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# समाचार पत्रों से चयित अंश Newspapers Clippings

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*Tue, 23 June 2020*

## **Five deadly Indian tactical weapons China fears: From nuclear attack submarines to BrahMos cruise missiles**

With one of the largest defence budgets in the world, and as the world's largest arms importer, India's armed forces today field a very formidable arsenal of tactical weapons systems across their three services. Russia has long been a primary source of armaments, from nuclear attack submarines to battle tanks and fighter jets, and defence ties between the two countries have grown close over several decades providing India's armed forces with access to several unique types of armaments not offered to other export clients. India has not only purchased top of the line Russian systems, but has also acquired them in uniquely large quantities – from a massive order for five S-400 units placed in October 2018 to orders for several thousand T-72 and T-90 tanks making it the largest foreign operator of all three weapons system. Although India's relations with China have overall remained positive, clashes in the Galwan Valley area have highlighted the possibility for conflict and drew unprecedented attention to the types of assets which could prove pivotal in a conflict. The capabilities of the five most outstanding of these are explored below:

### **Su-30MKI Heavyweight Fighter**

The Su-30MKI forms the backbone of the Indian Air Force with over 250 in service and dozens more planned, and they represent the heaviest and most capable fighters in the Indian inventory. The Su-30MKI can be equipped for a strike role with the BrahMos cruise missile, and as a bomber with a range of guided munitions including both indigenous platforms and the Israeli SPICE 2000. The fighter's twin seat configuration optimises it for such a role and allows it



to accommodate a weapons systems officer behind the pilot. The Su-30MKI is particularly prized for its air to air capabilities, and deploys a wide range of anti aircraft missile types including the Russian K-100 'AWACS killer' with a 3-400km range, the R-77 and R-27ER with ranges of 110km and 130km respectively, and the Astra jointly developed with Russia with a range of approximately 105km. The fighters benefit from a very high endurance, a high speed and altitude ceiling, and a large and very powerful radar providing excellent situational awareness. The Su-30MKI is considered a match for the J-11B which forms the backbone of China's heavyweight fleet, with the Indian jet retaining a manoeuvrability advantage at short ranges due to its thrust vectoring engines. Its ability to go head to head with more elite Chinese fighter classes such as the J-16 and J-20, however, remains highly questionable – with the deployment of these new aircraft expected to raise Indian interest in acquiring more advanced next generation aircraft of its own. The Indian Defence Ministry has already shown considerable interest in acquiring the Russian Su-

57 fighter, either as part of a licence production deal or 'off the shelf,' which would help to bridge the gap with newer Chinese fighters and complement the large Su-30 fleet. Upgrades to the Su-30 based on Su-35 technologies, including integration of new AL-41 engines and an Irbis-E radar, have also been offered by Russia.

### **Akula Class Nuclear Attack Submarine**

The Soviet Union's foremost class of nuclear attack submarine, the Akula Class boast performance advantages in traditional fields of Russian superiority while also challenging the American stealth advantage with unprecedented quietness. India deploys a single one of these ships commissioned in 2012, the INS Chakra, and the ship maintains the steel double hulls typical of Soviet designs providing a survivability advantage over Western designs. The Chakra benefits from access to powerful 3M-54E Kalibr cruise missiles designed to engage ships with a sea skimming trajectory at high speeds of around Mach 3. At over \$3 billion each, the warship is among the most costly in the world and is considered the most dangerous in the Indian fleet. The Akula design has been modernised considerably since it first became operational with new armaments, improved sensors and further reduction of noise to improve survivability. The submarine represents a particularly valuable asset considering the relatively weak anti-submarine warfare capabilities of China and Pakistan, meaning that if operating in open ocean far from enemy waters it is likely to be extremely survivable. India is considering leasing two more Akula Class ships for its Navy, which would provide one of the most formidable nuclear attack submarine fleets in the world.

