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समाचार पत्रों से चयित अंश
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Business Standard

Mon, 14 Sept 2020

Parliament all geared up for holding 18-day Monsoon Session from Sept 14

Entry in the premises will be allowed only on production of a Covid-19 negative report, with the test conducted not more than 72 hours before the start of the session

New Delhi: Parliament is fully prepared for the 18-day Monsoon Session from Monday under the shadow of the coronavirus pandemic with many firsts, including sitting of the two Houses in shifts without any off day, entry only to those having a negative COVID-19 report and compulsory wearing of masks.

In run-up to the session, while over 4,000 people including MPs and staff have been tested for COVID-19, most parliamentary operations have been digitalized, entire premises sanitised and doors made touch-free.

The first-of-its-kind Monsoon Session will see Lok Sabha and Rajya Sabha sitting in two different shifts, while special seating arrangements have been made for MPs in adherence to social distancing guidelines.

Frequent sanitisation of the entire parliament complex will also be carried out, while arrangements have been made to sanitise various parliamentary papers as well as footwear and cars of MPs, officials said.

Barring on the first day, Rajya Sabha will convene in morning shift from 9 am till 1 pm, and Lok Sabha in evening shift from 3 pm to 7 pm. The chambers of both houses along with their respective galleries will be used for sitting of the members in each shift.

In between the two shifts, the entire complex will be sanitised.

Entry in the premises will be allowed only on production of a COVID-19 negative report, with the test conducted not more than 72 hours before the start of the session.

Frequent sanitisation of the entire parliament complex will also be carried out, while arrangements have been made to sanitise various parliamentary papers as well as footwear and cars of MPs, officials said.

Frisking of people will also make way for touch-less security scanning, while thermal scanning will also be totally touch-free.

For making the entire Parliament complex a safe zone in view of the COVID-19 pandemic, Lok Sabha Speaker Om Birla and Rajya Sabha Chairman M Venkaiah Naidu had held a series of extensive discussions with officials of the Home Ministry, Health Ministry, ICMR and the DRDO.

As per the standard operating procedures finalised for holding the session from September 14 till October 1, the MPs and staff of secretariats of both houses, as also the media personnel covering the proceedings, will be asked to undergo COVID-19 test, not more than 72 hours before the start of the session.

Officials said arrangements were made for tests of close to 4,000 people, including the MPs, staff members and journalists. Only MPs and ministers will be allowed inside the main building,

while necessary seating arrangements will be made for separate sitting of their personal staff in the complex.

A new seating arrangement following social distancing guidelines has been prepared by both houses for their respective members. The MPs will also be allowed to address the Chair while seated and wearing their masks so that the risk of infection might be minimised.

It has also been decided that air of air conditioners will be exchanged six times every day to avoid any possible infection. The DRDO will also provide multi-utility COVID-19 kits to all MPs.

Each kit will contain 40 disposable masks, five N-95 masks, 20 bottles of sanitisers of 50 ml each, face shields, 40 pairs of gloves, a touch-free hook to open and close doors without touching them, herbal sanitation wipes and tea bags to enhance immunity.

The two houses together have more than 780 members at present. The Health Ministry has also suggested that the movement of Members of Parliament in chambers of both the houses can be made unidirectional to avoid face-to-face interactions.

The Ministry will make available short video clips to all MPs on awareness about COVID-19 infections and the benefits of wearing masks, etc.

Touchless sanitisers will be kept at 40 different places within the Parliament House complex, and emergency medical teams and ambulances will also be stationed.

All guidelines related to COVID-19 prevention will be strictly followed, the presiding officers of both houses have said.

The provision of ultraviolet boxes has also been made to sanitise various parliamentary papers handled by the presiding officers and members. Arrangements are also being made for sanitisation of footwear and cars used by the members and those provided by the Secretariat by providing mats of required dimensions soaked in Hypochloride gel placed in troughs.

Marshals will also wear masks and face shields.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/current-affairs/parliament-all-geared-up-for-holding-18-day-monsoon-session-from-sept-14-120091300548_1.html

नवभारत टाइम्स

Mon, 14 Sept 2020

भविष्य की जंग के लिए भारत की तैयारी, बनाएगा ऐसे घातक हथियार जो अब तक फिल्मों में ही देखे होंगे

DRDO (Defence Research and Development Organisation) हाई एनर्जी लेसर (High-energy lasers) और हाई पावर्ड माइक्रोवेव्स (high-powered microwaves) जैसे डायरेक्टेड एनर्जी वेपंस (directed energy weapons) बनाने के लिए नैशनल प्रोग्राम बना रहा है। इसमें 100 किलोवाट तक के हथियार डेवलप किए जाएंगे।

दीपक वर्मा रजत पंडित

हाइलाइट्स:

- ***लेसर/माइक्रोवव और पार्टिकल बीम्स पर आधारित हथियार बनाएगा DRDO***
- ***पहले से ही ऐसी प्रोजेक्ट्स पर चल रहा काम, अब नैशनल प्रोग्राम तैयार होगा***
- ***परंपरागत हथियारों के मुकाबले सस्ते और बेहद तेज होते हैं ये हथियार***
- ***अगर बिजली मिलती रहे तो बिना रुके लगातार हो सकता है इनका इस्तेमाल***

नई दिल्ली: डिफेंस रिसर्च ऐंड डेवलपमेंट ऑर्गनाइजेशन (DRDO) की तैयारी डायरेक्टेड एनर्जी वेपंस (DEWs) के लिए एक नैशनल **प्रोग्राम** चलाने की है। पूरी दुनिया में ऐसे हथियारों **की** पूछ बढ़ रही है ताकि आमना-सामना हुए बिना ही युद्ध लड़े जा सकें। ये हथियार कुछ-कुछ वैसे ही होंगे जैसे फैंटेसी मूवी सीरीज 'स्टार वार्स' में दिखाए गए हैं। DRDO के इस नैशनल प्लान में शॉर्ट, मीडियम और लॉन्ग टर्म के लिए लक्ष्य तय किए जाएंगे। कोशिश होगी कि घरेलू इंडस्ट्री के साथ मिलकर 100 **किलोवाट** क्षमता तक के DEWs डेवलप किए जा सकें। DRDO पहले से ही कई DEW प्रोजेक्ट्स पर काम कर रहा है। इसमें 'केमिकनल ऑक्सिजन आयोडीन' से लेकर 'हाई पावर फाइबर' लेसर तक शामिल **हैं।** DRDO एक पार्टिकल बीम वेपन 'काली' पर भी काम कर रहा है। हालांकि इनमें से कोई भी ऑपरेशनल होने के करीब नहीं है।

क्या होते हैं डायरेक्टेड एनर्जी वेपंस?

परंपरागत हथियारों में काइनेटिक/**केमिकल** एनर्जी का इस्तेमाल होता है। मिसाइलों व अन्य प्रक्षेपास्त्रों की मदद से टारगेट को उड़ाया जाता है। डायरेक्टेड एनर्जी वेपंस में टारगेट पर इलेक्ट्रॉनिक/मैग्**नेटिक** एनर्जी या सब-एटॉमिक पार्टिकल्स की बौछार की जाती है। इनके दो मेजर सब-सिस्टम होते हैं- लेसर सोर्स और पार्टिकल बीम कंट्रोल सिस्टम। पावर की बात करें तो एक **मिसाइल** को उड़ाने के लिए किसी लेसर वेपन को 500 किलोवॉट की बीम की जरूरत पड़ेगी।

क्या हैं ऐसे हथियारों के फायदे?

- प्रकाश की गति से लगते हैं, **निशाना** एकदम सटीक।
- एक शॉट पर कम खर्च आता है, **मिसाइलों** के मुकाबले फ्लेक्सिबल।
- रैपिड री-टारगेटिंग के साथ कई **टारगेट्स** को एक साथ निशाना बनाया जा सकता है।
- अगर पावर सप्लाई पर्याप्त हो तो इनका जब तक चाहें, इस्तेमाल जारी रख सकते हैं।

दो फेज में डेवलप होंगे ऐसे हथियार

अगले दशक के लिए DRDO का रोडमैप कहता है कि फेज 1 में सेना और वायुसेना को कम से कम 20 'टैक्टिकल हाई एनर्जी लेसर सिस्टम्स' की जरूरत होगी। इस चरण में डेवलप हथियारों की रेंज 6 से 8 किलोमीटर होगी। फेज 2 में ऐसे लेसर सिस्टम तैयार किए जाएंगे जिनकी रेंज 20 किलोमीटर से ज्यादा है। सेना को 20 हाई पावर इलेक्ट्रोमैग्नेटिक वेपन सिस्टम की भी जरूरत है जिनकी फेज 1 में रेंज 6 से 8 किलोमीटर तथा फेज 2 में रेंज 15 किलोमीटर से ज्यादा होगी।

दो DEW ऐंटी-ड्रोन सिस्टम बेहद शुरुआती

DRDO ने अबतक दो ऐंटी-ड्रोन DEW सिस्टम बनाए हैं जिनका बड़े पैमाने पर उत्पादन शुरू होना है। इनमें से एक ट्रेलर माउंटेड DEW है जो 10 किलोवाट के लेसर से हवा में 1 किलोमीटर की रेंज में टारगेट को उड़ा सकता है। दूसरा काम्पैक्ट ट्राइपॉड-माउंटेड है जो 1 किलोमीटर रेंज के लिए 2 किलोवाट लेसर यूज करता है। यह सिस्टम सेनाओं, इंटेलिजेंस एजेंसियों और पुलिस फोर्सज के सामने रखे जा चुके हैं। इनकी मदद से माइक्रो ड्रोन्स को जैम करने के अलावा उनके इलेक्ट्रॉनिक्स को भी डैमेज किया जा सकता है।

अभी बहुत रिसर्च-डेवलपमेंट की होगी जरूरत

हालांकि स्वदेशी DEW सिस्टम अभी बाकी देशों के मुकाबले शुरुआती स्तर में ही हैं। अमेरिका, रूस, चीन, जर्मनी और इजरायल के पास काफी शक्तिशाली DEWs हैं। अमेरिका ने कई साल पहले एक जंगी जहाज से 33 किलोवाट लेसर के जरिए ड्रोन्स को टारगेट किया था। मई 2020 में अमेरिकी नौसेना ने एक ड्रोन एयरक्राफ्ट को हवा में ही अपंग कर दिया था। अमेरिका अगले चार-पांच साल में 300 से 500 किलोवाट के DEWs तैनात कर सकता है जो क्रूज मिसाइलों को उड़ाने में सक्षम होंगे।

https://navbharattimes.indiatimes.com/india/drdo-developing-star-wars-like-directed-energy-weapons-fir-indian-army/articleshow/78097406.cms

THE TIMES OF INDIA

Mon, 14 Sept 2020

DRDO plans Star Wars-style weapons for battles of future

By Rajat Pandit

New Delhi: The Defence Research and Development Organisation (DRDO) is now planning a national programme on directed energy weapons (DEWs) like high-energy lasers and high-powered microwaves, which are increasingly being considered crucial around the world for the contactless conflicts of the future.

