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# समाचार पत्रों से चयित अंश Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

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Thu, 02 July 2020

## Ahmedabad firm to use DRDO tech to make disinfection towers

*The disinfection tower is a UV-based area sanitiser used for rapid and chemical-free disinfection of high infection prone areas. It has been designed and developed by Laser Science & Technology Centre (LASTEC), Delhi-based premier laboratory of DRDO*

Ahmedabad: City-based Motivation Engineers & Infrastructure Pvt Ltd (MEIPL) has entered into a technology transfer agreement with the Defence Research and Development Organisation (DRDO) for manufacturing Ultra Violet (UV) “disinfection towers” that can disinfect surfaces against viruses, including Covid-19.

The disinfection tower is a UV-based area sanitiser used for rapid and chemical-free disinfection of high infection prone areas. It has been designed and developed by Laser Science & Technology Centre (LASTEC), Delhi-based premier laboratory of DRDO.

“The agreement was signed three days ago. The tower, which will hit the markets in the next 15 days, can be managed through an mobile application. It has six motion sensors and can effectively disinfect an 400 square feet area in 10 minutes. It is useful to disinfect high tech surfaces like electronic equipment, computers and other gadgets in laboratories and offices that are not suitable for disinfection with the traditional chemical methods. In fact, chemical-based sanitisers are harmful to electronic gadgets,” Sunil Shah, Founder & Director, MEIPL, said. He said the technology can be helpful in disinfecting large areas and eliminate all virus, including Covid-19.

Though UV rays emitted by the tower could harm humans, Shah said the tower with motion sensors switches off on accidental opening of the room or human intervention. It can be operated remotely through phone or computer using WiFi.

MEIPL said that it has also applied for UV Bath Technology from DRDO, which is useful for material disinfection.

<https://indianexpress.com/article/cities/ahmedabad/ahmedabad-firm-to-use-drdo-tech-to-make-disinfection-towers-6486022/>



MEIPL said that it has also applied for UV Bath Technology from DRDO, which is useful for material disinfection. (DRDO)

## City firm gets DRDO tech for UV sanitizer

Ahmedabad: Motivation Engineers & Infrastructure Pvt Ltd (MEIPL) has entered into a technology transfer agreement with the Defence Research and Development Organization (DRDO) for making an ultraviolet (UV) disinfection tower, which is named as VIBAN.

The disinfection tower is a UV-based area sanitizer used for rapid and chemical-free disinfection of high infection prone areas. Named as VIBAN, the disinfection tower has been designed and developed by DRDO's Laser Science & Technology Centre (LASTEC) in Delhi.

"The disinfection tower is useful to disinfect high-tech surfaces like electronic equipment, computers and other gadgets in laboratories and offices that are not suitable for disinfection with the traditional chemical methods," said Sunil Shah, Founder & Director, MEIPL, a city-based technology solutions provider. The company claims the tower can also be used in areas with large flow of people such as airports, shopping malls, metros, hotels and factories.

<https://timesofindia.indiatimes.com/city/ahmedabad/city-firm-gets-drdo-tech-for-uv-sanitizer/articleshow/76739201.cms>



Thu, 02 July 2020

## Home Ministry ropes in DRDO to set up 1,000 bed hospital in Delhi

By Sumit Kumar Singh

New Delhi: As Covid-19 infection cases in Delhi on a steep rise, the Central government takes help of Defence Research and Development Organisation (DRDO) and armed forces to set up a 1,000 bed hospital in the national capital. The hospital will have 250 intensive care unit beds. The Home Ministry is monitoring the setting of the hospital which is to come up near Delhi Airport on Indian Air Force land.

The Home Secretary Ajay Bhalla held a meeting with all the stakeholders in the North Block on Wednesday afternoon. Sources said that the hospital to become functional in the next four to five days. The construction of the hospital was started two weeks ago on the barren land of the Air Force.

Sources also said that setting up of 1,000 bed hospital in a record couple of weeks time was a challenging task before DRDO. The DRDO has developed several indigenous medical equipments in the fight against Covid.

It was a lack of hospitals for the Covid-19 patients in Delhi, the home ministry decided to take the help of DRDO and armed forces.

Till Tuesday, the total number of Covid-19 cases stand to 87,360 and the death toll to 2,742. Further, Delhi's recovery rate is recorded at 66.8 per cent, with 58,348 people recovering so far.

Union Home Minister Amit Shah has taken control of the Covid-19 crisis in Delhi and had stated recently that by June 30 every house in containment zones will be inspected by health officials. Further he had stated there would be 30,000 beds available soon. He also disagreed with state's Deputy Chief Minister Manish Sisodia's statement that Delhi would have 5.5 lakh Covid-19 patients by July 31.

Last week, Shah had rejected claims that Delhi is witnessing community transmission of the global pandemic.

In the meantime, Delhi Chief Minister Arvind Kejriwal had also announced the creation of a "plasma bank" at the Institute of Liver and Biliary Sciences Hospital. The government is encouraging people who have been cured of the coronavirus disease to come forward and donate plasma to help treat other patients.

<http://www.daijiworld.com/news/newsDisplay.aspx?newsID=725645>

## DRDO Technology News



Thu, 02 July 2020

### India's three new indigenous fighters jets prototype to be ready in next four years

According to Chairman and Managing Director of HAL, R Madhavan, the prototypes of India's three new indigenous fighters jets prototype to be ready in the next four years. India's is currently working on three indigenous fighter jets — Tejas Mk2, Twin Engine Deck Based Fighter derived from the naval version of the LCA, and the fifth-generation Advanced Medium Combat Aircraft (AMCA).

“So first the LCA Mk2 will come out, and then the TEDBF and then AMCA. Prototypes of all three will be out within 3-4 years,” Madhavan said in the interview, adding that HAL was looking at a seven to eight year time-frame for ‘each of these aircraft getting airborne’. It is not yet clear how the private partner in the AMCA project will be chosen, though it is clear that HAL and DRDO are keen to progress the proposed structure and create a special purpose vehicle (SPV) as quickly as possible. The decision to include a private partner as an equal stakeholder in a joint venture is groundbreaking in Indian aerospace projects, with private firms so far confined to being tier-level suppliers of systems and subsystems. If the proposal goes through, it will be the first time a private firm will be on equal financial and work terms with HAL and DRDO on a military armament project.



Adding detail to timelines on the AMCA, Madhavan said, “It's on the drawing board. Preliminary design is completed. First prototype will be out (flying) by 2026-27. Secondly, as far as 4th Generation and 5th generation fighters, the latter loses out in terms of aerodynamics owing to stealth requirements, so not a good idea to put everything in one aircraft. With LCA Mk.2 and AMCA, we will be having both varieties — 4+ generation and 5th generation. One doesn't replace the other. If you look at the US, they too are buying fourth generation jets in addition to the F-35.”

India pulled out of the Su-57 fifth generation fighter program with Russia in 2018 after a committee warned that the IAF and HAL were headed the ‘Su-30’ way with the crucial FGFA, and would likely end up as bankrollers to the program in the short term, and nothing more than license-builders in the long term. A concerted view was taken with the IAF to walk away from the Indo-Russian project, despite moneys already sunk.

In related remarks that make for the most ambitious promise in Indian military aviation, Madhavan also said that the first prototypes of three separate new Indian fighter concepts,

including the AMCA, will be rolled out in four years. He said that HAL and its partner, the Aeronautical Development Agency (ADA) are working to unveil prototypes of the Light Combat Aircraft Mk.2, a new twin-engine LCA derived deck based fighter and the AMCA, in the next 3-4 years.

Answering a question on the twin-engine deck based fighter that HAL & DRDO have embarked on with government clearance earlier this month, Madhavan said, “So first the LCA Mk.2 will come out, and then the TEDBF and then AMCA. Prototypes of all three within 3-4 years. So 7-8 years is what we’re looking at for each of these aircraft getting airborne, which is a very short time in terms of aeronautical design.”

## **Here are details about India’s Three New Indigenous Fighters Jets Prototype**

### **1. LCA Tejas Mk2**

Contrary to what its name suggests, LCA Mk2, a significantly modified version of LCA Mk1, will actually be a medium-weight fighter aircraft.

Among other changes, the GE F404 engine in LCA Mk1 will be replaced with the more powerful F414 turbofan, and canards will be added behind the cockpit. While the new F414 turbofan engine will provide the fighter more thrust, canards will improve its manoeuvrability significantly.

As a result of the modifications being made by the Aeronautical Development Agency, the Mk2 variant will have higher payload capacities, giving it more weapon delivery options, and will carry more fuel, which will increase its range.

IAF may induct 12 LCA Mk2 squadrons (around 200 aircraft). LCA Mk1 is already in squadron service with the Indian Air Force (IAF). The second Tejas squadron, Number 18 Squadron ‘Flying Bullets’, was operationalised in May. The first LCAs were inducted into Number 45 Squadron ‘Flying Daggers’ in 2016. 16 LCAs of the first order of 40 have been delivered to the IAF and a new order of 83 Mk.1A fighters is likely to be signed with HAL by the end of this year. HAL has improved the rate of production — a second assembly line has been set up.

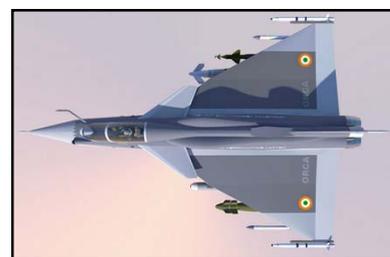
“Our target rate is 16 [LCA fighters] per year, for which a second line has already been set up now. We can easily ramp up to 16-20 per year as and when we receive the 83 LCA order,” Madhavan has been quoted as saying.

### **2. Twin Engine Deck Based Fighter**

TEDBF will be derived from the naval version of the LCA developed as a technology demonstrator. The naval variant of the LCA has undergone a series of tests, including a series of arrested landings on the deck of aircraft carrier INS Vikramaditya in January this year to demonstrate the capability of its landing gear among other things. Earlier, ADA was to develop a new version of the naval LCA.

However, due to design limitations, which were further complicated by the need for a heavy landing gear to bring a high-speed aircraft to a stop on the deck of the aircraft, the Navy and ADA were forced to ditch the plan. A twin-engine fighter, which will have increased fuel and weapons carrying capability, is being developed now.

“The single engine LCA is not the aircraft for the navy. It cannot meet the requirements. What the navy needs is a twin-engine aircraft, because then only it can carry armaments, because the landing gear itself is quite heavy. So a Twin Engined Deck Based Fighter is what we’re looking at for the navy,” Madhavan said, adding that the “ADA has started the project, and this month they have got the clearance, and they are expecting it to be in service in 6-7 years”. The experience gained from the development and testing of the LCA’s naval variant and the designing of AMCA will feed into the TEDBF programme, although the fighter will not have stealth features like the latter.



**Twin Engine Deck Based Fighter**

The experience gained from the development and testing of the LCA's naval variant and the designing of AMCA will feed into the TEDBF programme, although the fighter will not have stealth features like the latter.

