry, out-of-focus laser light. The team designed and built a new system at Colorado State University to collect data. The data was then reconstructed with computational imaging algorithms. The experiments verified an entirely new form of optical tomography that validates the experimental predictions.

"A key to the experimental demonstration of this new tomographic imaging was a custom, high-power laser, which was designed and built by CSU graduate student Keith Wernsing," said Randy Bartels, a CSU professor of electrical and computer engineering and a co-author of the paper.

The researchers used two types of samples to test their theory, said Chenfei Hu, a graduate student in the Popescu group. "The first was a manufactured crystal that is typically used for generating nonlinear signals. The second was a biological sample where we used a muscle tissue."

"This new type of tomographic imaging could prove to be very valuable for a wide range of studies that currently rely on two-dimensional images to understand collagen fiber orientation, which has been used as a reporter for a number of types of cancer," said Dr. Jeff Field, the director of the Microscopy Core Facility at CSU and a Research Scientist in electrical engineering.

"Unlike typical laser-scanning microscopes, an additional benefit of HOT is that its speed makes it much less vulnerable to vibrations and unwanted microscope drift, which leads to sharper images and increased repeatability," said study co-author Kimani Toussaint, a former professor in the College of Engineering at Illinois and now professor in the School of Engineering at Brown University.

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

Editor's Note: The paper "Harmonic optical tomography of nonlinear structures" can be found at https://doi.org/10.1038/s41566-020-0638-5.

https://www.eurekalert.org/pub_releases/2020-06/bifa-ntt060320.php

TECHNOLOGY NETWORKS
Exploring the Science That Matters to You

Thu, 04 June 2020

Doped aluminum oxide shows promise as a UV radiation detector

Exposure to ultraviolet (UV) radiation is a risk factor for skin cancer and other diseases. The risk increases when sunlight, the natural source of UV radiation, is combined with artificial sources such as UV lamps for medical therapy, among others. Detecting and measuring UV exposure in different environments was the scope of a research project conducted in Brazil at the São Paulo Federal Institute of Education, Science and Technology (IFSP) in collaboration with the University of São Paulo Physics Institute (IF-USP).

Credit: Unsplash

The researchers investigated the sensitivity to UV radiation of aluminum oxide doped with carbon and magnesium (Al2O3:C,Mg), as reported in an article published in *Journal of Luminescence*.

“Carbon-doped aluminum oxide [Al2O3:C] was already well known for its acute sensitivity to various kinds of radiation, such as X-rays and beta and gamma rays. It is used for personal and environmental UV dosimetry. What we discovered was that the material also responds to UV when it is doped with magnesium as well as carbon,” said Professor Neilo Marcos Trindade, first author of the article.

The response in question is thermoluminescence, light emission by a material when heated after being exposed to radiation. “Magnesium doping promotes a large number of defects in the crystal, and this makes the material respond even better to ionizing radiation and to nonionizing radiation like UV,” Trindade said.

The investigation was conducted by Trindade and two undergraduates, Maicon Gois Magalhães and Matheus Cavalcanti dos Santos Nunes, with the collaboration of Elisabeth Mateus Yoshimura, a professor at IF-USP, and Luiz Gustavo Jacobsohn, a professor at Clemson University in the

United States. It was supported by FAPESP via a Regular Research Grant awarded to Trindade, a Scientific Initiation Scholarship awarded to Magalhães, and a Scientific Initiation Scholarship awarded to Nunes.

Other findings

In addition to the main discovery, which enables these crystals to be used to detect UV, Trindade and his students obtained two other important findings. The first was that the material's response to UV radiation is analogous to its response to beta radiation, meaning that many measurements of beta radiation performed to date may have been affected by UV interference.

The second was that the two responses vary according to different patterns, enabling the UV interference problem to be solved in future devices. The material responds to beta radiation in a linear manner: its luminescence increases incrementally in a continuous curve as its exposure to ionizing radiation increases. In the case of UV radiation, the luminescence of the material does not vary linearly. "There is a saturation point after which the luminescence ceases to intensify even as exposure continues," Trindade said.