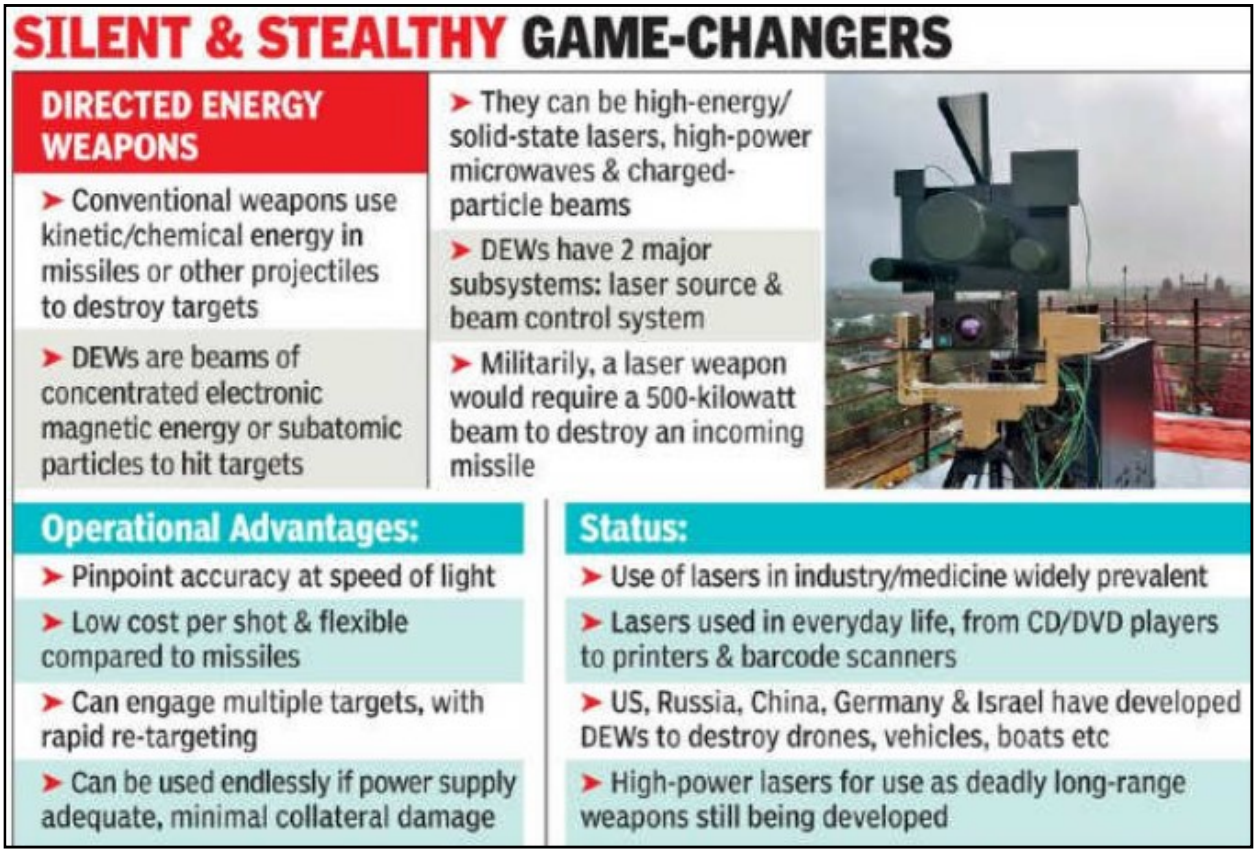
The national programme will have short, medium and long-term goals, with the eventual aim being to develop different DEW variants of up to 100 kilowatt power, in collaboration with the domestic industry, sources said.

The DRDO has been working on several DEW projects for long, ranging from 'chemical oxygen iodine' and 'high-power fibre' lasers to a secretive 'Kali' particle-beam weapon for 'soft-kills' against incoming missiles and aircraft.

But they are nowhere near becoming operational. The need for a focussed approach on DEWs has now gained urgency amid the ongoing military confrontation with China in eastern Ladakh.

DRDO Plans Star Wars-style weapons for battles of future (AP photo for representation only)

DRDO has so far developed two anti-drone DEW systems, which will now be productionised in large numbers with the help of the industry. While one is a trailer-mounted DEW, with a 10 kilowatt laser to engage aerial targets at 2-km range, the other is a compact tripod-mounted one with a 2 kilowatt laser for a 1-km range.



Successfully demonstrated to the armed forces, intelligence agencies and police forces in field operations, the two systems can bring down micro drones by either jamming their command and control links or damaging their electronics through the laser-based DEW, officials said. These indigenous systems, however, are extremely modest compared to the much more powerful DEWs developed by countries like the US, Russia, China, Germany and Israel to destroy multiple drones, vehicles and boats.

The US, for instance, tested a 33 kilowatt laser weapon from a warship to shoot down drones several years ago. More recently, in May, the US Navy tested a new 'high-energy solid-state laser' to disable a drone aircraft in mid-air. The US, in fact, may be just four to five years away from deploying 300 to 500 kilowatt DEWs capable of shooting down cruise missiles.

The Indian defence establishment's technological roadmap for the next decade says the Army and IAF need at least 20 'tactical high-energy laser systems' that can destroy 'small aerial targets', electronic warfare and radars systems at a range of 6-8 km in Phase-I.

In Phase-II, the laser systems should have a range of over 20 km to take on 'soft-skinned' vehicles and troops from ground and aerial platforms. Similarly, at least 20 high-power electromagnetic weapon systems are required for the forces, with 6-8 km range in Phase-I and over 15-km in Phase-II.

As reported by TOI last month, the ongoing Army study on 'niche and disruptive warfare technologies' has identified DEWs as one of the focus areas, with General M M Naravane stressing the need to invest heavily in such futuristic tools. But it will take a lot for such concentrated energy weapons to become an operational reality.

https://timesofindia.indiatimes.com/india/drdo-plans-star-wars-style-weapons-for-battles-of-future/articleshow/78096712.cms

DAILYEXCELSIOR.COM

Mon, 14 Sept 2020

India spreads its wings in hypersonic warfare

By Dr Sudershan Kumar

On the 7th of September 2020, Indian scientists yet again reached another milestone when they successfully tested the Hypersonic sonic Technology Demonstrator vehicle (HSTDV) at 1100hrs from APJ Abdul Kalam launch complex Wheeler islands off coast of Odisha. By this, India becomes only the fourth country after USA, Soviet Union (now Russia) and China to harbour the competence, capability and capacity to develop Hyper sonic glide vehicle for future war fare. This immense intricate superior technology working on the principle of hypersonic speed actually is a great boost to our defense arsenal thus capable of revolutionizing the future warfare. By hypersonic, one means to attain the speed five times more than the speed of the sound.

The speed of sound in air is around 343 meters per sec. This landmark achievement is yet another stepping stone towards a stronger India. Even the US Department of defence and intelligence also acknowledged this fact that the "Development in hypersonic purlins will certainly pave the way towards revolutionizing the future warfare by facilitating more quick striking of the targets even at greater distance with greater fire power." By turning the pages of history, one finds that that speed in maneuverability has been of prime importance thus playing a key role in battle fields by providing edge against adversaries.

This fact can well be ascertained by analyzing the time of the cold war, when both United States of Amercia and Soviet Union (now Russia) realized the importance of speed for future combats. So they initiated a number of programs for development of Hyper sonic vehicles which can be mounted on long range missiles. Besides, their forces also explored the possibility of using these vehicles in future wars against adversaries.

They mainly focused on two types of vehicles. One Hypersonic Glide vehicles and another Hypersonic cruise missiles. Hyper sonic glide vehicles are also called booster vehicles which employ booster rocket to carry them in outer space at altitude between 40 to 100 miles above the earth's atmosphere after which they get separated. They also possess the ability to manoeuver flight using satellite guidance to strike the targets with greater precisions. Hypersonic cruise missile unlike Hypersonic Glide Vehicle fly with in atmosphere and can be launched from land ,ship and from air craft with speed greater than 5 Mach and above to destroy the major targets. The range of Hypersonic cruise missiles is less as compared to Hyper sonic glide vehicles. They have to be launched from the sight close to targets.

China has developed Hypersonic glide vehicles and conducted number of tests to counter and thwart the threat from United States. These Hypersonic vehicles are commonly known as DF-ZF and are in operation since October 2019. One of the key features is that these vehicles can be mounted on long range and short range ballistic missiles. Moreover, the analysts are of the view that Hyper sonic glider vehicle DF-ZF (named by NATO as WU-14) will be used in short range roles as an anti ship missile or for other tactical purposes to address the problem of moving targets with ballistic missiles.

Moreover, the Chinese long term goal may be to include these as deterrence against the US missile capabilities with prospect strategic bombardment. Therefore Indian strategists and planners need to be well acquainted about this development in our neighborhood and acknowledge its repercussions. Especially when our northern neighbor has adopted wolf warrior diplomacy and is on a constant endeavor to alter status quo at LAC unilaterally.

Moreso, this has resulted into a very volatile situation at many points along LAC especially in eastern Ladakh where the situation is even more grim as troops from both sides are facing each other at eye ball distance. Parallelly our Western neighbor is bent upon creating trouble in Union territory of Jammu- Kashmir.

Therefore successful testing of Hypersonic Technology Demonstrator Vehicle by India is a loud and clear message to our adversaries that India is fully capable to thwart any nefarious design of our neighbours. It is also a fact that India has attained self-reliance in missile technology. Missile basically is a rocket propelled weapon designed to deliver with greater accuracy and high speed. Over the years India has produced innumerable types like air to surface, surface to surface, surface to air, and under water to air/surface missiles. Notably among them are Prithvi, Akash, Nag, Nirbhay, Agni series (A1, A2, A3, A4 and A5) and BrahMos cruise missile etc. Their range varies from few kilometer to more than 5000km.More over all sub systems including infrared seekers are indigenously developed. Many of these are nuclear capable.

Successful demonstration test of Hypersonic Technology demonstrator vehicle will further bolster their invisibility and striking power. DRDO scientists conducted this test by launching Hypersonic cruise vehicle using proven solid rocket motor. At an altitude of 30 km, the aerodynamic heat shield was separated at hypersonic Mach number. The cruise vehicle was separated from launch vehicle and the air intake opened as planned. The hypersonic combustion sustained and Cruise vehicle continued on its desired path at the velocity six times the velocity of sound that is nearly 2km per sec for more than 20 seconds. The parameters of launch and cruise vehicle including scram jet engine were monitored by multiple tracking radars, electro optical systems and telemetric stations. A ship was also deployed at bay of Bengal to monitor the performance during cruise phase of Hypersonic vehicle.

All performance parameters Indicated resounding success of the mission. With successful demonstration, many critical technologies such as Aerodynamic configurations for Hypersonic manoeuver, use of scramjet engine propulsion for ignition and sustained combustion and thermo static characteristics of high temperature materials, separation mechanism at hypersonic velocities were proven. This successful test has definitely carved a niche for India in the Hypersonic technology arena but simultaneously will also enable it get hold of the most advanced Hypersonic Vehicle. Moreover, this is another feather in the cap while making India Atma Nirbhar in defence.

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https://www.dailyexcelsior.com/india-spreads-its-wings-in-hypersonic-warfare/

Defence News

Defence Strategic: National/International

The Indian EXPRESS

Mon, 14 Sept 2020

State of play in Ladakh

While Indian Army has gained an advantage by taking the Chushul heights, a diplomatic & military long haul seems likely. Until LAC is delineated, the Chinese can be expected to continue violations of Indian territory

By V.P. Malik

How dangerous is the situation given the People's Liberation Army numbers, firepower, and the area they are occupying?

The PLA has deployed over two regular divisions (about 40,000 troops) along with supporting arms, logistic services and air force along the Eastern Ladakh frontline and as back-up. India too, has about two regular Army divisions supported by the Indian Air Force in this sector now.

Along the Line of Actual Control (LAC), the PLA has now occupied many areas which were earlier considered 'disputed', that is, lying between Chinese and Indian perceptions of the LAC.