ADA, reports say, "is studying at least 3 variations of the design of the fighter. It's still unclear whether the new fighter will be a tail-less delta platform, similar to the IAF's LCA Tejas fighter or, for that matter, feature canards, a small forewing placed ahead of the main wing of the aircraft to aid manoeuvrability".

### 3. Advanced Medium Combat Aircraft

AMCA, India's fifth-generation stealth fighter, is no new news. It has been in development for some years now, and latest reports say that the fighter jet will be built in partnership with a private player. Madhavan has said that HAL and DRDO are looking to form a joint venture with a private-sector firm to execute this project.

"HAL and ADA are together in the design of AMCA. We are also looking at productionisation already — we want to create a special vehicle, a joint venture between HAL, DRDO and a private partner," he has been quoted as saying.

According to a news report, the process of finding the private sector partner is all set to being and includes Larsen & Toubro, Lakshmi Machine Works Advanced Technology Centre, Tata Advanced Systems and at least three defence firms.

"Workshare, financials and other terms of reference are to be drawn up this year ahead of the decision on the private sector company," the report says.

<https://idrw.org/indias-three-new-indigenous-fighters-jets-prototype-to-be-ready-in-next-four-years/#more-230172>



Advanced Medium Combat Aircraft



Thu, 02 July 2020

## JV Company details explained: L&T, Tata and Boeing in the race to build AMCA fighter jet in partnership with HAL/ADA

After R Madhavan, Chairman and Managing Director of Government-owned Hindustan Aeronautics Ltd (HAL) confirmed that India's first 5.5 Generation Stealth will be built in Partnership with a Private company, it now has been confirmed that at least 4-5 companies have expressed their interests in tying up with ADA and HAL for the new company which will exclusively manufacture 100+ AMCA fighter jets in an upcoming facility at Defense Production Corridors to be set up in Tamil Nadu.

Responding to ADA's Expression of Interest (EOI) initial transaction documents issued some time back for the new Joint venture company, Tata Advanced Systems Limited (TASL), Larsen & Toubro Limited (L&T), Boeing India Inc, Lakshmi Machine Works Limited (LMW) and Vem Technologies Private Limited are some of the companies which have come forward and sent their proposals for the new proposed joint venture company as informed to idrw.org.

In the previous report, idrw.org had informed that HAL will be lead integrator in the AMCA program but as per new information provided which is yet to verified, it won't be. Selected Private company in the new Jv will run the whole operation and production floor while HAL will only be

providing, guidance and training in setting up the new facility which will be majorly owned by the new company.

idrw.org for the first time can confirm that the new facility might also be used for manufacturing of TEDBF for Navy and ORCA for IAF from 2030 onwards since HAL facilities will be busy manufacturing MWF-AF for the IAF during that period but the final decision is yet to be made on that. The facility is almost ready and as per the information provided, ADA will transfer the design details to the new company and which will set up the supply chain for the AMCA production and will be in charge of TD and Prototypes.

Once a Private sector company is selected and a new company is registered and formed, the almost ready facility will be used to assemble the first TD of AMCA by 2025 which will have its first flight by 2027, AMCA will enter production by 2035 onwards in Mk1 configuration for 40 jets and Mk2 configuration in 2039 for 80+ jets. IAF has expressed interests in 100+ AMCA jets some reports hinting at 120 jets with Two engine options of F414-GE-INS6 and locally manufactured K10+ engine for Mk2.

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<https://idrw.org/jv-company-details-explained-lt-tata-and-boeing-in-the-race-to-build-amca-fighter-jet-in-partnership-with-hal-ada/#more-230175>



Thu, 02 July 2020

## What is Maareech anti-torpedo decoy system inducted by Indian Navy?

***An advanced anti-torpedo decoy system: Indian Navy has inducted Maareech (advanced anti-torpedo decoy system) which can detect, locate, divert and neutralize incoming torpedo***

***By Arfa Javaid***

On June 26, 2020, Indian Navy inducted an advanced anti-torpedo decoy system-- Maareech. This system is capable of being fired from all frontline ships.

DRDO (Defence Research and Development Organization) has designed and developed Maareech. It can detect, locate, divert and neutralize incoming torpedo.

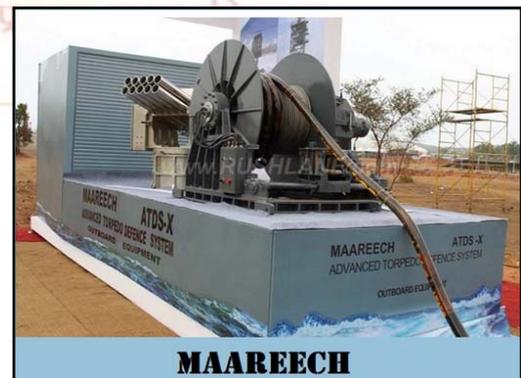
As per a press release by Indian Navy, a prototype of this system which was installed on a nominated naval platform has completed all user evaluation trials and demonstrated the features as per the Naval Staff Qualification Requirements.

The induction of this system testifies the joint efforts by the Indian Navy and DRDO towards indigenous development of defence technology. In addition to this, it also added a feather in the government's 'Make in India' initiative and is in the direction to become 'Aatma Nirbhar' or 'self-reliant' in niche technology.

The defence PSU (Public Sector Undertaking), Bharat Electronics Limited, will manufacture the advanced anti-torpedo decoy system.

### **What is an Advanced Torpedo Defence System?**

An Advanced Torpedo Defence System (ATDS) is a torpedo detection and countermeasure system used by the Indian Navy with the help of SONAR. The advance system can automatically



**MAAREECH**  
Advanced Torpedo Defence System

set its path towards the enemy warships with the help of low-frequency signals generated by engines of warship. The advance system also deploys multiple decoys to confuse the incoming torpedo.

#### **The functionality of Maareech:**

Maareech is an advanced Anti-Torpedo Decoy System and works mainly on:

**1- Hull mounted SONAR:** It detects and locates enemy torpedoes and send its location and other information to the processor unit.

**2- Towed Decoy and Winch System:** It is an additional decoy in the Maareech having a long array of decoys which are about 100 m long. This array is released in the ocean with the help of a winch system and is mounted on the ship.

**3- Expendable Decoy:** It launches multiple expendable decoys which generates low-frequency signals as that of warship engine. This creates confusion about the actual location of the warship.

**4- Display cum Processor Unit:** It receives a signal from hull-mounted SONAR and towed array. It helps the winch system and expendable decoy launcher to launch decoys.

#### **Working Principle of Maareech:**

The expendable and towed decoys force incoming torpedo to move in a circular path in search of warship and thus exhausts its energy by running through long and ineffective courses. This principle prevents the enemy from a torpedo from detecting the exact location of the warship.

#### **History of Induction of Maareech:**

In November 2015, the first Maareech ATDS system was inducted in the Indian Navy by the then Defence Minister, Manohar Parrikar. Currently, this system is used in INS Kolkata and INS Chennai warships of Indian Navy.

#### **What is Torpedo?**

Torpedo is an underwater ranged weapon which can be launched either above or below the surface of the water. The weapon is self-propelled towards a target and has an explosive warhead designed to detonate either on contact with or in proximity to the target.

Torpedoes are propelled by motors and work for about 10-20 minutes. After this period, they lose their system and sink in the ocean beds.

A modern torpedo can be launched from a variety of platforms and can be divided into two broad categories-- lightweight and heavyweight. It can be further divided in straight running, autonomous homers and wire-guided.

<https://www.jagranjosh.com/general-knowledge/maareech-1593588549-1>



Thu, 02 July 2020

## **Bharat Dynamics likely to get orders worth Rs 12,000 crore in FY21: Siddharth Mishra, CMD**

*Bharat Dynamics Limited has increased its profitability this time and it is a result of the efficiency that we have shown. We have several plans but the lockdown, which was implemented in the last week of March, had an impact on us and delayed the delivery of many missiles to the services*

*By Jitesh Kumar Jha*

Commodore Siddharth Mishra (Retd.), Chairman and Managing Director (CMD), Bharat Dynamics Limited (BDL), talks about Q4FY20 results, its participation in Atmanirbhar Bharat and CapEx and plans associated with it during an interview with Swati Khandelwal, Zee Business. Edited Excerpts:

**Q: The Company has posted strong numbers in Q4FY20. Take us through the highlights and what is your order book?**

A: Bharat Dynamics Limited has increased its profitability this time and it is a result of the efficiency that we have shown. We have several plans but the lockdown, which was implemented in the last week of



March, had an impact on us and delayed the delivery of many missiles to the services. However, our turnover improved and our profit after tax (PAT) and profit before tax (PBT) have increased significantly. It also increased because all our products were manufacturing projects and our efficiency increases when we work on manufacturing products. In fact, our workers do more work. At the same time, there was an increase in our efficiency in procurement. Increased efficiency has helped us in increasing our PAT by around 26%.

Currently, we have an order book of Rs 7,400 crore and expect that it will increase this year. We are supposed to get orders worth Rs 12,000 crore this year and many of the orders is being expedited amid ongoing situations.

Bharat Dynamics is India's only missile manufacturing company that makes the surface to air missiles, anti-tank guided missiles, torpedoes and underwater weapons among others. We have done a lot of work for export purposes. So, the improvement in the numbers was also supported by exports. We have a few orders this year related to exports that should be completed. We are willing to work also for different countries of the world and talks in this relation have started. Thus, we are paying a lot of attention to exports.

**Q: You have said that the orders are expediting and it is important when we talk about the Atmanirbhar Bharat (self-reliant India), under which the equipment and raw material, which were imported from China will be developed indigenously even for the export market. How important and big role Bharat Dynamics will play in it?**

A: There is a clarion call from the Prime Minister in which he has said that we will remain Atmanirbhar. In terms of design and development, we are associated with DRDO. And, DRDO has created many new weapon systems and we are associated as co-development partners with them. We have engaged in the development of lightweight torpedoes TAL, heavyweight torpedo Varunastra, Akash Weapon System and MR-SAM, the surface to air missile and we are working on it at present and we have received a big order related to it. Besides, the Ministry of Defence has given a clear-cut instruction and all the defence PSUs are working on it. We have planned that in the next 3-4 years, we will manufacture every item, including raw materials and components in India, which is imported to India at present. This will help us in increasing our Atmanirbharta, self-reliance. We will also be able to export it to other countries. This will greatly benefit us and the export of the products will definitely increase our profitability. Right now, we buy a lot of weapon systems from outside but will turn Atmanirbhar in that context in the next 3-4 years.