Reference

Trindade *et al*. (2020). Thermoluminescence of UV-irradiated α-Al2O3:C,Mg. *Journal of Luminescence*. DOI: https://doi.org/10.1016/j.jlumin.2020.117195

COVID-19 Research News

THE HINDU BusinessLine

Thu, 04 June 2020

Indian manufacturer shows high hopes of Covid-19 vaccine development

By Prashasti Awasthi

Mumbai: The Covid-19 pandemic has been looming over the world for half a year. According to the latest figures, the deadly contagion has infected more than 6 million people, with 1,98,700 cases reported in India alone.

The repercussions of the pandemic have pushed pharmaceuticals and research institutes to hunt for an effective vaccine. Experts have speculated that it may take a year or half to get a vaccine against the novel coronavirus.

India's leading vaccines and bio-therapeutics manufacturer Bharat Biotech International Limited in association with the Indian Council of Medical Research (ICMR) has shown positive development with lead researchers pinpointing the next month as the most "crucial" stage.

The makers have put their hopes on the effectiveness of the vaccine, which is modelled on building up the body's immunity. In a statement given to IANS, CEO Dr Krishna Mohan Ella said: "The vaccine development is moving in a positive direction. The next month is very crucial. I am a scientist and I believe in science."

The vaccine is being developed by isolating a spike protein and increase the production of antibodies to fight against the spread. However, according to the Times of India report, the vaccine would take at least 6-12 months to start rolling out.

The vaccine maker has also started testing another vaccine, CoroFlu against COVID-19, which has been developed in collaboration with global virologists and researchers.

Currently, there are seven other Indian vaccines under development that have been approved by the WHO, some of which are all set to proceed to the human clinical trial phase. Serum Institute of India, amongst them, has partnered with Oxford University in their vaccine clinical trials.

https://www.thehindubusinessline.com/news/indian-manufacturer-shows-high-hopes-of-covid-19-vaccine-development/article31737315.ece#

THE TIMES OF INDIA

Thu, 04 June 2020

Monkeys, ferrets offer needed clues in Covid-19 vaccine race

New York: The global race for a Covid-19 vaccine boils down to some critical questions: How much must the shots rev up someone's immune system to really work? And could revving it the wrong way cause harm?

Even as companies recruit tens of thousands of people for larger vaccine studies this summer, behind the scenes scientists still are testing ferrets, monkeys and other animals in hopes of clues to those basic questions — steps that in a pre-pandemic era would have been finished first.

"We are in essence doing a great experiment," said Ralph Baric, a coronavirus expert at the University of North Carolina, Chapel Hill, whose lab is testing several vaccine candidates in animals.

The speed-up is necessary to try to stop a virus that has triggered a pandemic, killing more than 360,000 worldwide and shuttering economies. But "there's no question there is more risk in the current strategy than what has ever been done before," Baric said.

The animal testing lets scientists see how the body reacts to vaccines in ways studies in people never can, said Kate Broderick, research chief at Inovio Pharmaceuticals.

With animals, "we're able to perform autopsies and look specifically at their lung tissue and get a really deep dive in looking at how their lungs have reacted," Broderick said.

She's awaiting results from mice, ferrets and monkeys that are being exposed to the coronavirus after receiving Inovio's vaccine. Since no species perfectly mimics human infection, testing a trio broadens the look at safety.

And there's some good news on the safety front as the first animal data from various research teams starts to trickle out. So far, there are no signs of a worrisome side effect called disease enhancement, which Dr Anthony Fauci of the US National Institutes of Health calls reassuring.

Enhancement is just what the name implies: Very rarely, a vaccine doesn't stimulate the immune system in quite the right way, producing antibodies that not only can't fully block infection but that make any resulting disease worse.