In the current situation, it will be a long haul on both the diplomatic and military fronts. India's forces on the ground have to remain alert to ensure that the PLA does not take any advantage during the lull created by long diplomatic engagement.

On Finger 4, north of Pangong Tso, the opposing troops are deployed a few hundred metres apart. On the south bank of Pangong Tso, they are occupying heights that overlook each other's military camps and vital road communications.

With such close and large deployment, coupled with lack of trust after the [June 15-16] Galwan incident [in which 20 Indian soldiers were killed], the pre-emptive occupation of the Kailash Range by Indian troops on August 29-30, and the PLA's provocative action on September 7 [when shots were fired along the LAC for the first time in 45 years], the situation on the ground, particularly in the Chushul sector, is indeed very tense and explosive.

Besides, accusations and counter-accusations flying thick and fast are only adding to the tension.

What does domination of the Fingers area by the Chinese mean for India?

On the north bank of Pangong Tso, there are eight major finger-like spurs coming down to the Tso (lake). From heights along these spurs, one can observe military activity on the north and south banks of Pangong Tso.

The Chinese and Indian (perceived) LACs are about 8 kilometres apart (between Finger 4 and Finger 8) in this area. In May, the PLA occupied this disputed area, deployed troops on Finger 4, and blocked Indian troops, which used to earlier patrol the areas up to Finger 8.

What are the advantages India gets by occupying the heights in Chushul sector?

Heights in the mountains enable observation of the adversary's military activities in the (visible) area, and the ability to bring down accurate direct and indirect fire on the chosen enemy target.

What if the talks don't lead to any disengagement on the ground?

In the current situation, it will be a long haul on both the diplomatic and military fronts. India's forces on the ground have to remain alert to ensure that the PLA does not take any advantage during the lull created by long diplomatic engagement.

Remember, it took nearly six years to resolve the Sumdorong Chu incident (1986) diplomatically.

The Chinese are also present near Demchok and Sub Sector North. How does India deal with that?

In Demchok, the PLA has been objecting to India's non-military developmental activities — road and water channel — for India's civilian population. About 90 km from Demchok, at Chumar, it had made territorial claims and military advances in September 2014.

There has been an LAC-related dispute in the Depsang Plains in Sub Sector North. In April 2013, the PLA troops set up a temporary camp in our area, but later withdrew. They have again occupied some area claimed by us. This has resulted in additional deployment of troops, including armour and artillery by both sides.

All these disputes in Eastern Ladakh, and elsewhere, are related to the LAC which has not been delineated on the maps. India has made many efforts, even at the highest level, but the Chinese have steadfastly refused. An ambiguous LAC enables the Chinese to continue with frequent pin-prick activities, and thus maintain political and military pressure on India.

In the recent incidents, China has deliberately violated all the confidence-building agreements and the perceived alignment of the LAC until now. Unless the LAC is delineated on the map, without prejudice to the final boundary settlement, such violations of Indian territory by the PLA are likely to continue, as these suit China strategically.

How will India cope if the Eastern and Central sectors too, see a Ladakh-like situation?

The situation in eastern Ladakh has already caused tension and the deployment of additional troops along the LAC and vulnerable points in the Central and Eastern sectors. This has become necessary due to the breach of trust with China.

What logistics challenges will Indian troops face in establishing defences in the coming months?

We have never deployed such large forces (Army, Air Force and paramilitary forces) in Ladakh earlier. As road access to Ladakh will not be available between mid-November and mid-May (2021), the winter stocking requirement for civilians and the military is huge. The IAF will remain heavily committed for essential daily maintenance and movement of troops whenever necessary.

What are the chances of the Ladakh situation leading to a conflict? Is there a weather window?

Climatically, intense conflict chances remain high until mid-November. The winter months will reduce the intensity, but we cannot expect a complete stoppage. Aerial and ground surveillance, infantry and artillery deployments will continue.

How important will be the role of the IAF in case of any armed conflict?

Today, one cannot imagine any armed conflict situation without synergy and jointness among armed forces.

The IAF has a crucial role at the strategic and operational levels. Besides its primary role of protecting air space and vulnerable areas/assets, it will be actively engaged in aerial reconnaissance, destroying enemy targets and providing tactical and logistic support to the Army.

What are the chances of this situation turning into a two-front threat with Pakistan also throwing its weight behind China?

China and Pakistan are already engaged in a 'collusive threat' (engaged in secret or hidden avowed goals) vis-à-vis India.

China is unlikely to bank on Pakistani collaboration or participation in any large-scale conflict with India. In the current scenario, however, a limited China-Pakistan military collaboration in the Karakoram Pass region cannot be ruled out. Its manifestations could be activation of diversionary military movements by Pakistan in Siachen and Kargil sectors, and an intensification of proxy war conditions in Jammu & Kashmir.

What else can be done by the Government of India to make it easier to craft a long-term China strategy or negotiate a solution?

National security, particularly armed conflict issues, requires a 'whole of the government' approach.

Unfortunately, we in India have not come out of the habit of working in ministerial silos and stovepipes which in the past have often resulted in military operations not achieving the desired strategic goals. Unlike western democratic nations, our ministers and civil officials are still shy of involving military personnel directly in defence policy-making or while negotiating such issues with foreign political leaders.

https://indianexpress.com/article/explained/ladakh-galwan-valley-army-china-fingers-pangong-lake-6594873/

THE TIMES OF INDIA

Mon, 14 Sept 2020

Midhani masters armour that can stop AK-47 shots

By Ch sushil Rao

New Delhi: At a time when India has started facing some tough challenges along the Line of Actual Control with China, an exclusive armour unit to manufacture bullet-proof jackets of international standards and protective gear and to supply bullet-proof vehicles will come up at Mishra Dhatu Nigam Ltd (Midhani) in Hyderabad's Kanchanbagh area.

The bullet-proof jackets are named 'Bhabha kavach' since the Bhabha Atomic Research Centre (BARC) had developed the technology

The bullet-proof jackets are named 'Bhabha kavach' since the Bhabha Atomic Research Centre (BARC) had developed the technology. These jackets can evenstop a bullet fired from an AK-47 as well. A few hundred bulletproof jackets have already been supplied to the paramilitary forces as samples.

"We have mastered the technology to deliver these bullet-proof jackets in huge quantities. We will also be keeping an eye on the ammunition that is developed across the world and make suitable changes accordingly to

upgrade the jackets," Midhani chairman and managing director Sanjay Kumar Jha told TOI.

The bulletproof jackets that are manufactured in Midhani meet the specifications of the Union ministry of home affairs and also the BIS level-6.

Sanjay Kumar said time has come for Midhani to diversify, including having a full-fledged armour plant which will have in addition to bullet-proof jackets, vehicle armoury and also protective gear for the armed forces.

An armoured vehicle which TOI saw at Midhani has features that security agencies will find suitable for use in challenging situations. For example, even if a tyre were to be shot at, the vehicle would still be able to travel a distance of 100 km. This, in technical parlance, is called 'runflat tyres' system. The vehicle, described as first-ever Isuzu-based combat vehicle, has several other features too. While its carrying capacity with weapons is seven persons, the vehicle can be used as a quick response team, escort vehicle, troops carrier in counter-insurgency operations and for other operational duties.

Centre's Atmanirbhar Bharat concept has come as a shot in the arm for the defence public sector enterprise as preference will have to be given to it instread of going for imports. Since Midhani has mastered the technology and proven that it can supply bullet-proof jackets produced indigenously, experts said the armed forces and security agencies could make purchases from Midhani.

https://timesofindia.indiatimes.com/city/hyderabad/hyderabad-midhani-masters-armour-that-can-stop-ak-47-shots/articleshow/78085437.cms

जागरण

Mon, 14 Sept 2020

सैन्य वापसी पर अब बैठकों का बदला मिजाज, सीमा पर भारतीय सेना कर रही चीन की सीधी निगरानी

चीन की तरफ से अपने सभी नए पोस्टों पर सैनिकों की संख्या बढ़ा दी गई है। भारतीय सैन्य बल भी पूरी तरह से किसी भी अतिक्रमण का अब जवाब देने को तैयार हैं।

नई दिल्ली: लद्दाख में वास्तविक नियंत्रण रेखा (एलएसी) के पास स्थित पैंगोंग झील के दक्षिणी इलाके में 30 और 31 अगस्त को जो हुआ है उसका असर दिखाई देने लगा है। सैनिकों की वापसी को लेकर जो गेम अभी तक चीन के पक्षकार खेल रहे थे अब भारत ने वही दांव उन पर आजमा दिया है। चीन को इस बात का एहसास हो गया है कि एलएसी के पास उसकी सैन्य तैनातियों की अब लगातार सीधी निगरानी भारतीय सैनिक कर रहे हैं।

चीन की तरफ से अपने सभी नए पोस्टों पर सैनिकों की संख्या बढ़ा दी गई है। भारतीय सैन्य बल भी पूरी तरह से किसी भी अतिक्रमण का अब जवाब देने को तैयार हैं।

सैन्य विवाद सुलझाने के लिए स्थानीय कमांडरों व कूटनीतिक स्तरीय वार्ता बेहद महत्वपूर्ण

कूटनीतिक सूत्रों का कहना है कि सैन्य विवाद को सुलझाने के लिए अगले कुछ दिनों में स्थानीय कमांडरों व कूटनीतिक स्तर पर होने वाली बातचीत बेहद महत्वपूर्ण है। मास्को में विदेश मंत्री एस जयशंकर और चीनी विदेश मंत्री वांग यी के बीच जिन पांच मुद्दों पर सहमति बनी है उसे स्थानीय कमांडरों को ही लागू करना है। इसी क्रम में राष्ट्रीय सुरक्षा सलाहकार अजीत डोभाल और चीनी विदेश मंत्री वांग यी के बीच अगली वार्ता की संभावना भी तलाशी जा रही

है। भारत पूर्वी लद्दाख में चीनी सैनिकों की वापसी की स्थिति को देखते हुए सीमा विवाद सुलझाने पर स्थापित विशेष प्रतिनिधियों (डोभाव व वांग) के बीच बातचीत को आगे बढ़ेगा।

चीन ने सीमा पर सैनिकों की संख्या और बढ़ा दी

सूत्रों का कहना है कि कार्प कमाडंरों के बीच होने वाली बातचीत के कई दौर के बावजूद भारतीय पक्ष को जुलाई, 2020 में इस बात का एहसास हो गया था कि चीन बातचीत को लेकर गंभीर नहीं है। विदेश मंत्रालय के स्तर पर भी चार दौर की बातचीत तब तक खत्म हो चुकी थी और उधर से भी कोई संकेत नहीं था कि सैन्य वापसी हाल फिलहाल होने वाली है। हकीकत में चीन का व्यवहार भी बदल रहा था और द्विपक्षीय वार्ताओं में पूरे प्रकरण की जिम्मेदारी वह भारत पर ही डालने लगा था। सीमा विवाद सुलझाने के लिए विदेश मंत्रालयों के बीच होने वाली बैठक में चीन ने यहां तक कहा कि उसके सैनिकों ने अपनी अंतरराष्ट्रीय सीमा को सुरक्षित करने के लिए कदम उठाया है। जून, 2020 के अंत में चीन ने गोगरा पोस्ट व हॉट स्प्रिंग एरिया से सैनिकों की वापसी की बात कही थी लेकिन जुलाई में वहां सैनिकों की संख्या और बढ़ा दी गई।