**Q: Many of the PSUs have land and manufacturing facilities among others and the government has said that it will focus on just four PSUs in the strategic sector, which means there will be a consolidation or divestment. So, do you have any plan to leverage your or unlock the value of your facilities like BEML, BHEL who have provided its manufacturing facility to other companies for contract manufacturing and more for being used for the purpose?**

A: Our utility factor is above 70% and we are creating many JVs with foreign companies. Last year, we signed two MoUs with Almaz Antey, a big Russian company to create a joint venture under which the parts of the Russian weapon systems will be manufactured in India. It will help in improving the product support to the Indian Armed Forces. Secondly, we have signed an MoU with Javelin Joint Venture to manufacture their missiles in India and then export them.

Apart from this, there is a big company in France named Roxel, who manufacturer's rocket motives and we want to manufacture these rocket motives in India along with them and they will play an important role in it. In addition to this, we have tied up with Naval Group, a French company, and some more companies. So, we have tied up with many foreign companies and it will help us in improving our productivity.

**Q: You have also manufactured Ventilators.**

A: Yes. At the very start of the pandemic, we thought of doing something for the country to control this pandemic and we had a discussion with IIT-Kanpur. There is a start-up company Nocca Robotics, which was designing a ventilator. We tied-up with them and then productized the design. Its prototype has been tested and it has been provided to HLL, a PSU, to verify and clear it. HLL has completed the functional trials and clinical trials are pending. However, the ventilator has also been provided to a private hospital, Ruby Hall Hospital, Pune, for conducting its clinical trials, which has been completed.

As far as BDL is concerned, we have completed all the trials and the ventilator is affordable and we have capabilities to manufacture 1,000-1,500 ventilators per month. These ventilators, if required, can also be exported in the case, if the requirement of the Indian government is fulfilled.

**Q: Tell us about the kind of CapEx that you have lined-up for FY21? You have said that talks are on with companies to form JVs and you are looking forward to technology partners. So, let us know about the important activities that we can see in next one-two quarters?**

A: As far as CapEx is concerned then, we have reduced our CapEx this year because we want to consolidate. However, it will be increased next year. We have planned new facilities and investments related to it will come by next year. Under the plan, we are establishing a new plant at our unit based in Ibrahimpatnam. Its first phase, where a rocket testing facility is located, has been completed and the actual manufacturing of medium-range surface to air missile will start in Phase II, which will happen by the end of this year or the start of next year. So, we have a CapEx this year but it is not quite big but it will increase next year.

<https://www.zeebiz.com/india/news-bharat-dynamics-likely-to-get-orders-worth-rs-12000-crore-in-fy21-siddharth-mishra-cmd-130288>

## The Tribune

Thu, 02 July 2020

### Mechanised forces remain battle-relevant

*There is a need to create an ecosystem for retrofitting and upgrading our tank fleet.*

*The current production base is a combination of Avadi (Chennai) and Medak (Telangana). The new infrastructure for light tanks, armoured cars and retrofitting should leverage the available land and skill base in the vacant HMT Pinjore complex. It can be mentored by the DRDO labs in the vicinity*

*By Lt Gen KJ Singh (Retd)*

Satellite imagery has picked up a buildup of Chinese armour — medium and light tanks — in proximity to the Line of Actual Control (LAC). It is the operationalisation of the People's Liberation Army's (PLA) concept, practised in mechanised exercises, in recent years. Manoeuvres have included a heavy drop of armoured vehicles, simulating the capture of passes. There are reports that the 6 Mechanised Division have deployed assorted AFVs (armoured fighting vehicles) — medium and light tanks — to leverage their coercive messaging potential, as part of psychological warfare.

At the outset, it will be appropriate to categorically state that India has adequate forces in a prepared and trained state, not only to take care of the threat but even cause criticalities for the Chinese. However, the PLA has more versatility in its fleet with the introduction of light tank,

ZTQ, first fielded during the Doklam crisis. Our BMP-2s and ICVs (infantry combat vehicles) can be adapted to a limited extent for relevant tasks.

In the past few weeks, transport aircraft have been making repeated sorties to shore up our mechanised deployment in Ladakh. What is indeed baffling is that there have been discussions, questioning the very relevance of mechanised forces. The unfortunate truth is that it has become almost a compulsive habit to occasionally tinker with our force mix. Mercifully, a crisis jolts us out of such forays. It is also relevant that articles have appeared in magazines, in support of this exercise, sounding the death knell of tanks and calling for major cuts in inventory. Like the proverbial cat with nine lives, tanks have not only survived, but have a battle-winning presence, generating deterrence and psychological pressure, as is being felt in Ladakh.

The fielding of light tanks across the Zoji La pass in 1947 operations, Chushul in 1962 and PT-76 tanks of the 63rd Cavalry racing to Dhaka, are abiding examples of their relevance, provided commanders employ them boldly with imagination. Our armoured cars were in the vanguard in the Katanga (Congo) UN peace-keeping operations in the 1960s and later in counter-insurgency operations in the North-East. Tank battles of Asal Uttar, Basantar and Chawinda in 1965 and 1971 operations are proof of their potential.

One of the widely proliferated images of the ongoing standoff has been the Chinese Humvee type of patrol cars. Yet, we have chosen to eliminate light tanks and armoured cars, part of most modern armies, from our arsenal, citing a host of reasons. The primary justification has been budgetary constraints, especially in the past decade. Naturally, the guillotine has to fall on cost-intensive platforms. The other overriding factor has been a Pak-centric approach with excessive focus on proxy war.



**Test of grit: Ultimately, it's the men behind the gun who make the vital difference, the superiority of the enemy's arsenal notwithstanding.**

Consequently, we have diluted our conventional options, which entail the use of mechanised forces. Such blinder-driven approach has meant that we are trapped in Pak's preferred domain of hybrid war and lack deterrence against China. Our mainstay, infantry, has been denied the much needed protection. Ideally, it should have some proportion of lightly armoured vehicles for quick reaction teams, reconnaissance and commanders. A proposal for such vehicles was torpedoed within the Army in 2012, despite multiple screening and demand from the other two services. Considering that it takes six to seven years for the proposals to fructify, we are already pushed back. This proposal was revived and is now in its last stages. Interestingly, it was shot down on specious grounds that once mounted, the infantry would lose orientation, a gross under-estimation of their resilience.

The light tank has been another sad story and a part of the blame lies with the hierarchy of mechanised forces, who have felt that limited budget should be applied on medium tanks like T-90s, T-72s and indigenous Arjuns. Our current force mix in Ladakh and Sikkim can match the Chinese medium tanks— ZTZ-99 and ZTZ-96 (Types 99 and 96) — though in the long run, it will be appropriate to induct the T-90s. The only way to deter the Dragon is by upgrading our equipment profile. There is also a crying need to create an ecosystem for retrofitting and upgrading our tank fleet, as the prohibitive cost of replacement dictates a need for life extension, coupled with modernisation. The current production base is a combination of Avadi (Chennai) and Medak (Telangana). The logistics cost of transportation of equipment for overhaul to South India even when the platforms are deployed on the western and northern borders has been imposed due to parochial preferences. The new infrastructure for light tanks, armoured cars and retrofitting should leverage the available land and skill base in the vacant HMT Pinjore complex. It can be mentored by the Defence Research and Development Organisation (DRDO) labs in the vicinity, such as the Terminal Ballistics Research Laboratory (TBRL) and Snow and Avalanche Study Establishment (SASE), coupled with IIT Ropar and PEC.

The Chinese light tank, ZTQ, is a hybrid variant and essentially a lighter version of the medium tank, weighing 36 tonnes. It is equipped with low-pressure 105 mm gun and has 1,000 HP power

pack. India should strive to field agile and versatile — air portable light tank, with missile and gun firing capabilities. It is an ideal platform for high altitude — Rann of Kutch, Siliguri corridor, riverine terrain, island territories and peace-keeping operations. Most importantly, it is crucial for quid pro quo options. It is learnt that some development work has been done by the DRDO and industry. There is also a possibility to optimise the hull (chassis) of K-9, Vajra self-propelled gun system. It will be prudent to quickly fix the qualitative requirements and initiate the project, in mission mode, synergising capabilities on work-sharing basis. If we can find partners like South Korea and Vietnam, it will be a new beginning.

Finally, notwithstanding the Chinese muscle-flexing, it's the men behind the gun who make the vital difference. Our tank crews have shown their grit in operations and the most notable was overcoming the vast disparity between the Pattons and our Centurions in 1965.

(Lt Gen KJ Singh (ret'd) *Former Western Army Commander*)

<https://www.tribuneindia.com/news/comment/mechanised-forces-remain-battle-relevant-106972>

THE  
**WIRE**

Thu, 02 July 2020

## Four years after Modi's 'Act East' promise, Vietnam is no closer to acquiring the BrahMos missile

*Senior military analysts say a more 'robust' response to the standoff between India and China could involve fast-tracking the long-promised transfer of missile systems to Hanoi*

*By Rahul Bedi*

The recent banning of 59 Chinese smartphone apps by Prime Minister Narendra Modi's Hindu nationalist BJP government is, at best, a feeble riposte to Beijing's continuing military adventurism along the disputed Line of Actual Control (LAC).

Senior military analysts in New Delhi said a more 'robust' response to the standoff between the Indian Army and the Peoples Liberation Army (PLA) in eastern Ladakh since early May was needed, and could involve fast-tracking the long-promised transfer of indigenous BrahMos and Akash missile systems to China's neighbouring rival Vietnam.

"Little or nothing with regard to providing both missile systems to Hanoi has so far been done despite extended talks," said a former two-star Indian Army officer, requesting not to be named.

Regardless of its bluster, the Indian government appears unwilling to further upset or rile the Chinese Dragon by making any untoward flanking moves towards Beijing's adversaries, he lamented.

Since 2014, the BJP government has been in discussions with Vietnam to supply it the BrahMos anti-ship cruise missile with a 292 km range, as part of New Delhi's proliferating bilateral strategic and military ties with Hanoi and to counter an increasingly militarist China.



File photo of the BrahMos missile, a joint India-Russia venture. Photo: PTI



Former defence minister Manohar Parrikar with Vietnamese defence minister Gen Ngo Xuan Lich in June, 2016. Photo: manoharparrikar/Twitter

The late defence minister Manohar Parrikar held extensive consultations with his Vietnamese counterpart, General Ngo Xuan Lich, in Hanoi in June 2016 on transferring BrahMos to its long-standing ally in south-east Asia.

These talks included the option of stationing a team of Indian technicians in Hanoi to provide the Vietnamese military instruction on the BrahMos whose transfer, official sources at the time in New Delhi four years ago maintained was imminent.

They also claimed that procedures on transferring BrahMos to Vietnam-and to other potential clients-had been resolved with Russia that had partnered India's Defence Research and Development Organisation (DRDO) in designing and series building the world's most lethal cruise missile in its class, which was also competitively priced.

Alongside, India's Ministry of Defence is believed at the time to have instructed BrahMos Aerospace, which manufactures the cruise missile in Hyderabad to increase its production to meet potential orders from Vietnam. Other countries like Indonesia, Malaysia, Philippines and Thailand had also expressed interest in acquiring BrahMos, but little had progressed.