That first happened in the 1960s with failure of a vaccine for respiratory syncytial virus, RSV, an infection dangerous to young children. More recently, it has complicated efforts at vaccines against mosquito-spread dengue fever.

And some attempted vaccines for SARS, a cousin of Covid-19, seemed to cause enhancement in animal testing.

Fast forward to the pandemic. Three recently reported studies in monkeys tested different Covid-19 vaccine approaches, including shots made by Oxford University and China's Sinovac.

The studies were small, but none of the monkeys showed evidence of immune-enhanced disease when scientists later dripped the coronavirus directly into the animals' noses or windpipes.

Some of the best evidence so far that a vaccine might work also comes from those monkey studies. Oxford and Sinovac created very different types of Covid-19 vaccines, and in separate studies, each team recently reported that vaccinated monkeys were protected from pneumonia while monkeys given a dummy shot got sick.

But protection against severe disease is just a first step. Could a vaccine also stop the virus's spread? The Oxford study raises some doubt.

Those researchers found as much virus lingering in the vaccinated monkeys' noses as in the unvaccinated. Even though the experiment exposed moneys to high levels of the coronavirus, it raised troubling questions.

The type of vaccine -- how it targets the "spike" protein that coats the coronavirus -- may make a difference. Researchers at Beth Israel Deaconess Medical Center in Boston designed six different vaccine prototypes. Some only partially protected monkeys -- but one fully protected eight monkeys from any sign of the virus, said Dr Dan Barouch, who is working with Johnson & Johnson on yet another Covid-19 vaccine candidate.

In monkeys, the new coronavirus lodges in the lungs but seldom makes them super sick. Ferrets — the preferred animal for flu vaccine development — may help tell if potential Covid-19 vaccines might stop the viral spread.

"Ferrets develop a fever. They also cough and sneeze," infecting each other much like people do, said vaccine researcher Alyson Kelvin of Canada's Dalhousie University.

And while Covid-19 is a huge risk to the elderly, vaccines often don't rev up an older person's immune system as well as a younger person's. So Kelvin also is studying older ferrets.

Some vaccine makers are reporting promising immune reactions in the first people given the experimental shots, including production of "neutralizing" antibodies, a kind that latches onto the virus and blocks it from infecting cells. But there's a hitch.

Said Inovio's Broderick: "Let me be honest. We're still not clear at all on what those correlates of protection are" — meaning what mix of immune reactions, and how much, are needed.

Some clues come from the blood of Covid-19 survivors, although "there's a huge variation" in immune reactions between the severely and mildly ill, Broderick added.

Still, if vaccinated animals that produce the same neutralizing antibody levels as certain Covid-19 survivors are protected — and people given test doses likewise produce the same amount — "that is great comfort that your vaccine approach actually may work," said Kathrin Jansen, head of Pfizer Inc.'s vaccine research.

But ultimately the real proof won't come before huge studies of whether vaccinated people get sick less often than the unvaccinated.

https://timesofindia.indiatimes.com/home/science/monkeys-ferrets-offer-needed-clues-in-covid-19-vaccine-race/articleshow/76173749.cms

The Indian EXPRESS

Thu, 04 June 2020

Explained: How far do distancing, masks reduce Covid-19 spread?

Current policies of at least 1 m physical distancing are associated with a large reduction in infection, and distances of 2 m might be more effective, the study said

By Anuradha Mascarenhas

A new study in The Lancet provides evidence on the optimum use of simple interventions to help flatten the epidemic curve. Part funded by the World Health Organization and conducted by researchers worldwide, the paper pooled 44 comparative studies (7 on COVID-19, 26 on SARS and 11 on MERS) that involved 25,697 participants and performed a meta-analysis to understand how effective was social distancing, wearing eye protection and wearing a mask on preventing the spread of Covid-19.