भारतीय सैन्य रणनीतिकार चीन को उसी की भाषा में देंगे जवाब

इन सब मुद्दों को देख कर भारतीय सैन्य रणनीतिकारों ने चीन को उसी की भाषा में जवाब देने की तैयारी की। इस बारे में नई दिल्ली में उच्च स्तर पर मंजूरी ली गई। बताया जाता है कि जिस स्थान पर भारतीय सैनिकों ने अपनी पहुंच बना कर बंकर डाला है उससे जुडी रणनीति को अमली जामा पहनाने में एक महीने का समय लगा। अलग- अलग स्थानों के लिए अलग-अलग सैन्य बलों को जिम्मेदारी दी गई।

भारतीय सेना ने ऊंचे स्थानों को पाने की रणनीति को मुकाम तक पहुंचाया

ऊंचे स्थानों के लिए पूरी तरह से अभ्यस्त स्पेशल फ्रंटियर पोस्ट, इंडो तिब्बत बोर्डर फोर्स और भारतीय सेना के विशेष बलों ने अपने-अपने स्तर पर रणनीति को मुकाम तक पहुंचाया। यह बेहद मुश्किल आपरेशन था जिसे पूरी तरह से गोपनीय रखना था और अपने सैनिकों को चीन की तरफ से बिछाये गये माइंस से भी बचाना था। गलवन नदी घाटी में चीनी सैनिकों ने फिंगर इलाके में अपनी पकड़ तब बनाई जब भारतीय सैन्य बल दूर-दर तक नहीं थे लेकिन इस बार भारतीय सैनिकों ने चीनी सैनिकों के नाक के नीचे से यह कार्रवाई की। यहां से चीन के ब्लैक टॉप व हेलमेट जैसे रणनीतिक महत्व वाले इलाके की चौबीसों घंटे निगरानी हो सकती है। महत्वपूर्ण बात यह भी है कि वर्ष 1962 में इस इलाके पर हमला करने के लिए चीन ने जो रास्ता अपनाया था उस पर भी भारत सेना पूरी तरह से निगरानी कर सकेंगे।

भारतीय सैन्य बल चीन को जवाब देने को तैयार

सूत्रों के मुताबिक 30 व 31 अगस्त के बाद चीन की तरफ से अपने सभी नए पोस्टों पर सैनिकों की संख्या बढ़ा दी गई है। भारतीय सैन्य बल भी पूरी तरह से किसी भी अतिक्रमण का अब जवाब देने को तैयार हैं। जिस इलाके पर भारत आगे बढ़ा है उसे हथियाने की कोशिश चीन की तरफ से दो-तीन बार असफल कोशिश भी की गई है।

https://www.jagran.com/news/national-indian-army-is-directly-monitoring-china-along-lac-border-20744420.html

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Mon, 14 Sept 2020

Uneasy calm on Ladakh front as India and China prepare for military talks

By Manu Pubby & Rahul Tripathi

Synopsis

An uneasy calm prevails in eastern Ladakh as the two sides have beefed up troops at two key border positions along the banks of the Pangong lake but the Army has not been taking any chances, with surveillance at an all-time high.

New Delhi: Distrust remains high and the Army is at its highest level of alert as India and China prepare for the crucial military commander-level talks, which will reveal whether Beijing's diplomatic and political overtures to resolve the Ladakh situation peacefully are matched by PLA's actions on the ground.

An uneasy calm prevails in eastern Ladakh as the two sides have beefed up troops at two key border positions along the banks of the Pangong lake but the Army has not been taking any chances, with surveillance at an all-time high. Plans are also in place to maintain border outposts through the winter, with joint patrolling by the forces.

"No aggressive manoeuvres have been observed from the Chinese side over the past two days but the problem of trust continues as there seems to be a clear disconnect between diplomatic engagements with China and the actions of its troops on the border," an official said.

A series of high-level meetings have been held at South Block to discuss the ongoing tensions as well as position to be taken at the upcoming corps commander-level talks. Sources said that a date hasn't been finalised yet but it is likely to happen early this week.

While the immediate priority is to disengage the troops deployed in close proximity at several locations in the Chushul sub-sector and in the Finger Area, the Army is clear that de-escalation can only be achieved if the Chinese forces move back to their pre-April locations and vacate forward positions taken along the Line of Actual Control.

The key problem in taking the disengagement process ahead is trust, given the attempt by PLA to occupy key heights along the southern bank of the Pangong.

Keeping in mind the fact that several talks have failed to make any headway, India is preparing to maintain border outposts and joint patrolling by forces despite harsh winter conditions.

These outposts, officials said, will be supported with supplies and logistics using choppers as most of them become inaccessible by roads during winters. "We have a large number of BOPs in forward areas. As the disengagement process is gradual and slow, we plan to deploy our troops in a graded manner during the winters," said a senior official.

Officials familiar with the deployment said both Indian and Chinese troops continue in "eyeball-to-eyeball" positions at all the friction points along the LAC in Ladakh. However, the situation might ease after the military-level talks.

"The military commander-level meeting will reassess and redefine the whole process of de-escalation based on the discussions between two foreign ministers," added another official.

https://economictimes.indiatimes.com/news/defence/uneasy-calm-on-ladakh-front-as-india-and-china-prepare-for-military-talks/articleshow/78097234.cms

THE DIPLOMAT
Read The Diplomat, Know the Asia-Pacific

Mon, 14 Sept 2020

India and Japan's proactive convergence continues: The ACSA and beyond

The conclusion of the ACSA is another milestone in a nearly two decade-long process of strategic convergence

By Ankit Panda

A little less than two years after they began formal negotiations on the matter after an October 2018 leader-level summit, India and Japan last week concluded their Acquisition and Cross-Servicing Agreement (ACSA). Like the Logistics Exchange Memorandum of Agreement (LEMOA) with the United States and ACSA agreements that New Delhi maintains with five other countries, the bilateral arrangement will allow the armed forces of both countries to "exchange supplies and services on a reciprocal basis during exercises in which both participate," as *The Diplomat*'s Abhjinan Rej explains.

Credit: Japanese Ministry of Foreign Affairs

The ACSA speaks to what has been a near-two decade process of strategic convergence between New Delhi and Tokyo, two major swing powers in the Asia-Pacific. Following a visit to India by Japanese Prime Minister Yoshiro Mori back in 2000, the two countries have found much to agree on insofar as their geopolitical interests in the Indo-Pacific region are concerned. In fact, together, India and Japan anchor the two ends of the Indo-Pacific. Given their growing concerns about China, it's unsurprising to see continued progress building on landmark past agreements, including their 2006 declaration of a "strategic and global partnership" and 2008 conclusion of a joint declaration on security cooperation. The preamble to their 2008 agreement, for instance, observed that both countries have a "mutual stake in each other's progress and prosperity." That remains as true today as it was then—particularly as concerns rise in both New Delhi and Tokyo about the sustainability of Asia's regional security architecture in the face of a rising and more ambitious China.

For Japan's outgoing prime minister, Abe Shinzo, the conclusion of the ACSA with India represents a capstone on a longstanding strategic project. Abe, who more so than any single Japanese leader in the past two decades has driven Indo-Japanese convergence, saw Tokyo's fate in Asia as very much intertwined with New Delhi's. The origins of the Indo-Pacific as a geostrategic concept can be traced back to a speech Abe delivered to the Indian parliament back in 2007, during his first non-consecutive prime ministerial term. Abe then referred to the "confluence of the two seas," and in the ensuing years, India and Japan developed their bilateral security partnership while further pursuing networked minilateral consultations, including in the quadrilateral format with the United States and Australia.

In this context, the ACSA should be understood as an enabler of greater Indo-Japanese cooperation. Since 2015, Japanese Maritime Self-Defense Force warships have become a regular presence in the Indian Ocean and arrangements like ACSA can and should facilitate longer deployments for the MSDF and encourage additional interactions with the Indian Navy. It's clear that Tokyo sees this agreement as critical to a broader strategic project: preserving the regional status quo. The Japanese Foreign Ministry's readout underscores that the agreement will "enable [India and Japan] to actively contribute to international peace and security."

https://thediplomat.com/2020/09/india-and-japans-proactive-convergence-continues-the-acsa-and-beyond/

Hindustan Times

Mon, 14 Sept 2020

Chinese PLA's new expansion plans on Bhutan

The Bhutanese rulers have been sensitised at the highest level and have been asked to prepare for a military contingency plan

By Shishir Gupta

New Delhi: After Ladakh and the South China Sea, the People's Liberation Army (PLA) is poised to open another front against Bhutan, with a build-up in western and central part of Kingdom in a bid to settle the border on terms favourable to China in the forthcoming 25th round of boundary talks, people familiar with the matter said,

While Thimpu has been sensitised at the highest levels about the PLA threat, the people added, Beijing will likely use PLA transgressions and encroachments in central Bhutan for a possible trade-off on already encroached areas and claims in the western part of the kingdom in the forthcoming negotiations.

From left to right: Prime Minister Narendra Modi, Bhutan's ruler and 5th Druk Gyalpo Jigme Khesar Namgyel Wangchuck and Chinese Premier Xi Jinping. (AFP/PTI/ANI)

Bhutan is central to India's national security as the country lies next to the Siliguri corridor and any territorial compromise made by Bhutan will have an adverse impact on Indian defences in the area. Although India helped Bhutan Hold its own against PLA during the 73-day stand off at Doklam plateau in 2017, the Chinese army has not stopped testing the armies of the two close allies in the area, the people, in India's military, diplomatic and security establishment said, speaking on condition of anonymity.

Chinese territorial claims in Bhutan include 318 sq km in the western sector and 495 sq km in the central sector. Continuing with its expansionist polices under the grab of peaceful coexistence, the PLA is continuing to construct roads, build and improve military infrastructure and intimidate the miniscule Royal Bhutan Army through aggressive patrolling and denial of access, the people explained.

According to diplomats based in Thimpu and New Delhi, since the 2017 Doklam stand-off, PLA has intruded into five areas of western Bhutan and laid claim to a new boundary that extends approximately 40 km inside Bhutan, to the east of Chumbi Valley. It has methodically built up infrastructure, improved defences, constructed roads, tracks, helipads for troop movement and last mile logistics.

In true Middle Kingdom style, PLA patrols on August 13 and 24 crossed the main stream of Torsa nullah (Dolong Chu) into south Doklam and asked Bhutanese herders to vacate the area near Raja Rani lake in which they were grazing their livestock. The basic idea behind the PLA move is to force both India and Bhutan to agree that China's boundary extends to Gyemochen on Jhampheri ridge rather than on the Sinche la -Batang La axis, the true alignment of the trijunction. This is exactly what PLA was attempting to do in 2017, when it was stopped by the Indian Army.

According to national security planners, PLA has increased surveillance in north Doklam by installation of surveillance cameras and continues aggressive military technical upgradation on the Chinese side of the contested plateau. Thimphu has asked the Royal Bhutanese Army to prepare for a reaction plan by deploying additional troops in order to prevent PLA from coming south of Torsa nullah or unilaterally alter the disengagement lines agreed to by Beijing in Doklam in 2017.

The PLA expansionist plans are not limited to western Bhutan. In June , China raised an objection against Bhutan's Sakteng Wildlife Sanctuary (SWS) Project on the contention that it was located in a disputed border area. Spanning some 750 sq km, the sanctuary is located in the eastern Trashigang Dzongkhag of Bhutan, bordering India and China. This new claim may draw India

again into The contest since the Sakteng Wildlife Sanctuary abuts Arunachal Pradesh which China claims as its territory.