Configured on Russia's 3M55 Oniks/Yakhont system (NATO designation: SS-NZX-26) and named after the Brahmaputra and Moskva rivers in India and Russia, the 8.4 m long, air-breathing BrahMos is a two-stage vehicle with a solid propellant booster and a liquid propellant ram-jet system. It is capable of being launched from ships and its variants from mobile, land-based platforms.

The DRDO has also successfully mated the BrahMos-A air-launched cruise missile with Indian Air Force (IAF) multi-role Russian Sukhoi Su-30MKI fighters. In June the Bangalore-based Centre for Military Airworthiness and Certification (CEMILAC) formally granted the BrahMos-A fleet release clearance to operate combat missions. The DRDO is also in advanced stages of arming and Indian Navy (IN) submarine with the BrahMos.

"Providing Vietnam with the BrahMos and the Akash would not only be a major strategic move by India in countering China, but also a boost for the government's material export policy projected to hit \$5 billion by 2025," said former Air Marshal V.K. Bhatia. It's time India shed its diffidence and inhibitions by taking on China, added the highly decorated IAF fighter pilot who has served extended tours of duty along the LAC.

Pushing its advantage, India also opened talks with Vietnam in late 2016 over the possible sale to Hanoi of its indigenously developed Akash surface-to-air (SAM) missile with a 25km strike range against aerial targets like fighters, helicopters and unmanned aerial vehicles.

But Chinese belligerence in response to both Indian missile offers to Vietnam spooked the BJP into ineptitude.

In November 2017, the *Global Times*, China's Communist Party newspaper, tactlessly declared that any moves by India to step-up military ties with Vietnam to counter China will create "disturbance" in the region and Beijing will not "sit with its arms crossed.

"When India and Vietnam are in talks about possible (weapon) sales, New Delhi seems to keep taking a sneak peak at Beijing, as if the deal is aimed stealthily at China" raved the Communist Party mouthpiece. The paper also waned Delhi against 'turning hostile' by picking sides 'at the cost of suffering enormous losses of development opportunities', a euphemism for Beijing launching economic embargoes and impediments against India.

Thereafter, little or nothing has been heard from Delhi regarding the supply of either the BrahMos, the Akash or both missile systems to Vietnam, in what many recall to be a tiresome flashback to promises by former prime minister Narasimha Rao of transferring the tactical Prithvi surface-to-surface short-range ballistic missile to Hanoi in the early 1990's.

As part of his 'Look East' policy, Rao is believed to have discussed the 'possibility' of transferring Prithvi to Vietnam, not only to further long-standing bilateral ties, but also as a counter to China that continued supplying assorted missile systems to its strategic, military and nuclear ally Pakistan for employment against India.

Two decades later Modi, in his initial flush of political ascendancy and foreign policy initiatives after assuming office in 2014, upped the ante by promising Vietnam the bigger and better BrahMos missile system under his 'Act East' policy alongside Akash. Woefully, six years later Vietnam remains a semantical victim of contending catchy mantras, but without a credible missile system to deter China.

As for India, little has changed. Beijing continues its missile and military co-operation with Islamabad under the even greater stranglehold of the China-Pakistan Economic Corridor that is linked to the current crisis along the LAC. The narrative is simple: If China can effectively use Pakistan as its surrogate to strategically immobilise India, why can Delhi not do the same with Hanoi?

Perhaps now is the time, as many serving and retired Indian military-men believe, to kickstart talks with Vietnam which too is locked in conflict with Beijing over continuing tensions in the South China Sea. These spiked recently in April after a Chinese Coast Guard vessel deliberately rammed into and sank a Vietnamese fishing boat.

Possibly, the newly appointed Chief of defence staff General Bipin Rawat, the single-point conduit between the military and the government has an answer. Or not.

<https://thewire.in/security/india-vietnam-brahmos-missile>

Defence News

Defence Strategic: National/International



Thu, 02 July 2020

## Amid India-China border tension, DAC to clear deal for 21 Mig-29 and 12 Su-30s

A multi-billion-dollar deal with Russia, in the pipeline for a long while, will be placed before the Defence Acquisition Council or DAC headed by Defence Minister Rajnath Singh and including Chief of Defence Staff General Bipin Rawat and the three chiefs. The two issues that comprise this deal are the purchase of 21 MiG-29 fighter planes and the newer Sukhoi-30 MKI. About 12 Sukhoi jets are being purchased.

The deals come at a time of heightened border tensions with the Chinese People's Liberation Army. The face-off began in the Galwan area of Ladakh in early May and is likely to continue for several weeks, maybe more. It is also a time when the Indian Air Force has been speaking about the loss of strength, with its old fighter jets retiring. Instead of 40 squadrons of fighters, the Indian Air Force has about 35. Two squadrons of the high-performance Rafale fighters are on their way. The first four to six are expected in late July. But it will take a while before all 36 arrive.

The MiG-29 has been with the IAF since the mid-Eighties and the arrival of a squadron plus of this fighter will be a help. A decision to upgrade the existing MiG-29 fighters has been taken. The Sukhoi-30, keeping in mind that the Rafale is yet to arrive, is the newest Indian fighter. Earlier, there had been a decision by the IAF not to acquire more of these fighters. They require two pilots

and are seen as expensive to maintain. There had been servicing issues and also, other problems, many of which have been sorted out. The dozen aircraft are much needed keeping in mind the coming shortages of aircraft with more planes being retired.

<https://idr.w.org/amid-india-china-border-tension-dac-to-clear-deal-for-21-mig-29-and-12-su-30s/>



Thu, 02 July 2020

## New defence procurement policy in the pipeline, says HAL CMD R Madhavan

With an aim to push indigenous and local material and software as part of the 'Atmanirbhar Bharat' initiative, the Union government announced a slew of measures taking the vision of the draft defence procurement policy even further. ET Now spoke to R Madhavan CMD, Hindustan Aeronautics about the government's initiatives and gauging the impact of the lockdown on the company.

Hailing the government's moves as extremely positive, Madhavan said raising the sectoral cap of foreign direct investment (FDI) (automatic approval) from the existing 49 per cent to 74 per cent and a negative list for the import of defence equipment in India were major steps in the right direction. "India has become an attractive destination on the defence front. A negative list of imported weapons will allow Indian products to be used more in the defence sector. Opening FDI should look to bring new technology along with manufacturing," he said.



Alluding to a constraint in operations due to the lockdown, Madhavan said that although HAL has restarted operations in April after losing some production in lockdown, the domestic and international supply chains were impacted due to lockdown. The company has a number of major orders in the pipeline and will complete the delivery of 70 Hindustan Turbo Trainer-40 by 2026. "We have made a pitch for an Advanced Light Helicopter, and can make necessary modifications."

Focusing on the 'Make In India' initiatives, Madhavan said, "The private industry should take the initiative and partner with OEMs to set up manufacturing in India. The availability of a large population of technically qualified manpower is a boost for the country." Although he is of the view that there is a need to see a speed up the decision-making process. Aerospace according to him will see an increase in demand. "Aerospace is highly technologically driven and needs a lot of capex. There is a requirement of enhancing capacity in certain areas," said Madhavan.

<https://idr.w.org/new-defence-procurement-policy-in-the-pipeline-says-hal-cmd-r-madhavan/#more-230228>

Thu, 02 July 2020

## India planning to buy more Spice-2000 bombs

Seeking to further strengthen its capability to hit ground targets, India is planning to acquire a lethal and more capable version of the Spice-2000 bombs.

The bombs, which were used effectively to destroy the Pakistani terrorist camp in Balakot town in Khyber Pakhtunkhwa province last year, are planned to be acquired by the Air Force as part of the emergency financial powers granted to the services in the middle of a row with China.



"The Indian Air Force already has the Spice-2000 bombs. It is now planning to acquire more stand-off weapons like the Spice-2000 bombs under the emergency procurement powers granted to the services," government sources told ANI.

The Spice-2000 bombs can hit targets upto 70 kms and the new variant inducted in the force can also destroy bunkers and hardened shelters, they said.

The version used in the Balakot airstrikes could penetrate into hardened shelters and buildings and cause destruction inside.

Under the emergency powers, the Narendra Modi government has granted financial power to the defence forces under which they can buy any weapon system under Rs 500 crore.

This emergency power was given close on the heels of recent clashes between Indian and Chinese troops in Galwan Valley of eastern Ladakh in which 20 Indian soldiers lost their lives.

The armed forces were granted similar financial power after the Uri terror attack and the Balakot airstrike against Pakistan.

As part of the process, the Army is planning to place orders for the Excalibur precision-guided missiles from the US under Foreign Military sales procedure while the Navy is also looking to buy equipment under the procedure this time.

<https://www.defencenews.in/article/India-planning-to-buy-more-Spice-2000-bombs-861362>



Thu, 02 July 2020

## Delays hits production of Dhanush guns

Covid outbreak has hit the supply of Dhanush 155x45mm artillery guns, the Indian version of Bofors, to the army. The weapon systems are being made at the Gun Carriage Factory (GCF), Jabalpur, in MP. The first batch of six guns was issued from the GCF in April 2019. This year the factory was supposed to supply another six to eight guns. However, no dispatch could happen as the Covid lockdown hampered operations at the factory.

It is learnt four guns are ready for issue after trials, but could not be delivered to the army due to logistics hurdles. Another batch has been built, but the trials could not happen on account of lockdown. The total supply of the Dhanush guns would still be short of equipping one full artillery regiment this year. Sources said after building the entire gun, each piece has to be



proven fit for use after trials. The ranges are in other states and access to the area was not possible due to the lockdown. The ranges are located in two different corners of the country, they said.

After the factory reopened in June, the production process remains slow as workers have to follow Covid prevention standard operating procedure (SOP), a source said.

This coupled with procedural hurdles is expected to delay completion of entire project by one year. After the project was initiated in 2010, Ordnance Factory Board (OFB) got a bulk production clearance to make the guns in 2019. The army has placed an indent for 114 Dhanush guns. The order is supposed to be completed in four years but it may now take five, said sources.

It is expected the current year's batch may be delivered in a couple of months with delivery of the guns that have already been proven to happen before that. GCF will have to scale up its production to 50 guns a year from 2021 to meet targets. At present, the factory is operating at its optimum capacity. Much of the new machines have been procured and the process continues.

Though based on Swedish Bofors, Dhanush is an advanced weapon system with higher range and accuracy. It took a series of trials for the army to finally place an order for 114. The guns have fired 5,000 rounds during trials to get the final clearance. This was a record on its own.

The ordnance factories are also upgunning the existing 130 mm guns with the army to 155mm. This will help increasing their range. Named Sharang, the factory is supposed to deliver 300 guns. This project is also expected to be delayed by a year, said sources.