Current policies of at least 1 m physical distancing are associated with a large reduction in infection, and distances of 2 m might be more effective, the study said. "These data also suggest that wearing face masks protects people (both health-care workers and the general public) against infection by these coronaviruses, and that eye protection could confer additional benefit. However, none of these interventions afforded complete protection from infection, and their optimum role might need risk assessment and several contextual consideration."

'Do not sit here' stickers on seats of a bus in New Delhi to ensure social distancing amid the coronavirus pandemic. (Express Photo: Amit Mehra)

Nine studies that compared the effects of social distancing found that 3 per cent of the people caught the coronavirus infection if they maintained a distance of more than 1m, compared to 13 per cent if the distance maintained was less than 1m.

Thirteen studies that examined the effect of wearing an eye protective device found that the risk of catching the infection was 6 per cent among those who wore an eye protective equipment, compared to 16 per cent among those who did not.

Ten studies that examined the efficacy of wearing a face mask showed that if you wore a mask, the risk of catching the infection was 3 per cent, compared to 17 per cent if you did not.

Dr Sundeep Salvi, Director of the Pulmocare Research and Education Foundation in Pune, told The Indian Express that the end of the lockdown is not the end of the pandemic, but the beginning of a long drawn-up battle against the virus, where social distancing, hand hygiene, wearing eye protection and wearing a mask are the best options at hand to reduce the spread.

Among these, wearing a mask seems to be the most useful intervention. A cloth mask made of cotton quilt, or a hybrid mask made up of cotton and chiffon, or cotton and silk offer good quality protection, he added.

https://indianexpress.com/article/explained/how-far-do-distancing-masks-reduce-covid-19-spread-6438042/

newsGP

Thu, 04 June 2020

New research finds link between COVID-19 and lower humidity

If COVID-19 is a seasonal illness, is Australia's easing of social distancing restrictions going into winter a good idea?

By Anastasia Tsirtsakis

Guwahati: In a massive boost to Assam's Covid-19 testing infrastructure, the Defence Research and Development Organisation (DRDO) has approved the Defence Research laboratory in Tezpur as a testing facility.

A 1% decrease in humidity can increase the number of COVID-19 cases by 6%.

That was the probability suggested by a new Australian study published in *Transboundary and Emerging Diseases*, which found an association between lower humidity and an increase in positive cases of COVID-19.

Lead researcher, Professor Michael Ward, an epidemiologist in the School of Veterinary Science at the University of Sydney (USYD), together with his team studied 749 locally acquired cases of COVID-19, mostly in the greater Sydney area of NSW, between 26 February and 31 March.

They matched each patients' postcode with data from the nearest weather observation station and studied the rainfall, temperature and humidity for the period of January–March.

'The pandemic in China, Europe and North America happened in winter so we were interested to see if the association between COVID-19 cases and climate was different in Australia in late summer and early autumn,' Professor Ward told *newsGP*.

'Humidity during that period was the most important factor that explained when the cases were occurring. It's about a two week window before each case.'

Similar findings were noted in research published in *Science Direct* by USYD and partner institution Fudan University last month, suggesting low humidity promoted transmission of COVID-19 cases in China. There was also an association with low daily temperatures, but this did not emerge as a factor in the Sydney-based research.

Professor Ward says it's not surprising.

'When you look at the China study, those temperatures were sort of in the 3–6^{0}C temperatures, so they're pretty cold. In Australia, we don't get quite as cold, so you might not see such a strong temperature impact and it might still be just humidity driven,' he said.

'But we haven't really got into winter yet in New South Wales.'

The biological theory behind the role of humidity is the same as that with respiratory transmission of other airborne viruses such as influenza.

'When there is low humidity, there's not much water vapor in the air. So the air is very dry and that means when someone coughs, particularly an infectious person, you get aerosolised particles in the air,' Professor Ward said.

'When the air is dry, those particles are small, so they can stay suspended for much longer in the air.

'When it's humid and there's a lot of water in the air, those particles are quite big and they're heavy, and they drop fairly quickly. That reduces the potential exposure to other people and transmission.'