The development came as a surprise to Bhutan. China had never before claimed the land of the Sakteng Wildlife Sanctuary or, for that matter, any land in eastern Bhutan, analysts said. Even more puzzling, Beijing had not mentioned the region during 36 years of diplomatic talks that the two sides have held to resolve their boundary differences. Naturally, the Bhutanese government strongly opposed the Chinese claim questioning the sovereignty of Bhutan. While rejecting the claim of China, Thimpu has also conveyed that the Sakteng Wildlife Sanctuary is a sovereign territory of Bhutan and Not disputed. China's Foreign Ministry, however, has a different perspective and made an official declaration that "the boundary between China and Bhutan has never been delimited. There have been disputes over the eastern, central and western sectors for a long time".

It is notable that the Chinese stand emerged in early June — at a time when Beijing was involved in a series of military standoffs along its Line of Actual Control (LAC) with India in Ladakh. China's new territorial claim in eastern Bhutan indicates Beijing's intent and its sudden territorial claim reinforces the expansionist narrative that the country has now embarked on under Xi Jinping.

https://www.hindustantimes.com/world-news/chinese-pla-s-new-expansion-plans-on-bhutan/story-bqKkkq7SpHPl8xq5R7UpuN.html

The EurAsian Times

Mon, 14 Sept 2020

US offers India 'Air Dominance' Fighter Jets that can even outdo F-35s in an aerial dogfight

Developed by American aerospace juggernauts Boeing, the twin-seat fighter jet possesses a deep magazine that can carry an array of advanced weapons on board and overshadows its predecessor F-15s and even the mightily F-35s because of its Open Mission Systems (OMS) architecture

Despite India reaching a five-point consensus with China, including the disengagement of both respective soldiers from the contested Himalayan Border, it is likely that the blazing fire between the two nations might not diffuse just yet.

Adding Pakistan in the mix along with its "Iron Brother" China, the future paves way for a series of escalations along India's volatile border and thereby highlights India's need to enhance its military arsenal and there is just the fighter jet which might do that – the new US "F-15EX".

The most advanced version of the McDonnell Douglas F-15 Eagle twin-engine, all-weather tactical fighter jet, the F-15EX uses the frame of the classic F-15 and incorporates generations of technological improvements developed over the period of the last thirty years.

Developed by American aerospace juggernauts Boeing, the two-seat fighter possesses a deep magazine that can carry an array of advanced weapons on board and overshadows its predecessor F-15s because of its Open Mission Systems (OMS) architecture.

According to Boeing, "The most significant difference between the F-15EX and legacy F-15s lies in its Open Mission Systems (OMS) architecture. The OMS architecture will enable the rapid insertion of the latest aircraft technologies."

While India's recent induction of the first five of the 36 French Dassault 4.5 generation Rafale Jets is considered a promising sign for the Indian Air Force which is bolstering its air fleet, the current strength of 31 squadrons against the sanctioned one of 42 squadrons would need further procurements of advanced fighters – as India needs to be ready for a possible two-front war.

While the F-15EX were said to be running for the Indian Medium Multi-Role Combat Aircraft (MMRCA) contract, they could yet again return for the MMRCA 2.0 which is to be phased by the IAF for the procurement of further 114 fighters.

With emerging conflicts on the border against neighbors China and Pakistan, there is a need for the future IAF fighters to fulfill different sets of roles. India needs fighter jets which have the ability to strike deep into enemy territories, while also being able to stay up in the air for longer hours, something which will be offered by the F-15EX.

The Russian-made SU 30 MKIs are already deployed on the Chinese border in the Himalayas, and if India decides to go ahead with the purchase, the fighters could be joined by F-15EX, with their heavy engine capacities making them suitable to be operated in the high altitudes regions.

Despite the F-15EX fighters not being stealth fighters unlike US' most advanced F-35 fighter jets, the F-15EX fighters have a potent deterrent capability as compared to the smaller F-35s and are also able to attain air supremacy and even outdo the F-35 fighters.

While the F-35 is an aircraft for tactical operations, the F-15EX is an airspace dominance weapon system and can perform a variety of roles including cross border strikes, engaging in proximity fights with enemy fighter jets, destroying enemy ships while keeping the aircraft carriers at a safe distance.

While the F-35s are superior in terms of overall capabilities and are one of the most sought after jets in the world, however, the US Air Force has been mighty impressed with F-15EX jets and has recently placed an order with Boeing.

"The F-15EX is the most advanced version of the F-15 ever built, due in large part to its digital backbone," said Lori Schneider, Boeing F-15EX program manager. *"Its unmatched range, price and best-in-class payload capacity make the F-15EX an attractive choice for the U.S. Air Force."*

What they would need would be an aircraft that can fly for longer hours, is heavily equipped with weapons systems, and is big enough to carry substantial fuel tanks, so that they do not have to return to the airbase for refueling.

This void can be filled by the F-15EX who can have a combat range of 1,100 miles as compared to the 670 miles range offered by the F-35s. Moreover, the F-15EX has a speed of Mach 2.5 and can accommodate heavy radars.

Moreover, with the fighters possessing the ability to strike deep within Pakistan and with its configurations modifiable to carry nuclear weapons, if New Delhi indeed looks to fill a squadron of these multi-role fighters, it would have a significant influence in the region besides cementing military ties with US government.

https://eurasiantimes.com/us-offers-india-air-dominance-fighter-jets-that-can-even-outdo-f-35s-in-an-aerial-dogfight/

livemint

Mon, 14 Sept 2020

Spacetech startups are ready to take off in India

By Nandita Mathur

- ***Investors, who have placed bets on space startups, believe that the time for space tech is ripe now, driven by tailwinds that include proliferation of micro-satellites, reduced launch costs, and the need for more real-time deep intelligence***

New Delhi: Spacetech startups in India are ready to take off, spurred by government policy, local tech expertise and increasing investor interest. A slew of startups such as Pixxel, Bellatrix Aerospace, Agnikul, Vesta Space among others, led by young founders, have raised funds amid the pandemic, as they identify unique opportunities in space that can solve problems across industries.

While the Indian Space Research Organization (ISRO) has been at the forefront for driving the space sector so far, the finance minister announced opening up the sector to private players in May. The reforms include level 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 ISRO.

"The government is making a lot of good noise, we are very excited with the intent.. that's a great start. The space tech startups in India are extremely good and can launch a rocket at 1/3 rd the cost as compared to US in the same segment," says Arpit Agarwal, principal at Blume Ventures.

Investors such as Blume Ventures, StartupXCeed and Inflexor Ventures, who have placed bets on space startups, believe that the time for space tech is ripe now, driven by tailwinds that include the proliferation of micro-satellites, reduced launch costs, and the need for more real-time deep intelligence on our planet.

While the Indian Space Research Organization (ISRO) has been at the forefront for driving the space sector so far, the finance minister announced opening up the sector to private players in May. (REUTERS)

There were three funding deals in 2020, according to data sourced from Tracxn.

Pixxel raised $5 Million seed funding from Blume, growX and Lightspeed that will strengthen its plans for its first satellite launch later this year and accelerate development of the second satellite. In March, Agnikul, a Chennai-based spacetech startup raised ₹23.4 crore led by pi Ventures and in May, Pune-based Vesta Space Technology raised $10 million from US-based Next Capital LLC.

"India has many advantages in space tech. Indian companies will spend less both in terms of manufacturing and operating costs as compared to US companies, we have an enormous talent pool of engineers that we can tap into and the VC eco system is warming up," said Awais Ahmed,CEO, Pixxel that raised $5 million in seed funding in August.

Founded in 2019 by then 21-year olds Awais Ahmed and Kshitij Khandelwal, while still studying at the Birla Instituite of Technology and Science (BITS), Pilani, Pixxel's satellites claim to collect high quality data as compared to today's satellites that will then be analyzed using machine and deep learning models in order to detect, monitor and predict global problems. The first satellite is scheduled to launch towards the end of this year on a Soyuz rocket.

Ahmed said that they have completed the manufacturing and testing of the first satellite in January this year and are booked for a launch. “The launch has been pushed to November-December due to the lockdown. In the meantime, we are building the second satellite."

Founders said that VC funds are also warming up to spacetech startups.

“Last 6 months interest has been increasing with 2-3 big fundings in the last six months. This was unthinkable of 1.5 years ago," added Ahmed.

StartupXseed, that launched a second fund of ₹200 crore for investing in seed and growth stages in deep tech last week, has backed a number of startups working in space.

“Space startups have a long gestation cycle so lot of VCs were not looking at this sector. The bigger VC funds look for bigger deals. It needs lot more effort and focus to identify such companies, but there is enormous potential in India. People are waiting for 1-2 success stories... things will open up then," Ravi Thakur, co-founder, StartupXseed.

Thakur claims that demand is picking up while the technology and talent in India is on a par with the Silicon Valley and with the government opening up the sector, space tech startups are in a good orbit.

Part of StartupXseed’s portfolio,Bellatrix Aerospace that is developing orbital launch vehicles (rockets) and electric propulsion systems for satellites, raised $3 million in a pre-Series A round last year.

“Now is the best time to do a space tech startup, because the government and ISRO have opened up the space sector. Earlier there was no legal framework to launch a satellite or rocket, neither was ISRO facility open for private companies," says Yashas Karanam co-founder and COO at Bellatrix.

The Indian Institute of Science (IISc) incubated startup, founded by two 22-year-olds, is also the only venture in India to have a technology development contract from ISRO for an electric propulsion system.

Blume’s Agarwal added that deep tech startups working in AI, medical imaging, drones, robotics, automation, and spacetech have lot of potential and there is enough experience available in the ecosystem that a new startup can leverage.

https://www.livemint.com/companies/start-ups/spacetech-startups-are-ready-to-take-off-in-india-11599991828454.html

PHYS.ORG

Sat, 12 Sept 2020

Regulating the absorption spectrum of polydopamine

By Thamarasee Jeewandara

Polydopamine (PDA) is an advanced functional material and its emergent light absorption properties make it crucial for applications in materials science. However, it is challenging to rationally design and regulate PDA absorption properties due to its complex architecture. In a new report, Yuan Zou and a team of researchers in polymer science, optoelectronic materials and physical chemistry in China proposed a simple method to regulate the light absorption behaviors of PDA. To accomplish this, they constructed donor-acceptor pairs in the microstructures via connections between specific chemical moieties. They then used detailed structural and spectral analysis as well as density functional theory (DFT) simulations to confirm the existence of such donor-acceptor molecular pairs. The molecular pairs could decrease the energy bandgap (or energy gap where no electrons exist) and increase electron delocalization to enhance light absorption across a broad spectrum. The rational design of PDA nanoparticles with tunable absorption properties allowed an improved photothermal effect, which the team demonstrated with excellent performances during solar desalination. The work is now published on *Science Advances*.

Polydopamine

Inspired by the bio-macromolecular pigments of melanin, polydopamine (PDA) has received increasing attention for applications in surface engineering, photothermal therapy and bioimaging. The strong adhesive and light absorption properties of PDA can also benefit interfacial engineering during water remediation. Scientists have proposed many synthetic methods to prepare PDA nanomaterials, although with limited attention to regulate its absorption spectrum. The dopamine polymerization process is composed of several complicated pathways and therefore not fully understood. As a result, Zou et al. assumed that the construction of highly conjugated structures relative to donor-acceptor pairs in the PDA nanostructures could regulate the absorption spectrum of the sample. To accomplish that in this work, they developed a one-pot synthesis strategy to synthesize PDA nanoparticles (NPs) with tunable light absorption properties.