<https://idrw.org/delays-hits-production-of-dhanush-guns/#more-230230>



Thu, 02 July 2020

## 21 New MiG-29UPG jets to be manufactured by HAL in India: CEO, MiG Corporation

By Raunak Kunde

Ilya Tarasenko, CEO, MiG Corporation has confirmed that talks to sell 21 unused airframes to India is underway and has been fast-tracked under request from India recently, as both sides work to conclude a contract for the sale of currently under storage airframes of the Mig-29s and UPG Upgrade Kits to make them same as the current upgraded fleet of MiG-29UPG in Indian Air Force.

Airframes manufactured for a certain export customer were put on cold storage at various facilities of the MiG Corporation after the deal collapsed nearly 20 years ago. Complete fuselage along with wings and other airframes have been inspected by IAF Team last year and was reported back that indeed airframes have been unused and can be used to integrate into a new fighter jet back home.



HAL which was in charge of upgrading Mig-29A into Mig-29UPG Standards for the entire fleet of 60 odd jets with IAF, which included new engines and radars along with Multi-Role capabilities for the jets. Tarasenko has confirmed that airframes will be shipped to India and UPG upgrade kit will be used to integrate them in to brand new aircraft with Zero airframe hours which can serve with IAF for the next 30 years.

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<https://idrw.org/21-new-mig-29upg-jets-to-be-manufactured-by-hal-in-india-ceo-mig-corporation/#more-230171>

## Israeli smart bombs, French stealth cruise missiles to boost IAF strike prowess

*The Indian Air Force is, reportedly, planning to acquire more SPICE-2000 munitions*

As the standoff with China at the Ladakh border continues, the Indian government is making emergency purchases of weapon systems for the three armed services.

On Tuesday, news agency ANI reported that the Indian Air Force was planning to acquire "more Spice-2000 bombs" from Israel for the purposes of destroying bunkers and buildings.

The SPICE-2000 made headlines last February when it was revealed that Indian Air Force Mirage 2000 fighters had used these weapons to bomb the terror camp in Balakot.

In the strictest sense, the SPICE-2000 is not a bomb in itself. The SPICE-2000 is from a family of munitions. SPICE, which stands for Smart, Precise Impact and Cost-Effective, is a guidance and manoeuvring kit manufactured by Israel's Rafael. The SPICE kit adds a sophisticated guidance system—consisting of inertial navigation, satellite guidance and electro-optical sensors for pinpoint accuracy—and control fins to a conventional unguided bomb. The SPICE turns a conventional 'gravity' bomb into a sophisticated, long-range guided weapon.

The SPICE-1000 kit, which is available for 500kg bombs, has a glide range of nearly 100km, while the SPICE-2000 (meant for 1,000kg bombs) has a glide range of around 60km. While laser-guided bombs are less expensive than the SPICE and are as accurate, cloud cover and adverse weather tend to degrade their performance; furthermore, laser-guided bombs typically have a range of around 15km.

Their long range makes the SPICE family of smart bombs suited for hitting targets in protected air space. China operates a variety of potent air defence systems, including the Russian S-300 and the newer S-400 as well as indigenous platforms.

Soon after the Balakot attack last year, PTI reported that the Indian Air Force was "in the process of equipping the Su-30MKI with Israeli SPICE-2000 bombs, to make the fighter jets more potent". The Su-30MKI is numerically and technologically the most important fighter in Indian Air Force service, with around 250 aircraft in operation. With a maximum takeoff weight of over 35 tonnes, twice that of the Mirage-2000, a single Su-30MKI could carry at least three SPICE-2000 bombs, giving it massive operational flexibility.

### Scalp power

More SPICE munitions are not the only weapons that will strengthen the Indian Air Force's ground-attack capability. Earlier this week, *The Print* had reported that France had shipped to India Meteor air-to-air missiles and Scalp cruise missiles, both of which will arm the Rafale fighter jets destined for the Indian Air Force. The Scalp is an air-launched cruise missile manufactured by European defence consortium MBDA. The Scalp, which is designed in France, weighs around 1,300kg. According to MBDA, the Scalp has a stated range of 250km, though media reports claim the weapon can go twice that distance.

Like the SPICE-2000, the Scalp uses a range of guidance options—GPS, inertial navigation, infra-red seeker and terrain reference. The Scalp also has a design that emphasises 'low observability' (stealth) by reducing exposure of its air intakes and flies at very low level to avoid radar detection. The Scalp has been advertised as being capable of destroying "high-value" fixed targets such as air defence command-and-control centres and bunkers.



A Scalp missile on a Rafale jet | MBDA

The Scalp missile and its British derivative, the Storm Shadow, have been used in multiple conflicts in the past two decades, including the invasion of Iraq and air strikes over Libya and Syria. In addition to the air forces of France and the UK, the Scalp missile and Storm Shadow have been exported to Greece, Saudi Arabia and Qatar, among others.

The Rafale can carry two Scalp missiles, along with three large fuel tanks, in a long-range attack configuration. Along with the air-launched Brahmos missile, the Scalp will be the first 'deep strike' missile of the Indian Air Force. However, in its current configuration, the Brahmos is too heavy and a single Su-30 MKI can only carry one missile.

The addition of more SPICE munitions and arrival of the Scalp cruise missiles is crucial for the Indian Air Force, given the relentless growth of China's fighter fleet and also its development of air-launched cruise missiles. China's fleet of H-6 bombers are being equipped with missiles like the CJ-20, which is estimated to have a range of over 1,000km.

<https://www.theweek.in/news/india/2020/07/01/israeli-smart-bombs-french-stealth-cruise-missiles-to-boost-iaf-strike-prowess.html>

## THE ECONOMIC TIMES

Thu, 02 July 2020

### Indian, Chinese armies identify expeditious and phased de-escalation as priority: Sources

*The sources said the process of disengagement along the LAC is "complex" and in such a context, speculative and unsubstantiated reports need to be avoided*

New Delhi: India and Chinese militaries have emphasised on the need for an expeditious, phased and step wise de-escalation as a priority at a nearly 12-hour corps commander-level meeting on Tuesday which was aimed at ending the seven-week bitter standoff in eastern Ladakh, military sources said. They said the discussions at the talks reflected the commitment of the two sides to reduce tensions along the Line of Actual Control (LAC) and more meetings are expected, both at military and diplomatic levels, to arrive at a mutually agreeable solution.

The sources said the process of disengagement along the LAC is "complex" and in such a context, speculative and unsubstantiated reports need to be avoided.

The talks took place on the Indian side of the LAC in Chushul sector in eastern Ladakh.

The meeting began at 11 AM and continued for nearly 12 hours, the sources said.

"The meeting on Tuesday was long and held in a businesslike manner keeping in view the COVID-19 protocols. The discussions reflected the commitment of both sides to reduce the tensions along the LAC," said a source.

<https://economictimes.indiatimes.com/news/defence/indian-chinese-armies-identify-expeditious-and-phased-de-escalation-as-priority-sources/articleshow/76729893.cms>



Indian army convoy moves towards the Line of Actual Control (LAC) from Leh, Sunday, June 28, 2020.

## India, China repeat calls for phased de-escalation in 3rd round of corps commander talks

*India & China's calls for de-escalation are similar to those made at the second round of military talks but implementation is proving a challenge on the ground*

*By Amrita Nayak Dutta*

New Delhi: The third round of corps commander-level talks between India and China Tuesday saw the countries discuss the need for an “expeditious, phased and step-wise de-escalation” to resolve the ongoing military standoff at the Line of Actual Control in Eastern Ladakh, government sources have said.

It was with a similar agreement that the second round of talks was wound up on 22 June.

The meeting Tuesday, held at Chushul on the Indian side of the Line of Actual Control (LAC), started at 10.30 am and continued for 12 hours, the sources added.

“The meeting yesterday was long and held in a business-like manner keeping in view the Covid-19 protocols. The discussions reflected the commitment of both sides to reduce the tensions along the LAC,” a government source said.

The source added that more meetings are expected at “both the military and at the diplomatic level... to arrive at mutually agreeable solutions and ensure peace and tranquility along the LAC in keeping with bilateral agreements and protocols”.

The western sector of the LAC in Ladakh has been tense since May on account of Chinese provocations at the border, which are believed to be a mark of protest against Indian construction activity in the area.

The tensions took a deadly turn 15 June as soldiers of the two nations came to blows in Galwan Valley, leading to 20 fatalities among Indian personnel and an unconfirmed number on the Chinese side.

India and China have since been engaged in discussions through established military and diplomatic channels to address the situation along the LAC.

In a report about Tuesday’s meeting, China’s state-run *Global Times* newspaper quoted a source “close to” the country’s border troops as saying that the two sides have agreed to disengage frontline troops in batches and take measures to ease the situation in the border areas to avoid further escalating the situation.

### **‘Implementation a challenge on the ground’**

ThePrint had reported after the first two rounds of corps commander-level talks, held on 6 June and 22 June, that the two countries had agreed to follow some protocols, such as keeping a distance of at least 100 metres between patrols, desisting from ramming boats and vehicles into each other, avoiding confrontation, and disengagement in case of an eventuality.

The Indian side, it is learnt, had also told China to refrain from carrying out any further construction between Finger 4 and Finger 8 of the Pangong Lake, which constitutes Indian territory.

The countries also discussed the possibility of not deploying additional troops and equipment in the area of the ongoing stand-off at eastern Ladakh, besides stopping new tents and bunker construction activity in friction areas.

Despite the talks so far, sources say, there has not been much of a change in the ground situation. A defence source said implementation of the understanding arrived at by the two sides is a real challenge on the ground.

“In the last round of talks they (the Chinese) had agreed to pull back and prevent further escalation. However, the build-up, especially in the depth areas, has continued,” the source added.

The PLA reportedly deployed cheap and lightweight PCL-181 155 mm vehicle-mounted howitzers at the LAC late last month, with reports also suggesting the deployment of the S-400 air defence systems in Tibet, which adjoins Ladakh.

“To counter the Chinese aggression and buildup, India is not physically moving additional troops in the area, but is keeping the reserve formations prepared and also moving additional stores and other equipment,” the source said.

“If any confidence-building measures are to be implemented, one of the two sides has to make the first move. It remains to be seen who will do that,” the source added.

According to the Indian defence establishment’s assessment, the stand-off in Ladakh could last until the winter as full disengagement is likely to take time.

*(This report has been updated with additional information)*

<https://theprint.in/defence/india-china-repeat-calls-for-phased-de-escalation-in-3rd-round-of-corps-commander-talks/452475/>



Thu, 02 July 2020

## Defence Minister Rajnath Singh, Army Chief Naravane to visit Ladakh for security review on Friday

*The defence minister will review the on-ground security situation amid the border standoff with China and the progress in talks with the Chinese military*

Defence Minister Rajnath Singh will visit Ladakh on Friday along with Army Chief General MM Naravane to review the on-ground security situation amid the border standoff with China and the progress in talks with the Chinese military.

According to government sources, preparations are underway to arrange the visit, which is likely to conclude within a day. This will be Singh’s first visit to Ladakh since the tensions broke out between the two countries in May, and Naravane’s second in just over a week.