The theory appears to ring true for the Northern Territory, where to date just 29 cases have been recorded and zero deaths. Similarly in Cairns and Townsville in North Queensland there were a combined total of 58 cases and no fatalities.

But it is hard to say for certain whether the low numbers are due to climate or public health efforts such as social distancing measures and the closure of borders.

Professor Ward says time and more data will tell, but that for countries like Australia that have several different climate zones, it is hard to generalise.

'While there's a broad theme here of humidity and temperature, there's local context of what's going on,' he said.

'Inland Australia, humidity is actually lowest in summer, whereas Sydney along the coast it's highest in summer but lowest in winter. So even within the same state, there'll be some regional differences.'

What the research thus far indicates is that heading into winter, populations living in Australia's southern coastal areas will be at the highest risk.

While Australia's case numbers remain relatively low, helping to pave the way for the easing of social distancing measures heading into winter, Professor Ward says the research highlights the need to be vigilant.

'It's about having that really strong surveillance in place, maintaining hygiene, and restrictions,' he said.

'I know they're easing as we're going into winter, but keeping in mind if the conditions are becoming conducive to transmission whether there needs to be some sort of tailored restrictions for winter.

'But it's a major public health problem in terms of messaging to get across that you have to have different behaviours in summer versus winter – it's a real challenge for public education.'

Professor Ward and his team are currently studying case data from April and May, while starting to look at regional differences between areas such as Sydney and the Blue Mountains, which are relatively close in proximity but differ climate-wise.

However, if Australia's community transmission remains low, Professor Ward says researchers focusing on local context may find themselves in the ironic situation of not having enough data to assess the bigger picture.

'There were an extra 450 cases in April and May, so it's a little bit over half of what it was in February and March,' he said.

'It's still plenty of cases to look at, but then after that we're getting ones and twos in terms of locally acquired cases, which really, in the middle of winter if that continues, it's just not enough cases to see if there's really a climatic effect going on.

'The public health intervention has overwhelmed any underlying climatic effects – which is good, but it's not good for research.'

The RACGP has more information on coronavirus available on its website.

https://www1.racgp.org.au/newsgp/clinical/new-research-finds-link-between-covid-19-and-lower

EurekAlert!

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RMRC, ILS scientists take up research on Covid-19

By Sandip Mishra

Bhubaneswar: The Regional Medical Research Centre (RMRC) and Institute of Life Sciences (ILS), Bhubaneswar, have collaborated to undertake an advanced research to find out the iology, epidemiology, diversity, immune response, diagnostics and therapeutics related to Covid-19. As part of the research, the scientists of both the institutions, led by Sunil Raghav of ILS and Jyotirmayee Turuk of RMRC, have carried out genome sequencing of Covid-19 viral strains, which are obtained from the Covid positive cases from the state.

Genome sequencing is the process to determine the DNA of an organism. The scientists said the genome sequencing will help them understand more about the deadly coronavirus. An official source said the team has carried out high quality sequencing of 45 Covid-19 genomes.

"This data will be of great relevance in understanding the migration of viral strain from its point of origin. It will elucidate the pathotypes and provide information on diversity and virulence of the strains," Raghav said. Turuk of RMRC seconded the view.

The scientists said the sequence information has been submitted to the Global Initiative on Sharing All Influenza Data database, which hosts sequence information from round the globe. In the coming days, ILS and RMRC will increase sequencing efforts and aim to sequence around 200 genomes specific to Odisha.

RMRC Bhubaneswar director Sanghamitra Pati said this effort as a part of the state's Covid-19 research study team will provide many significant outcomes once the data are fully analysed. ILS Bhubaneswar director Ajay Parida said the basic information from the sequencing data will enable researchers to carry out further studies and it will contribute to disease prevention, control and treatment.

https://timesofindia.indiatimes.com/city/bhubaneswar/rmrc-ils-scientists-take-up-research-on-covid-19/articleshow/76179823.cms