Synthesis and characterization

During the synthetic process, they conducted direct copolymerization of 2,2,6,6-Tetramethylpiperidine-1-oxyl (TEMPO) – a typical nitroxyl radical, onto dopamine in an aqueous solution. They doped the TEMPO moiety to the polydopamine microstructure by covalently connecting the molecule with 5,6-dihydroxyindole (DHI) and Indole-5,6-quinone (IQ) oligomers to narrow the energy band gaps of the material and improve light absorption behaviors of conventional polydopamine nanoparticles (PDA NPs). The scientists confirmed the outcomes by using electrochemical analysis, density functional theory simulations and spectral measurements. The work demonstrated an outstanding photothermal efficiency for the product that can be used in interfacial solar steam generation and seawater desalination.

The scientists developed three types of PDA NPs (classified between 1 to 3) with different doping contents and similar particle sizes by tuning the initial concentration of TEMPO. They synthesized conventional PDA NPs through self-polymerization of dopamine in the presence of ammonium using a well-established method. They observed the resulting PDA sample characteristics using scanning electron microscopy, dynamic light scattering and Fourier transform infrared spectra (FTIR). Using X-ray photoelectron spectroscopy (XPS), they confirmed the existence of carbon, nitrogen, and oxygen elements in all PDA samples highlighting the successful preparation of TEMPO-doped PDA NPs. Based on the results, Zou et al. hypothesized two possible pathways to form the cross-linked macromolecular structure.

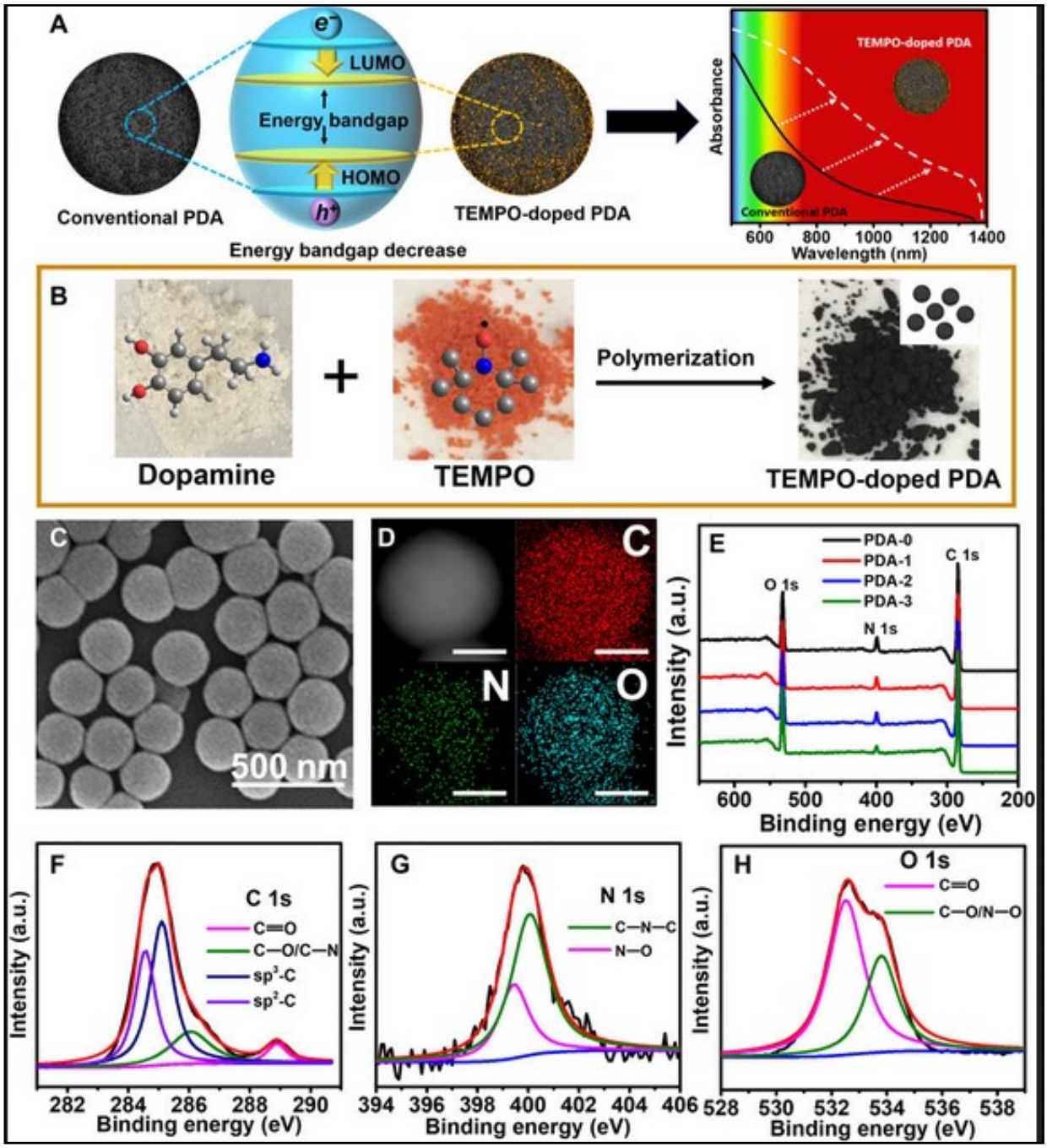


Figure 1 Synthesis and characterization of TEMPO-doped PDA. (A) Schematic illustration of the TEMPO-doped PDA with narrower bandgap and improved light absorption ability compared to conventional PDA. (B) Polymerization of dopamine and TEMPO, together with their molecular structures and powder photographs. (C) SEM image of PDA-3. (D) EELS mapping analysis of PDA-3 (Scale bars, 100 nm). (E) XPS survey spectra of PDA-i (i = 0 to 3). a.u., arbitrary units. (F) C 1s peaks, (G) N 1s peaks, and (H) O 1s peaks in XPS spectra of PDA-3. Credit: Science Advances, doi: 10.1126/sciadv.abb4696

Enhanced light absorption and photothermal behavior of TEMPO-doped PDAs.

The team examined the light absorption capacity and total photothermal effect of these TEMPO-doped PDA NPs, where the product strongly absorbed light by catching and converting solar energy to heat energy efficiently with wide-ranging applications. During further tests, they dispersed PDA-3 in water at several concentrations for irradiation under lasers. When compared to many other outstanding photothermal materials, the TEMPO-doped PDA NPs showed better photothermal behaviors. For instance, Zou et al. noted how gold nanoparticles could suffer substantial loss of light absorbance after long-term irradiation due to structural destruction via the accompanying heat of the experimental conditions. The team contrastingly demonstrated how TEMPO-doped PDA NPs maintained enhanced light absorption capabilities with improved

photothermal behaviors compared to conventional photothermal nanomaterials. The resulting material can serve as new generation photothermal agents to complete a variety of applications.

Analyzing the structure and absorption property regulation of TEMPO-doped PDA

The scientists noted the spontaneous formation of donor-acceptor microstructures in the TEMPO-based PDA system due to chemical conjugation between TEMPO and DHI, IQ and their oligomers during the polymerization process. This reaction contributed to the lower energy bandgap and enhanced light absorption of the product. To verify this, they calculated the optical bandgap value of different PDA samples in their aqueous solution forms alongside their electrochemical cyclic voltammetry (CV) to investigate energy bandgaps of all samples. They established the highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO) using the CV measurements and established the TEMPO unit as a donor fragment. As the doping concentration of TEMPO increased, the IQ moiety proportion also gradually increased, resulting in better delocalization of electrons for improved light absorption. The team hypothesized an increase in free radicals during PDA synthesis via TEMPO doping, which they tested and verified using electron paramagnetic resonance (EPR) measurements. Since the exciton-induced absorption (EIA) spectra did not rely on the amount of TEMPO doped to form the compound, the team credited it broadly to the presence of excitons in its additional constituents (such as DHI, IQ).

Applications of water desalination

The excellent photothermal and light absorption properties of TEMPO-based PDA made the material well-suited for applications in water steam generation and seawater desalination. Of the variety of samples, Zu et al. selected PDA-3 as the most promising candidate to develop the evaporation device. To accomplish this, they deposited the PDA-3 aqueous solution onto a cellulose membrane as a hydrophilic light absorber and prevented direct contact with water by using a thermal insulation layer such as polystyrene. When Zou et al. exposed the experimental setup to solar irradiation, they purified water by collecting condensed water from the solar steam. The PDA-3-coated cellulose membrane showed improved light absorption compared to control samples. The construct absorbed a majority of solar energy in the UV and visible regions. To understand solar vapor generation and photothermal evaporation performance, they measured the weight loss of water during evaporation and considered the energy conversion efficiency as an important index. The results indicated the feasibility of the device for desalination alongside efficient and durable activity.

In this way, Yuan Zou and colleagues proposed a simple method to regulate the absorption spectrum of polydopamine (PDA) in a one-pot polymerization process in the presence of dopamine and TEMPO. The resulting nanoparticles had improved light absorption ability and photothermal effects when compared to conventional PDA nanomaterials due to the donor-acceptor structures in the PDA system. When they coated the resulting TEMPO-based PDA on the cellulose film, the construct acted as a sunlight absorber suited for water evaporation with a high efficiency of solar conversion and excellent rate of evaporation. The work will offer new opportunities for structural and functional PDA nanomaterials suited for light-harvesting applications.

More information: Yuan Zou et al. Regulating the absorption spectrum of polydopamine, *Science Advances* (2020). DOI: 10.1126/sciadv.abb4696

Kaifeng Wu et al. Plasmon-Induced Hot Electron Transfer from the Au Tip to CdS Rod in CdS-Au Nanoheterostructures, *Nano Letters* (2013). DOI: 10.1021/nl402730m

S. Premi et al. Chemiexcitation of melanin derivatives induces DNA photoproducts long after UV exposure, *Science* (2015). DOI: 10.1126/science.1256022

Journal information: *Science Advances* , *Nano Letters* , *Science*

https://phys.org/news/2020-09-absorption-spectrum-polydopamine.html

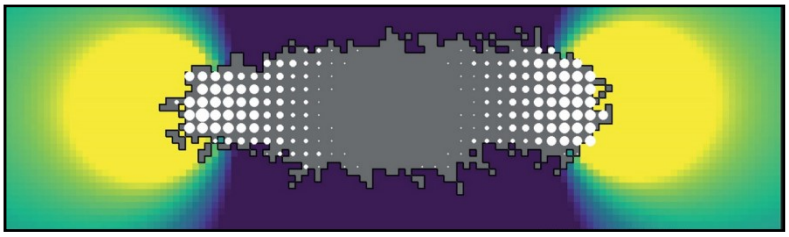
PHYS.ORG

Sat, 12 Sept 2020

Study finds how body cells move within a tissue

A new mathematical model may explain how body cells get their shapes and what makes them move within a tissue. The model provides fundamental knowledge for applications in tissue engineering, amongst other things. Publication in open-access journal *iScience*.

Body cells can take on different shapes and move within a tissue. Previous mathematical models have proposed explanations for a particular shape or movement of a cell, but did not explain these phenomena in unison. Roeland Merks, professor of Mathematical biology at the Institute of Biology Leiden (IBL) and the Mathematical Institute (MI) and his former Ph.D. candidate Lisanne Rens of the Centrum Wiskunde & Informatica (CWI) developed a mathematical model that can explain various phenomena of the mechanical interaction between cells and their environment. How cells behave in a tissue is important in, for example, tissue engineering. The mechanical interaction between cells and their environment also appears to play a role in diseases such as cancer and liver cirrhosis.