It will come after the third round of commander-level talks were held by Lieutenant General Harinder Singh, the commander of India’s Leh-based XIV corps, and his People’s Liberation Army counterpart, South Xinjiang military region chief Major-General Liu Lin, on Tuesday.



File photo of defence minister Rajnath Singh. (PTI)

At the talks that ran for 12 hours, government sources said broad parameters were agreed to disengage troops at Patrolling Point 14, 15 and 17, running from the Galwan Valley to the Hot Springs area, involving the PLA pulling back some hundreds of metres from territories claimed by India. Patrolling point 14 was the site where a large-scale hand-to-hand battle between troops had led to the loss of the lives of 20 Indian Army soldiers.

The Indian as well as the Chinese armies stressed the need for “expeditious and step-wise de-escalation” along the contested Line of Actual Control (LAC) as part of ongoing efforts to cool heightened border tensions.

Government sources, however, said there had been little progress on ending the confrontation along the Pangong lake, the site of the largest build-up on the LAC, the source of a violent clash on May 5 that left soldiers on both sides severely injured.

Even as the talks continue, the Indian armed forces are preparing for a long haul at the LAC, and have deployed extra troops, tanks and fighter planes to be ready for any scenario.

The Army Chief had visited Ladakh for two days last week to review the on-ground situation and had interacted with soldiers at the Military Hospital in Leh after the June 15 clash.

<https://www.news18.com/news/india/defence-minister-rajnath-singh-army-chief-naravane-to-visit-ladakh-for-security-review-on-friday-2696411.html>

**hindustantimes**

Thu, 02 July 2020

## India sending high-powered boats to match heavier Chinese vessels while patrolling Ladakh lake

*The decision to send steel hulled boats to Pangong Tso was taken by the tri-services this week with the Navy asked to transport the vessels through C-17 heavy lift transporters to Leh on a priority basis*

*By Shishir Gupta*

New Delhi: Indian Navy is sending a dozen high-powered, bigger capacity and top-of-the-line surveillance equipped steel boats to Ladakh so that the Indian Army can patrol Pangong Tso and match the heavier Type 928 B vessels of the Chinese Army lake fleet. The Pangong Tso lake is at the centre of People's Liberation Army (PLA) aggression in East Ladakh with the Chinese bullying India into ceding territory on both the banks and deliberately pushing the Modi government into retaliatory mode.

While the third senior military commander level talks stretched late into Tuesday night at Chushul, the word out is that they were held in cordial atmosphere with both the Leh Corps Commander and his Xinjiang Military district counterpart discussing the specifics of de-escalation and disengagement along the 3488 km Line of Actual Control (LAC).

The decision to send steel hulled boats to Pangong Tso was taken by the tri-services this week with the Navy asked to transport the vessels through C-17 heavy lift transporters to Leh on a priority basis. Apart from signalling Indian intent to stand up strong to any Chinese provocation, the heavier vessels will not be pushed around in the water by PLA boat fleet. Even though there are some logistical issues in transporting the huge boats by plane, solutions are being worked out by both Indian Navy and Army.

The Indian Navy is forwardly deployed on its eastern and western seaboard with its naval fleets monitoring the movement of ships from Andamans Sea to Persian Gulf to prevent any untoward activity.

While ostensibly China is talking peace and disengagement in the East Ladakh, it is quite evident to Indian national security planners that the PLA is actually consolidating on the four stand-off points along the 1597 KM LAC in the western sector. The amassing of troops in the Galwan sector, the building of road at Gogra point, the upgradations of communications at Hot Springs and the massive infra push at the Pangong Tso all shows that the PLA has no intentions to restore status quo ante. Instead, the PLA is hell-bent on provoking Indian Army by trying to nibble more territory and force an escalation on the border.



Lt Gen YK Joshi, GOC Ladakh 14 Corps, along with then Northern Army commander Lt Gen Ranbir Singh on a boat patrol in Ladakh's Pangong Tso lake in September 2019 (Indian Army)

The Modi government has given Indian military a free hand to deal with the situation on the border as China has decided to turn the difference on the LAC into permanent dispute. The Indian troops and air force are all standing up to the PLA but will not initiate escalation on their own but only responds to the Chinese aggression. Just like 2001 Operation Parakram, Indian Forces are prepared to wait till such time status quo ante is restored in East Ladakh.

Even as the world, particularly the US and Russia, are waking up to new Chinese aggression, the Middle kingdom has always been a civilizational concept with Beijing rulers in the past two centuries. In this concept the only refined society is China with the rest of world being barbarians or tributary states. By contesting sovereignty of Senkaku islands with Japan, contesting Taiwan security with US, contesting South China Sea with ASEAN and forcing India into a military stand-off in Ladakh, China is cocking a snook at the globe.

<https://www.hindustantimes.com/india-news/india-sending-high-powered-boats-to-match-heavier-chinese-vessels-while-patrolling-ladakh-lake/story-FZSNWwepM10bzGg0CoXGIJ.html>



Thu, 02 July 2020

## Tiptoeing around China's control of Indian territory won't make problem go away, Writes Lt Gen Hooda

*Unsubstantiated allegations that India has been regularly losing territory to China in Ladakh do grave injustice to the army and ITBP troops, and also deflect attention from current Chinese actions in Ladakh*

*By Lt Gen (Retd) DS Hooda*

The standoff in Eastern Ladakh is now entering the third month and shows little signs of an early resolution. However, there has been a slight dampening of the noisy debates on television, and the crisis is going off the front pages of newspapers. Perhaps, this is the time to do a sober analysis of the situation and suggest a way forward.

I must admit that I have no access to any additional information, and I am basing my analysis on what is available in open source. The only advantage I enjoy is a greater understanding of the geography and some historical knowledge of how the army has been managing the Line of Actual Control (LAC), particularly in Ladakh.

Briefly, what we know is this: the People's Liberation Army (PLA), in a planned operation involving thousands of soldiers, has activated the LAC in Eastern Ladakh. In at least two areas, the North bank of Pangong Tso and the Depsang Plains, the PLA has crossed the Indian LAC and established a permanent presence. At Galwan Valley, the PLA is attempting to gain a tactical advantage that enables it to overlook the vital road leading up to Daulat Beg Oldi and the Karakoram Pass.

The LAC is a de facto border that separates Indian-controlled areas from those that are Chinese-controlled. There are a few areas where the Indian perception of the LAC differs from the Chinese interpretation (Pangong Tso and Depsang are two such locations). In these areas, there was an understanding that both sides would patrol up to their own perception, and neither side would establish a permanent presence in these pockets. Thus, both sides could keep their claims alive.



In this September 14, 2018, file photo, an Indian Army truck crosses Chang la pass near Pangong Lake in Ladakh region, India. (AP)

By physically intruding into the areas of Pangong Tso and Depsang, the Chinese have blocked the movement of India patrols up to their traditional patrol points. In effect, this has shifted the Chinese control westward and into what we consider Indian territory.

The importance of patrolling up to the LAC was also highlighted by India's ambassador to China, Vikram Misri. He said: "The resolution of this issue is quite straight forward from our perspective. The Chinese side needs to stop creating obstruction and hindrances in the normal patrolling patterns of the Indian troops".

To resolve this standoff, India has chosen to adopt the negotiation route, at least for the present. This is the correct approach as neither side wants the situation to escalate to a military conflict. It is also going to be a long and arduous path, as many experts within and outside the government have pointed out. In this period, our negotiating stance must show greater clarity than has been displayed until now.

It is a little surprising to see some members of the strategic community, including military officers, invoking the term 'disputed area' and 'grey zone' for the north bank of Pangong Tso. This somehow conveys the impression that there is some justification for the PLA's actions as the area is disputed.

The Chinese may have a differing perception, but India's maps have a clearly marked LAC that passes through Finger 8, and any violation of this line should be unacceptable to us. There should be no arguments that weaken our military position on the LAC.

We also see numerous comments that India has been regularly losing territory to China in Ladakh. These unsubstantiated allegations do grave injustice to the army and ITBP troops who have been resolute in protecting and defending the LAC in Ladakh, irrespective of which government is in power. They also deflect attention from current Chinese actions in Ladakh.

Contrast our statements with those coming from China's Ministry of Foreign Affairs that blame Indian soldiers for crossing the LAC and committing acts that are "of a vile nature and have serious consequences." Even as we hesitate to admit the PLA's presence in our territory, the Chinese lay unsubstantiated claims to the complete Galwan Valley.

In international politics, deterring an adversary depends a lot on how we convey our intentions. Thomas C. Schelling writes in his classic work *Arms and Influence*, "It is a tradition in military planning to attend to an enemy's capabilities, not his intentions. But deterrence is about intentions - not just *estimating* enemy intentions but *influencing* them. The hardest part is communicating our own intentions."

Tiptoeing around the problem will not make it go away. Let us communicate our firm national resolve to the Chinese government. The PLA has taken a tremendous risk by destroying the carefully constructed agreements and protocols that have ensured peace along the LAC. It is for them to step back, and for us to show them the dangers of not doing so. The banning of Chinese apps is just one step in this process.

Deterrence and compellance are efforts to shape the perceptions of the adversary. We should not underplay the seriousness of the current situation as it could convey the impression of a defensive attitude and weaken our credibility. We must clearly proclaim that we are unwilling to step back from our demand for restoration of status quo ante.

It is generally felt that retention of the initiative is a crucial factor for victory. Sometimes, when dealing with a strong adversary, it is a good strategy to show that you have burned the bridges behind you and the initiative to escalate, and its associated costs, have passed on to the adversary. This will require a strong commitment of intent from our side.

It is also the time to show political solidarity. It is distressing to see personal attacks on political leaders, both ruling and in opposition, at a time when we should be focused on an external rival. If our politicians speak in one voice, this would be the loudest message to China. The fight has to move beyond television studios to the real world.

*(Disclaimer: The author is former Northern Commander, Indian Army, under whose leadership India carried out surgical strikes against Pakistan in 2016. Views expressed are personal.)*

<https://www.news18.com/news/opinion/tiptoeing-around-chinas-control-of-indian-territory-wont-make-problem-go-away-writes-lt-gen-hooda-2695715.html>

## THE TIMES OF INDIA

Thu, 02 July 2020

# PLA has deployed over 20,000 troops along LAC, India wary of third division in Xinjiang

New Delhi: The People's Liberation Army (PLA) has deployed more than 20,000 of its troops along the Line of Actual Control (LAC) near the Eastern Ladakh sector even as India is closely watching the activities of another 10,000-12,000 Chinese troops deployed in Xinjiang with high mobility vehicles and weaponry in the rear positions with the capability to reach the Indian front in 48 hours time.

"The Chinese Army has deployed around two divisions worth of troops (around 20,000) along the LAC in the Eastern Ladakh sector. There is another division (10,000 troops) which has been stationed by it in the Northern Xinjiang province almost a 1,000 kilometres from the front but they can be mobilised to reach our frontiers in maximum 48 hours time due to the flat terrain on the Chinese side," top government sources told ANI.