Elongated cell on an ECM of intermediate stiffness in the model by Lisanne Rens and Roeland Merks. The white circles represent the focal adhesions, the 'feet' of the cells. The colour represents the strain in the ECM: yellow coloured locations are at maximal stress, and blue at minimal stress. Credit: Rens and Merks, *iScience* 2020, CC BY 4.0

Flat like a pancake

Body tissues are made up of cells that live within a structure called the extracellular matrix (ECM). The ECM gives shape and firmness to tissues and the cells that lie in them. Mechanical forces between the ECM and cells give cells a certain shape: on a soft surface, cells are often round and small, on a firm surface the cells spread out like pancakes, and on a surface of intermediate stiffness cells become elongated. Merks explains: "Our model shows that the effect of substrate stiffness on cell shape can be explained by the interaction between the forces that cells exert on their environment, how easily the environment yields to those forces, and the response of the focal adhesions, which are the 'feet' of cells. They become stronger as they experience more forces."

Grip on the surface

So it seems that the "feet" of cells have more grip on a stiff surface. This degree of grip also appears to play a role in the movement of cells. Merks: "The feet adhere slightly more strongly to the stiffer side of the matrix than to the softer side. If the cells constantly pull themselves off of the substrate and make new connections to the substrate, the stronger connections on the stiffer side persist for longer. In this way, the cell gradually moves in the stiffer direction." According to Merks, the model provides insights that contribute to fundamental knowledge about how cells behave in tissues: "The insights are important for tissue engineering, and also for a better understanding of blood vessel growth and the spread of tumor cells. We have added another piece of fundamental knowledge."

More information: Elisabeth G. Rens et al. Cell Shape and Durotaxis Explained from Cell-Extracellular Matrix Forces and Focal Adhesion Dynamics, *iScience* (2020). DOI: 10.1016/j.isci.2020.101488

Journal information: *iScience*

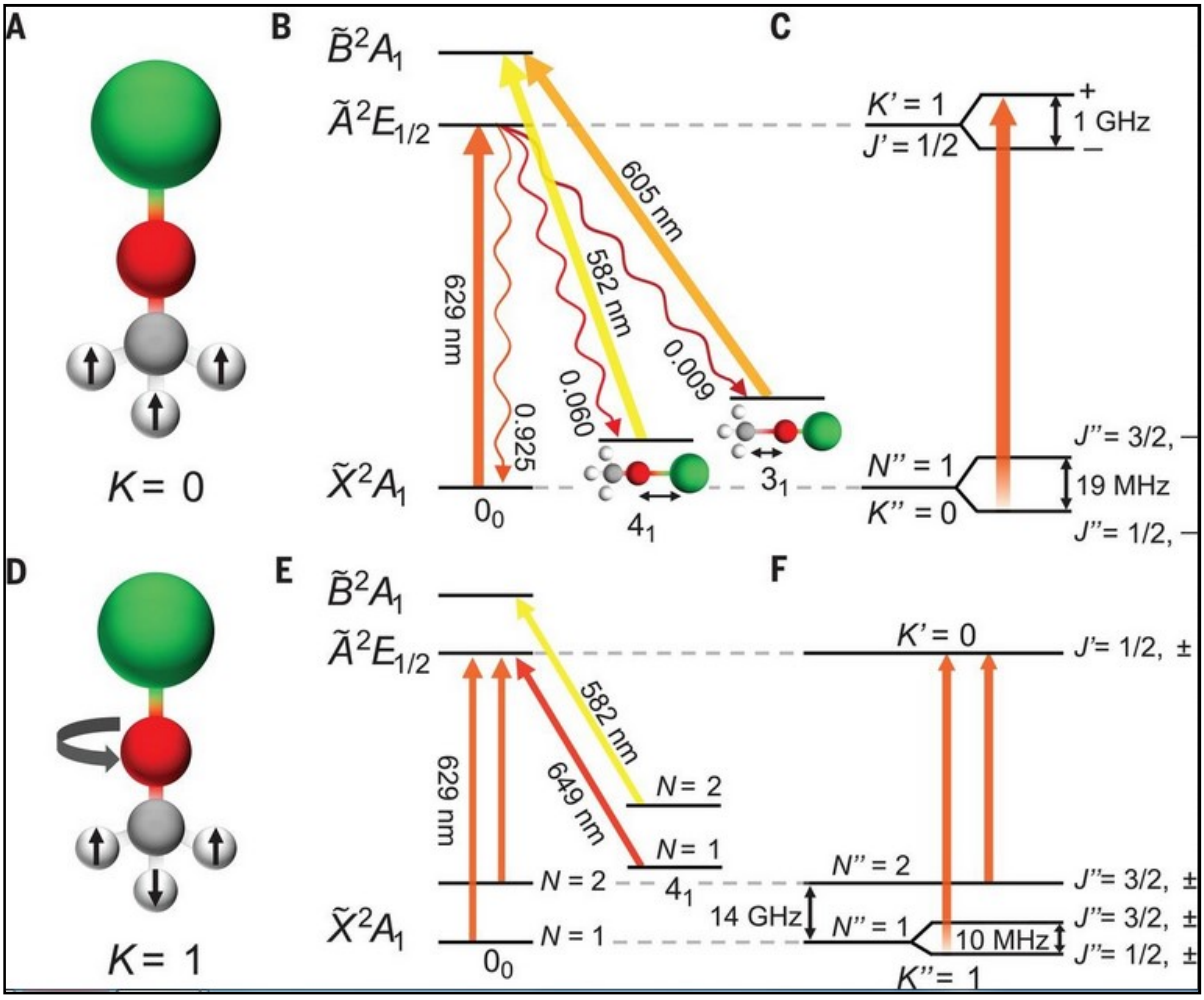
https://phys.org/news/2020-09-body-cells-tissue.html

Sat, 12 Sept 2020

Nonlinear polyatomic molecule, CaOCH3 laser-cooled to ~700 mK

By Bob Yirka

A team of researchers at Harvard University has developed a way to cool nonlinear polyatomic molecules to extremely cold temperatures. In their paper published in the journal *Science*, the group describes their method and possible uses for it. Eric Hudson with the University of California, Los Angeles, has published a Perspective piece in the same issue describing the decades-long history of work involved in attempting to cool complex molecules, and also outlines the work by the team in California.



CaOCH3 laser cooling schemes. Credit: Science (2020). DOI: 10.1126/science.abc5357

As Hudson notes, the first real breakthroughs in chilling complex molecules to extremely low temperatures came about over the past 30 years, starting with a team that developed a technique that involved firing lasers in scattershot fashion at a particle to reduce its heat. They won a Nobel prize for their efforts. Hudson describes it as somewhat like firing ping-pong balls at a bowling ball to slow it down. As time passed, researchers refined the method to use it on progressively more complicated molecules, most of which were gasses.

In recent years, the focus of such efforts has turned to complicated non-gas molecules. The team in this new effort has extended that research by demonstrating laser cooling of the nonlinear polyatomic molecule $CaOCH_3$ along a single dimension of a laser beam, down to a temperature of

~700 mK. They also showed that using the technique allowed for separate deterministic cooling of two nuclear spin isomers.

The technique involved applying a combination of rotational-vibrational spectroscopy applications on the transitions of molecular states. Such transitions involve measuring changes in both the rotational and vibrational states of a molecule. Notably, when such transitions occur, they can either absorb or emit photons with the frequency proportional to the differences in the energy levels.

Hudson suggests the work proves that it is possible to laser cool nonlinear polyatomic molecules to extremely cold temperatures, which, he notes, is likely to open the door to new three-dimensional cooling of a variety of quantum objects. He further suggests that the new technique is likely to be used in advanced quantum computers, timing devices and chemistry.

More information: Debayan Mitra et al. Direct laser cooling of a symmetric top molecule, *Science* (2020). DOI: 10.1126/science.abc5357

Journal information: *Science*

https://phys.org/news/2020-09-nonlinear-polyatomic-molecule-caoch3-laser-cooled.html

COVID-19 Research News

The Indian EXPRESS

Mon, 14 Sept 2020

Expect COVID-19 vaccine by early next year, will take first shot if any trust deficit: Vardhan

According to a Health Ministry statement, he said while no date has been fixed for the launch of a vaccine, it may be ready by the first quarter of 2021, and made available first to those who need it the most, irrespective of their paying capacity

New Delhi: A COVID-19 vaccine is likely to be available by early next year and the government is considering its emergency authorisation for high-risk people, Union Minister Harsh Vardhan Sunday said, asserting he will take the first shot to address any "trust deficit" over its safety.

According to a Health Ministry statement, he said while no date has been fixed for the launch of a vaccine, it may be ready by the first quarter of 2021, and made available first to those who need it the most, irrespective of their paying capacity,

Health Minister Harsh Vardhan ade these remarks during interaction with his social media followers on the 'Sunday Samvad' platform. (File Photo)

The minister made these remarks during interaction with his social media followers on the 'Sunday Samvad' platform.

He covered a multitude of queries concerning not only the current COVID-19 situation, but also the government's approach to it, the changes expected in the post COVID world and the steps taken by the Modi dispensation.

Vardhan stated the government is taking full precautions in human trials of vaccines and the National Expert Group on Vaccine Administration for COVID-19 is drawing up a detailed strategy on how to immunize the majority of the population.

"Issues like vaccine security, cost, equity, cold-chain requirements, production timelines etc., are also been discussed intensely," he stated.

Further, he said the government is considering emergency authorisation of COVID-19 vaccination especially for senior citizens and people working in high-risk settings.

"This shall be done after a consensus has been reached," he was quoted as saying the statement.

To allay any fear regarding the safety aspect of vaccines, he said he would be happy to take the first dosage "if people have a trust deficit".

On vaccine candidates and their development in the country, he said India is actively partnering with Coalition for Epidemic Preparedness Innovations (CEPI) and trials of several vaccines at different phases are underway at laboratories (private or public) and hospitals.

The Department of Biotechnology and the Indian Council of Medical Research have been proactive in responding to the emerging situation, he said.

It is hoped that a consensus will emerge in the next few months over the desired level of protective herd immunity in any community, he said.

The minister, however, also noted that a safe and effective vaccine will help in establishing immunity to COVID-19 at a much faster pace as compared to the natural infection, the statement said.

Vardhan highlighted how the pandemic became a turning point for Indian manufacturing.

"From the time when there were no indigenous manufacturers of PPEs with requisite standards, now there are nearly 110 indigenous manufacturers of PPE with requisite standards. The country is in a position to not only meet its own demands but also export to help out fellow nations," Vardhan said.

Vardhan said the government has directed all states and UTs to fix a reasonable price for COVID-19 treatment in private hospitals for making it affordable for the common man.

Free coverage up to Rs 5 lakhs for COVID-19 patients for those who are eligible under the Ayushman Bharat PMJAY package was announced, the statement said.

He added that the Central government has also asked states and UTs to proactively engage with the private sector health providers and consider pooling in public and private healthcare facilities, as this will help in providing prompt, good quality and reasonable health care to COVID-19 patients.

He has himself appealed to the private hospitals to refrain from overcharging COVID patients, the statement stated.

The minister said measures have been taken to ensure accessibility and affordability of all drugs and other therapeutics to all, irrespective of their paying capacities.

Vardhan stated the government is seized of the evolving nature of the infection and emerging evidence of the systemic health complications in those who have been infected.

AIIMS and other research institutions have been asked to undertake research to study the long-term impact of COVID-19 while the ICMR is establishing a National Clinical Registry on COVID-19 that will provide insights into the clinical course of COVID-19 disease, spectrum and outcome of patients.