"We are keeping a close eye on the movement of these troops along with the ones which have been deployed close to the Indian territory," the sources said.

The sources said that even though India and China have been talking at the diplomatic and the military level for over six weeks now, there has been no thinning down in troop numbers or equipment by the Chinese side on this front, they said.

Sources said the Chinese normally also have two divisions deployed in the Tibet region but this time, they have brought in close to two divisions extra from locations as far as 2,000 kilometres from mainland China for deployment against the Indian positions.

Sources said the Indian side has also beefed up positions and added at least two divisions from nearby locations for the Eastern Ladakh sector. This includes a reserve mountain division which every year conducts its wargames in the Eastern Ladakh area.

Tanks and BMP-2 infantry combat vehicles have been also flown in by the Air Force in addition to the existing elements of the armoured brigade deployed close to the DBO sector.

Eastern Ladakh sector, is at present, guarded by the Karu-based Trishul Infantry Division along with its three brigades located all along the LAC.

Looking at the Chinese aggression and deployment along the DBO sector from Galwan Valley onwards to the Karakoram Pass area, the Indian Army is now also considering the deployment of another division in that sector, the sources said.

In the Pangong Tso lake and the Finger area, the Chinese have now stationed themselves very strongly on the Finger 8 area where they have established their administrative base along with deployment of heavy vehicles and bigger boats.

"The road built by the Chinese from the Finger 8 to Finger 5 alongside the lake also helps them in the quick transfer of troops from there to the Finger 4 base. The reaction time of the Chinese to move their troops is much shorter than the Indian side," the sources said. The Chinese are also creating proper military infrastructure in the area under them near the lake," the sources said.

The Chinese side had marched in its troops in heavy numbers in the Finger area and Pangong Tso lake on May 18-19 when they marched in with almost 2,500 soldiers against around 200



Indian soldiers deployed there on the bank of the lake. Depicting the Chinese movement near the lake and in it as a "locust attack", sources said the Chinese have not been allowing Indian patrols to go on patrolling beyond the Finger 3 where the Indian side also has an administrative base.

The sources said that despite talks being done with the Chinese at the military and diplomatic levels, it seems that the time taken for the resolution of the crisis would be very long and the Indian side is also preparing itself for a long haul. "The deployment is expected to continue till September-October time frame when snowfall starts in a big way in the high altitude terrain," the sources said.

In the Galwan river valley, the sources said the Chinese deployment would be more difficult in the summer months and the condition would become relatively easier during the winter months when the water would freeze, the sources said.

The massive deployment on both sides started when the Chinese side first marched close to the Patrolling Point 14 in Galwan river valley on May 4-5 to claim the territory there and asking the Indian side to go west of the Shyok river near the Indian position KM-120 there.

<https://timesofindia.indiatimes.com/india/pla-has-deployed-over-20000-troops-along-lac-india-wary-of-third-division-in-xinjiang/articleshow/76727622.cms>

THE ECONOMIC TIMES

Thu, 02 July 2020

## Australia to invest 270 billion dollars to boost defence capabilities amid China's threat in Indo-Pacific

*PM Morrison said that the Indo-Pacific was the epicentre of rising strategic competition and tensions. Territorial claims are rising across the Indo-Pacific region, as seen recently on the border between India and China, and the South China Sea, and the East China Sea*

Melbourne: Australian Prime Minister Scott Morrison on Wednesday said 270 billion Australian dollars will be invested to modernise the country's defence capabilities in the coming decade to maintain regional security and deter or respond to "aggression" in the strategic Indo-Pacific, amidst China flexing its muscles in the region.

"The challenges and nature in the Indo-Pacific have meant we need a new approach and one that actively seeks to deter actions that are against our interests," the prime minister said.

Morrison said that the Indo-Pacific was the epicentre of rising strategic competition and tensions. Territorial claims are rising across the Indo-Pacific region, as seen recently on the border between India and China, and the South China Sea, and the East China Sea.

China has been fast expanding military and economic influence in the Indo-Pacific region, triggering concern in various countries of the region and beyond.

China is also engaged in hotly contested territorial disputes in both the South China Sea and the East China Sea. Beijing has built up and militarised many of the islands and reefs it controls in the region. Both areas are stated to be rich in minerals, oil and other natural resources and are vital to global trade.

Morrison said the world was changing rapidly after the COVID-19 outbreak. "This simple truth is this: Even as we stare down the COVID pandemic at home, we need to also prepare for a post-



Australian Navy personnel move inside the HMAS Newcastle of Royal Australia Navy

COVID world that is poorer, that is more dangerous and that is more disorderly,” the prime minister said.

"The risk of miscalculation and even conflict is heightening. Regional military modernisation is occurring at an unprecedented rate," Morrison said.

"You've got to have a responsible deterrent and Australia plays an important role in our region, working with others, particularly like India and Japan and many other nations, Indonesia, right across the Indo-Pacific,' he said.

India, Australia, the US and Japan are part of the Quadrilateral Security Dialogue (Quad), an informal grouping which shares intelligence and conducts military drills.

"We've got to be aware of the potential threats that can emerge. I mean, the strategic competition between China and the United States means that there's a lot of tension a lot of risk of miscalculation," he told a news channel.

In an official statement, Morrison said the new investments totalling 270 billion Australian dollars (USD 186.7 billion) will be made across air, maritime and land assets to give the Australian Defence Force enhanced options to protect interests and its assets.

The new defence plan, he said, was "to maintain regional security and deter or respond to aggression in the Indo-Pacific as part of the 2020 Defence Strategic Update and Force Structure Plan."

The new defence expenditure will include acquiring advanced maritime strike capability system AGM-158C Long Range Anti-Ship Missile (LRASM) from the US Navy at an estimated cost of 800 million Australian dollars (USD 553 million), 9 billion Australian dollars (USD 6.2 billion) will be spent on developing hypersonic weapons and an additional recruitment of 800 defence personnel will be done, including 600 personnel in the Navy.

"These new capabilities will provide a strong credible deterrent in our region that will help provide the stability and security we need," Morrison said, adding that investments would also be made for integrated and automated sensors and weapons.

"We're for a peaceful, stable Indo-Pacific, a certain environment in which people can trade and live their lives and sovereign nations can work and trade with each other and have good relationships," he said.

Defence Minister Linda Reynolds said military capability in the region was modernising rapidly and it needed to maintain a regional capability edge.

"It is essential that we have the capabilities that can hold forces and infrastructure at risk from a greater distance, to influence decision-making of those who may seek to threaten our national interests," Reynolds said.

<https://economictimes.indiatimes.com/news/defence/australia-announces-mega-billion-dollar-defence-plan-says-tension-rising-in-indo-pacific/articleshow/76727549.cms>

Thu, 02 July 2020

## Scientists pinpoint previously unknown sections of DNA silenced by epigenetics

All life depends on a genome, which acts as an instruction manual for building all the products essential for development and survival. But knowing which of these individual instructions – or genes – need to be read, and when, is key for a properly functioning organism: so how does life get this right?

Enter epigenetic regulation – the process by which cells control the expression, or readability, of genes. In multicellular organisms, epigenetics is the reason why every type of cell varies in shape and function, with each cell type following a different subset of instructions. Cells also use epigenetic regulation as an “immune system”, suppressing the activity of disruptive “jumping genes” called transposons that can otherwise hop around the genome and threaten its integrity.

Despite its importance, scientists are still struggling to untangle the many pathways that cells use to precisely control the activity of genes. Now, researchers from the Okinawa Institute of Science and Technology Graduate University (OIST) have uncovered a clue to the mystery, by looking at how plant cells suppress transcription – the first stage of how genes manufacture their products. Their findings, recently published in *Nature Communications*, pinpoint previously unknown sections of DNA that are silenced by epigenetic regulation, many of which originate within transposons.

"This study provides a comprehensive view on how and where cells suppress transcription across the whole genome," said Dr. Tu Le, first author and postdoctoral researcher in the OIST Plant Epigenetics Unit. "Importantly, we found that this silencing was vital for ensuring that genes involved in development and stress responses function properly."

During transcription, cellular machinery copies a section of DNA into RNA. Usually, these RNA transcripts are then used to make proteins. Cells can boost or suppress transcription by adding chemical tags to DNA or to histone proteins that package the DNA, which tell the machinery which RNA transcripts – and ultimately proteins – to produce and in what quantity.

This level of precise control is vital for managing transposons. "Transposons are parasites of genomes, that promote their own expression at the expense of the organism," said Professor Hidetoshi Saze, senior author of the study and leader of the Plant Epigenetics Unit. "When a transposon is active, its genetic sequence is used to manufacture a protein that can move the transposon to a different location in the genome, like cut-and paste or copy-and-paste computer functions."

Transposons are usually silenced, as their activity can disable important genes. But sometimes, when under stress, plants re-activate transposons as they are a source of genetic variation, potentially generating beneficial mutations that allow the plant to adapt to the changing environment.

"Our lab ultimately aims to determine exactly how cells recognize and regulate transposons," added Dr. Le. "This work is an important first step toward this goal."

## **Unveiling hidden sites of transcription**

In the study, the scientists used several mutant strains of a plant called *Arabidopsis thaliana*, with a different epigenetic pathway disabled in each strain.

The team then used a sequencing technique to detect specific DNA sequences that act as starting sites for the genome's transcription machinery. They revealed thousands of these “transcription start sites” (TSSs) that were only active in the epigenetic mutants.

"Many of these sites hadn't been detected in previous studies, because they are completely silenced in wildtype plants. Our discovery of these hidden – or cryptic – TSSs provides a valuable source of data for future epigenetic research in plants," said Prof. Saze.

The scientists identified one mutant strain of the plant that activated an especially high number of cryptic TSSs. The gene this mutant was missing encodes a key protein which maintains DNA methylation. When methyl groups are added to DNA, this epigenetic tag triggers a biochemical pathway that causes histones to pack the DNA more tightly. This physically stops transcription machinery from accessing the regions of the genome that contain the cryptic TSSs.

"The sheer number of cryptic TSSs activated when DNA methylation is lost shows that it is a powerful and prevalent method of silencing," said Dr. Le.

### **From transposons to stress tolerance**

Another key finding was the link between transposons and cryptic TSSs. The scientists found that up to 65% of cryptic TSSs originated within these “jumping genes”, which were longer and more heavily methylated than transposons without cryptic TSSs.

"This suggests that transposons with cryptic TSSs are younger, intact and still able to jump around the genome, which is why they are silenced," explained Dr. Le.

Strikingly, the scientists noticed that when the cryptic TSSs were activated in the epigenetic mutants, this changed the activity of nearby genes involved in stress and development. The scientists don't yet fully understand the mechanism behind this impact, but the implications are intriguing.

"There is previous research that shows that over time, as transposons degrade, plants can adapt the TSSs in transposons for their own use, to regulate the activity of nearby genes," said Prof Saze. "The effect of the activated cryptic TSSs on stress and development genes suggests that in the future, plants could use these TSSs to adapt to changing conditions."