Expert group consultations are already going on to review the emerging evidence and generate own data on organ system specific (respiratory system, renal system, cardiovascular and gastro-intestinal) sequela of COVID-19, he stated.

On the recently-launched National Digital Health Mission, he said it is one of the most ambitious missions of the government and is set to catapult India as a global leader in the field of digital health.

"However, there are vested interests that do not want India to succeed and are spearheading a disinformation campaign against NDHM," he said.

He said it is an "utter lie" that those who do not become part of this system shall not be allowed to access hospitals.

"Those persons or institutions who are not a part of this system shall continue to enjoy access to the healthcare system in exactly the same manner as they are doing now. Participation in the digital health ecosystem shall be totally optional and shall never be made mandatory for individuals," he underscored.

On Sunday, India's COVID-19 caseload mounted to 47,54,356 with 94,372 new infections being reported in a day, while the death toll climbed to 78,586 with 1,114 people succumbing to the infection in a span of 24 hours, the data updated at 8 am showed.

https://indianexpress.com/article/india/harsh-vardhan-covid-19-vaccine-coronavirus-trust-deficit-6594756/

Hindustan Times

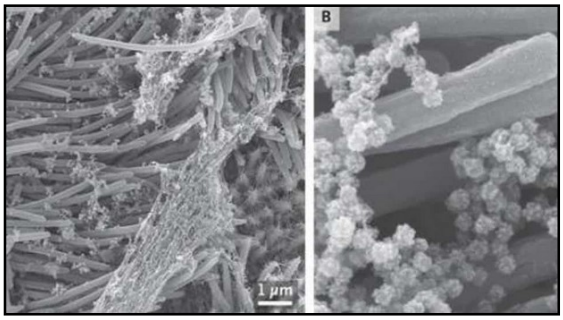
Mon, 14 Sept 2020

Scientists publish images of coronavirus infected cells

The images, published in the New England Journal of Medicine, were re-colorised, and show infected hairy ciliated cells with strands of mucus attached to cilia tips

Washington: Scientists have produced images of the novel coronavirus infecting lab-grown respiratory tract cells, findings that illustrate the number of virus particles that are produced and released per cell inside the lungs. The researchers, including Camille Ehre from the University of North Carolina (UNC) Children's Research Institute, captured these images to illustrate how intense SARS-CoV-2 infection of the airways can be in very graphic and easily understood images. The generated high-powered microscopic images show a large number of the virus particles on human respiratory surfaces, ready to spread infection across tissues, and to other people.

In the research, the scientists inoculated the novel coronavirus SARS-CoV-2 into human bronchial epithelial cells of the lungs, which they then examined 96 hours later using the high-powered scanning electron microscopy.



An en face image (Panel A) shows an infected ciliated cell with strands of mucus attached to the cilia tips. At higher magnification, an image (Panel B) shows the structure and density of SARS-CoV-2 virions produced by human airway epithelial cells. (Photo courtesy: New England Journal of Medicine)

The images, published in the New England Journal of Medicine, were re-colorised, and show infected hairy ciliated cells with strands of mucus attached to cilia tips. The scientists explained that the cilia are hair-like structures on the surface of airway epithelial cells that transport mucus and trapped viruses from the lungs. Using a higher power magnification, they showed the structure and density of SARS-CoV-2 produced by human airway epithelia. These virus particles, the researchers said, are the complete, infectious form of the virus released onto respiratory surfaces by infected host cells.

They said the imaging research helps illustrate the incredibly high number of virions produced and released per cell inside the human respiratory system. According to the scientists, the large viral burden is a source for spread of infection to multiple organs of an infected individual, and likely mediates the high frequency of Covid-19 transmission to others. They said the images make a strong case for the use of masks by infected and uninfected individuals to limit SARS-CoV-2 transmission.

https://www.hindustantimes.com/world-news/scientists-publish-images-of-coronavirus-infected-cells/story-TyvhAZt5KjyqlRVpPWZ8hN.html

livemint

Mon, 14 Sept 2020

Coronavirus genomes in India have 5.39% mutation similarity with 72 nations: Study

- ***The finding is part of a study by Indrajit Saha, an assistant professor in the Department of Computer Science and Engineering of National Institute of Technical Teachers' Training and Research, Kolkata, and his team***

New Delhi: Coronavirus genomes in India have 5.39 per cent mutation similarity with 72 nations, found a study by a group of researchers trying to identify the genetic variability and potential molecular targets in the virus and humans to find the best possible answer for combating COVID-19.

Mutations in an organism's genetic material are natural 'errors' in the cell replication process that may give the virus new 'powers' of survival, infectivity, and virulence. It can affect the ability of vaccines and drugs to bind the virus, or to create a specific immune response against it.

The study also reveals that the US, the UK and India are the top three nations with a geometric mean of 3.27 per cent, 3.59 per cent, and 5.39 per cent, respectively, of mutation similarity score with other 72 countries.

Indrajit Saha, an assistant professor in the Department of Computer Science and Engineering of National Institute of Technical Teachers' Training and Research, Kolkata, and his team have also developed a web-based COVID-Predictor to predict the sequence of viruses online on the basis of machine learning.

The scientists are on track to identify the number of virus strains using single nucleotide polymorphism, spot the potential target proteins of the virus and human host based on protein-protein interactions, recognise candidate of synthetic vaccines based on conserved genomic regions that are highly immunogenic and antigenic and detect the virus miRNAs that are also involved in regulating human mRNA.

They analysed 566 Indian SARS-CoV-2 genomes separately to find the genetic variability in terms of point mutation and single nucleotide polymorphism.

The scientists have mainly found that 57 out of 64 SNPs are present in six coding regions of Indian SARS-CoV-2 genomes, and all are nonsynonymous in nature. This work has already been published in Infection, Genetics, and Evolution journal.

They have extended this research for more than 10,000 sequences around the globe and found 20,260, 18,997, and 3514 unique mutation points globally, including India, excluding India and only for India, respectively with the similarity score as mentioned above.

(This story has been published from a wire agency feed without modifications to the text. Only the headline has been changed.)

https://www.livemint.com/news/india/coronavirus-genomes-in-india-have-5-39-mutation-similarity-with-72-nations-study-11600012721318.html

ThePrint

Mon, 14 Sept 2020

Yale study shows coronavirus attacks the brain too, scientists say it's 'a silent infection'

Yale study offers first clear evidence on how SARS-CoV-2 invades brain cells, says the virus hijacks cells to make copies of itself & sucks up oxygen to starve nearby cells

By Sravasti Dasgupta

New Delhi: A new study conducted by scientists at the Yale University has suggested that the novel coronavirus, which primarily targets the lungs, may also affect the brain.

The study offers the first clear evidence on how the SARS-CoV-2 invades brain cells, "hijacks" them to make copies of itself and sucks up all of the oxygen nearby to starve neighbouring cells to death.

The study was posted online last week but has not yet been vetted by experts for publication.

'Silent infection in the brain'

Scientists have found that unlike the zika virus, which also infects the brain, the novel coronavirus exploits brain cells' machinery to multiply without destroying them.

When zika virus attacks the brain, the body's immune cells flood the damaged sites and try to destroy infected cells. But no such response has been found in the case of coronavirus infection.

"It's kind of a silent infection. This virus has a lot of evasion mechanisms," Dr Akiko Iwasaki, the scientist leading the Yale research, told *The New York Times*.

The study has also found that the novel coronavirus reduces the number of synapses or connections between two nerve cells.

Speaking about synapses, Dr Alysson Muotri, a neuroscientist at the University of California, told *The New York Times*, "Days after infection, and we already see a dramatic reduction in the amount of synapses. We don't know yet if that is reversible or not."

How coronavirus enters brain

Earlier studies had suggested that the brain doesn't have enough ACE2, a protein on the surface of a cell that is used by the coronavirus to infect. But the Yale study has found that the Covid-19 virus uses the same method to attack brain cells too.

The ACE2 protein occurs throughout the body but is especially present in the lungs.

The researchers have found that the virus may enter brain cells through the olfactory bulb, which regulates smell, via eyes as well as the bloodstream. They have also said virus infection in the brain can be more lethal than in the respiratory system.

For the study, the scientists had inserted ACE2 receptors in two sets of mice — one in the lungs and another in the brain. The brain-infected mice lost weight rapidly and died within six days, while the lung-infected ones didn't die, and neither lost weight.

No clear picture on how common brain infection is

While Covid-19 patients have reported symptoms such as headaches and delirium, the scientists have now found more damaging effects that suggest brain infection.

Low blood oxygen from infected brain cells can cause strokes, they said. But strokes can also be caused by inflammation in the lungs that clog up blood vessels.

While the researchers have said scientific data is ahead of clinical evidence now, doctors will still need to study autopsy samples to see how common brain infection is and whether it is present in milder cases or severe ones.

According to Dr Michael Zandi, consultant neurologist at Britain's National Hospital for Neurology and Neurosurgery in Britain, there is not much evidence of brain infection but doctors

and scientists have known the possibility. “This data just provides a little bit more evidence that it certainly can,” he told *The New York Times*.

https://theprint.in/health/yale-study-shows-coronavirus-attacks-the-brain-too-scientists-say-its-a-silent-infection/501730/

REPUBLICWORLD.COM

Mon, 14 Sept 2020

COVID-19: Indian scientists working on genomic sequences of SARS-CoV-2 to combat disease

A group of scientists in India is working on genomic sequences of SARS-CoV-2 around the world, including India, to identify genetic variability

A group of scientists in India is working on genomic sequences of SARS-CoV-2 around the world, including India, to identify genetic variability and potential molecular targets in virus and human to find the best possible answer to combat the novel Coronavirus that causes the COVID-19 disease.

Breaking down the novel coronavirus challenge into many pieces to get to its root and see it from multiple directions, Dr. Indrajit Saha, Assistant Professor in the Department of Computer Science and Engineering of National Institute of Technical Teachers’ Training and Research, Kolkata, and his team have developed a web-based 'COVID-Predictor' to predict the sequence of viruses online on the basis of machine learning and analysed 566 Indian SARS-CoV-2 genomes to find the genetic variability in terms of point mutation and Single Nucleotide Polymorphism (SNP).

The study being sponsored by the Science and Engineering Research Board (SERB), a statutory body under the Department of Science and Technology (DST), has been published in the Journal called Infection, Genetics, and Evolution. They have mainly found that 57 out of 64 SNPs are present in 6 coding regions of Indian SARS-CoV-2 genomes, and all are nonsynonymous in nature.

They have extended this research for more than 10,000 sequences around the globe, including India, and found 20,260, 18,997, and 3,514 unique mutation points globally, including India, excluding India, and only for India, respectively.

The scientists are on the track to identify the genetic variability in SARS-CoV-2 genomes around the globe including India, find the number of virus strains using SNP, spot the potential target proteins of the virus, and human host based on Protein-Protein Interactions. They also carried out integrating the knowledge of genetic variability, recognise candidates of synthetic vaccine based on conserved genomic regions that are highly immunogenic and antigenic, and detect the virus miRNAs that are also involved in regulating human mRNA (messenger RNA).

They have computed the mutation similarity in sequences of different countries. The results show that the USA, England, and India are the top three countries having the geometric mean, 3.27%, 3.59%, and 5.39%, respectively, of mutation similarity score with other 72 countries. The scientists have also developed a web application for searching the mutation points in SARS-CoV-2 genomes globally and country wise. Besides, they are now working more towards protein-protein interactions, epitopes discovery, and virus miRNA prediction.

(with inputs from ANI)

https://www.republicworld.com/technology-news/science/covid-19-indians-scientists-working-on-genomic-sequences-of-sars-cov.html