In future research, the scientists hope to learn more about these cryptic TSSs and how they affect the activity of nearby genes. "This study might help us to better understand how plants respond to environmental changes such as global warming, drought and nutrient degradation in soil. It may then be possible to develop new crops which are resistant to these kinds of stress," Prof. Saze said.

### **Reference**

Le *et al.* (2020). Epigenetic regulation of spurious transcription initiation in *Arabidopsis*. *Nature Communications*. DOI: <https://doi.org/10.1038/s41467-020-16951-w>  
<https://www.technologynetworks.com/tn/news/scientists-pinpoint-previously-unknown-sections-of-dna-silenced-by-epigenetics-336852>

Thu, 02 July 2020

## COVID-19 Virus Likely to Infect 'Mini-Brains': Research

Researchers have found that organoids (tiny tissue cultures made from human cells that simulate whole organs) known as "mini-brains" can be infected by the novel coronavirus that causes COVID-19.

The results, published in the ALTEX: Alternatives to Animal Experimentation, suggest that the virus can infect the human brain cells.

"This study is another important step in our understanding of how infection leads to symptoms, and where we might tackle the COVID-19 disease with drug treatment," said study lead author William Bishai from the Johns Hopkins University School of Medicine in the US.

Early reports from Wuhan, China, the origin of the COVID-19 pandemic, have suggested that 36 per cent of patients with the disease show neurological symptoms, but it has been unclear whether or not the virus infects human brain cells.

In their study, the Johns Hopkins researchers demonstrated that certain human neurons express a receptor, ACE2, which is the same one that the novel coronavirus uses to enter the lungs.

Therefore, they surmised, ACE2 also might provide access to the brain.

When the researchers introduced coronavirus particles into a human mini-brain model, the team found evidence of infection by and replication of the pathogen.

According to the researchers, the human brain is well-shielded against many viruses, bacteria and chemical agents by the blood-brain barrier, which in turn, often prevents infections of the brain.

"Whether or not the SARS-CoV-2 virus passes this barrier has yet to be shown. However, it is known that severe inflammations, such as those observed in COVID-19 patients, make the barrier disintegrate," said study senior author Thomas Hartung from the Bloomberg School of Public Health.

The impermeability of the blood-brain barrier, also can present a problem for drug developers targeting the brain, the study said.

"The mini-brains which model the growing human brain contain the ACE2 receptor from their earliest stages of development," the study authors wrote.

Therefore, the findings suggest that extra caution should be taken during pregnancy.

As of Wednesday morning, the overall number of global COVID-19 cases has increased to over 10.4 million, while the deaths have soared to more than 5,09,000.

The US accounted for the world's highest number of infections and fatalities with 26,29,372 and 1,27,322, respectively, according to Johns Hopkins University.

<https://weather.com/en-IN/india/coronavirus/news/2020-07-01-covid-19-virus-infect-mini-brains-research>

## COVID-19: Study shows virus can infect heart cells in lab dish

*Research uses stem cell technology to learn how coronavirus may directly attack heart muscle*  
**Summary:** A new study shows that SARS-CoV-2, the virus that causes COVID-19 (coronavirus), can infect heart cells in a lab dish, indicating it may be possible for heart cells in COVID-19 patients to be directly infected by the virus.

A new study shows that SARS-CoV-2, the virus that causes COVID-19 (coronavirus), can infect heart cells in a lab dish, indicating it may be possible for heart cells in COVID-19 patients to be directly infected by the virus. The discovery, published today in the journal *Cell Reports Medicine*, was made using heart muscle cells that were produced by stem cell technology.

Although many COVID-19 patients experience heart problems, the reasons are not entirely clear. Pre-existing cardiac conditions or inflammation and oxygen deprivation that result from the infection have all been implicated. But until now, there has been only limited evidence that the SARS-CoV-2 virus directly infects the individual muscle cells of the heart.

"We not only uncovered that these stem cell-derived heart cells are susceptible to infection by novel coronavirus, but that the virus can also quickly divide within the heart muscle cells," said Arun Sharma, PhD, a research fellow at the Cedars-Sinai Board of Governors Regenerative Medicine Institute and first and co-corresponding author of the study. "Even more significant, the infected heart cells showed changes in their ability to beat after 72 hours of infection."

The study also demonstrated that human stem cell-derived heart cells infected by SARS-CoV-2 change their gene expression profile, further confirming that the cells can be actively infected by the virus and activate innate cellular "defense mechanisms" in an effort to help clear out the virus.

While these findings are not a perfect replicate of what is happening in the human body, this knowledge may help investigators use stem cell-derived heart cells as a screening platform to identify new antiviral compounds that could alleviate viral infection of the heart, according to senior and co-corresponding author Clive Svendsen, PhD.

"This viral pandemic is predominately defined by respiratory symptoms, but there are also cardiac complications, including arrhythmias, heart failure and viral myocarditis," said Svendsen, director of the Regenerative Medicine Institute and professor of Biomedical Sciences and Medicine. "While this could be the result of massive inflammation in response to the virus, our data suggest that the heart could also be directly affected by the virus in COVID-19."

Researchers also found that treatment with an ACE2 antibody was able to blunt viral replication on stem cell-derived heart cells, suggesting that the ACE2 receptor could be used by SARS-CoV-2 to enter human heart muscle cells.

"By blocking the ACE2 protein with an antibody, the virus is not as easily able to bind to the ACE2 protein, and thus cannot easily enter the cell," said Sharma. "This not only helps us understand the mechanisms of how this virus functions, but also suggests therapeutic approaches that could be used as a potential treatment for SARS-CoV-2 infection."

The study used human induced pluripotent stem cells (iPSCs), a type of stem cell that is created in the lab from a person's blood or skin cells. iPSCs can make any cell type found in the body, each one carrying the DNA of the individual. Tissue-specific cells created in this way are used for research and for creating and testing potential disease treatments.

"This work illustrates the power of being able to study human tissue in a dish," said Eduardo Marbán, MD, PhD, executive director of the Smidt Heart Institute, who collaborated with Sharma and Svendsen on the study. "It is plausible that direct infection of cardiac muscle cells may contribute to COVID-related heart disease."

The investigators also collaborated with co-corresponding author Vaithilingaraja Arumugaswami, DVM, PhD, an associate professor of molecular and medical pharmacology at the David Geffen School of Medicine at UCLA and member of the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research. Arumugaswami provided the novel coronavirus that was added to the heart cells, and UCLA researcher Gustavo Garcia Jr. contributed essential heart cell infection experiments.

"This key experimental system could be useful to understand the differences in disease processes of related coronaviral pathogens, SARS and MERS," Arumugaswami said.

**Story Source:**

**Materials** provided by [Cedars-Sinai Medical Center](#). Note: Content may be edited for style and length.

**Journal Reference:**

1. Arun Sharma, Gustavo Garcia, Yizhou Wang, Jasmine T. Plummer, Kouki Morizono, Vaithilingaraja Arumugaswami, Clive N. Svendsen. **Human iPSC-Derived Cardiomyocytes , are Susceptible to SARS-CoV-2 Infection.** *Cell Reports Medicine*, 2020; 100052 DOI: [10.1016/j.xcrm.2020.100052](https://doi.org/10.1016/j.xcrm.2020.100052)  
<https://www.sciencedaily.com/releases/2020/06/200630155745.htm>

**hindustantimes**

DESIDOC

Thu, 02 July 2020

## Assam lab isolates Covid-19 virus in tissue culture; 4th in country to do so

*Other uses of cultures of SARS-CoV-2 include drug screening for potential drugs or drug candidates against the virus, testing effectiveness of disinfectants, use in development of therapeutic antibodies etc*

*By Utpal Parashar*

Guwahati: A government laboratory in Assam has successfully isolated the SARS-CoV-2 (Covid-19) virus becoming the fourth such facility in the country to achieve the feat.

Indian Council of Medical Research's (ICMR) Regional Medical Research Centre (RMRC) located in Lahowal in Dibrugarh district follows National Institute of Virology, Pune, Centre for Cellular and Molecular Biology, Hyderabad and Bharat Biotech, Hyderabad to be able to isolate the virus.

"The significance of Covid-19 virus isolation by team at RMRC, Dibrugarh is that live and viable SARS-CoV-2 (Covid-19 virus) can now be produced in abundance in lab as and when required," said a press release issued by RMRC-Dibrugarh.

"It is important for development of inactivated Covid-19 vaccine where virus grown in laboratory are inactivated by heat or chemical and purified for use as vaccines after pre-clinical and clinical trials," it added.

Apart from vaccine development, other uses of cultures of SARS-CoV-2 include drug screening for potential drugs or drug candidates against the virus, testing effectiveness of disinfectants, use in development of therapeutic antibodies etc.

According to scientists at RMRC, Dibrugarh all strains of SARS-CoV-2 were L-type and not S-type, which is slowly disappearing across the world.

<https://www.hindustantimes.com/india-news/assam-lab-isolates-covid-19-virus-in-tissue-culture-4th-in-country-to-do-so/story-7S9lvqbFRnKyAgLfmAKChL.html>



The Regional Medical Research Centre (RMRC) in Dibrugarh district said live and viable SARS-CoV-2 (Covid-19 virus) can now be produced in abundance in lab as and when required(HT PHOTO)

## **Blood test can predict severity of COVID-19: Study**

*The research could lead to new treatments to prevent deadly  
'cytokine storms' seen in severe cases of COVID-19, researchers say*

Washington: Doctors can examine the blood of COVID-19 patients to identify those at greatest risk of severe illness and to pinpoint those most likely to need a ventilator, according to researchers, including one of Indian-origin.

The research could lead to new treatments to prevent deadly "cytokine storms" seen in severe cases of COVID-19, the researchers said.

It also may help explain why diabetes contributes to worse outcomes in patients with the coronavirus, they said.

The scientists, including Mayuresh Abhyankar from the University of Virginia (UVA) School of Medicine in the US, found that the levels of a particular cytokine in the blood upon diagnosis could be used to predict later outcomes.

Cytokines -- proteins produced by immune cells -- are responsible for severe overreactions by the immune system, known as cytokine storms, associated with COVID-19 and other serious illnesses, the researchers said.

They said the discovery could become part of a scoring system to let doctors flag at-risk COVID-19 patients for closer monitoring and personalised interventions.

The finding also identifies cytokines doctors could target as a new treatment approach, according to the findings shared on the pre-print server medRxiv.org.

The team identified 57 COVID-19 patients treated at UVA who ultimately required a ventilator.

The researchers then tested blood samples taken from the patients within 48 hours of diagnosis or hospital admission.

They compared the results with those from patients who did not wind up needing a ventilator.

The researchers say additional research is necessary to determine how the cytokines are contributing to COVID-19 outcomes.

<https://www.deccanchronicle.com/science/science/010720/blood-test-can-predict-severity-of-covid-19-study.html>