### **Brahmos Cruise Missile**

Jointly developed by India and Russia, and based loosely on the Russian P-800 anti ship cruise missile, separate variants of the BrahMos are fielded by the Navy, Air Force and Army for anti shipping and standoff precision strikes. The missile is capable of reaching speeds of Mach 3 and benefits from an advanced precision guidance system allowing it to engage mobile targets reliably. The missile is reported to have torn warships in half upon impact with its sheer speed, which combined with its long range and considerable payload makes it a very potent asset. Naval variants of the BrahMos have revolutionised India's long range anti shipping capabilities, although their capabilities are still relatively lacking compared to Chinese rivals such as the YJ-18 which have some similar characteristics but much longer ranges. Those in the army deployed from mobile launch vehicles have provided an effective complement to India's tactical ballistic missile arsenal. The latest variant to become operational, the air launched variant has been in service since late 2019 and is paired with India's most formidable and longest ranged fighter the Su-30MKI. Although its range is shorter than the SCALP missile which will equip India's French built Rafale fighters, the BrahMos is approximately four times as fast and is considerably more difficult to intercept. This combined with its ability to reliably engage warships, which the SCALP notably lacks, and its use of the heavier and much longer ranged Su-30MKI as a launch platform makes it a much more dangerous asset. BrahMos missiles launched by the fighters will benefit not only from the Su-30's long range, but also from their high speed and altitude ceiling which provide the missiles with considerable energy upon launch. The low altitude ceiling and below average speed of the Rafale and its much shorter range impose restrictions on its own capabilities for delivery of air to ground missiles.

### **T-90MS Battle Tank**

Following purchases of over 2500 T-72 tanks, India has moved to gradually phase the older but still formidable platforms out of frontline service in favour of the T-90MS. The tanks have been built under licence in India and over 1000 are currently in service with several hundred more on order. The underperformance of the indigenous Arjun battle tank program, over 10 years behind schedule and with capabilities which the Indian Army has been reluctant to consider sufficient, means the T-90MS is likely to retain its importance – possibly alongside the newer fourth generation T-14 in which India has also shown considerable interest. The possibility of upgrading the T-90MS with T-14 technologies, much like Russia has done with the new T-90M, also remains a significant possibility – particularly as the capabilities of rival Chinese tanks such as the Type

99A continue to improve. While China's most advanced tanks are capable of going head to head with the T-90MS, the older Type 96 which forms the bulk of Chinese armoured could well struggle particularly given the sheer numbers of Indian tanks deployed.

### **S-400 Air Defence System**

Although India has yet to receive its first S-400 batteries, the country remains by far the largest foreign client for the system having purchase five separate units for over \$5 billion. The S-400, and its more mobile counterpart the S-300V4, are considered the most capable multirole air defence systems available for export in the world today. The system is particularly prized for deployment of multiple powerful interconnected radars to provide unrivalled situational awareness. These can not only detect but also lock onto and track stealth aircraft, which is considerably more difficult. While China has not deployed any stealth fighters under its Western Theatre Command facing India, with its entire J-20 fleet thought to be deployed under the Eastern Command facing Japan, Taiwan and U.S. forces, China's emergence as a world leader in stealth technologies with considerable investment in the field has made the S-400 a valuable asset for India.

<https://www.defenceaviationpost.com/2020/06/five-deadly-indian-tactical-weapons-china-fears-from-nuclear-attack-submarines-to-brahmos-cruise-missiles/>



*Tue, 23 June 2020*

## **India Steps Up Security Along LAC, Deploys QRSAM In Ladakh Amid Chinese Air Activities**

In a significant development along the Line of Actual Control (LAC), Republic TV sources have said that in the backdrop of increased activity by the Chinese Choppers, the Indian Armed Forces have deployed Surface to Air Missiles (SAM) defence system in Ladakh area. The air defence system was deployed to take care of the area and to prevent violations by the Chinese Army, sources added.

### **QRSAM deployed at the Eastern Ladakh Sector**

Sources said that the Chinese activity was increased in the Eastern Ladakh area before the Galwan Valley incident and their choppers were spotted as they tried to enter the Indian territory. To counter any such activity by the PLA army, the Armed Forces have deployed Quick Reaction Surface to Air Missile System (QRSAM) at the Eastern Ladakh Sector.



Meanwhile, the Centre on Sunday gave the three defence forces financial powers up to Rs 500 crore per project for the acquisition of critical ammunition required in case an all-out or limited conflict breaks out, according to ANI. This move has been taken in amid the Galwan valley face-off where 20 soldiers were martyred. Similar financial powers were given to the armed forces after the Uri attack and the Balakot aerial strikes against Pakistan.

<https://idr.org/india-steps-up-security-along-lac-deploys-qrsam-in-ladakh-amid-chinese-air-activities/#more-229656>

### THE WEEK

Mon, 22 June 2020

## Niti Aayog member wants govt to stop raw material import for bullet-proof jackets from China

New Delhi, Jun 22 (PTI) Niti Aayog member VK Saraswat on Monday said Indian companies manufacturing bullet-proof jackets for the army personnel should avoid importing raw materials from China because of "inconsistencies in the quality" of the shipments.

This assumes significance as the clamour for boycott of Chinese goods has been growing louder ever since the violent clash broke out between the Indian and Chinese armies in the Galwan Valley last week.

Saraswat, also a former Defence Research and Development Organisation (DRDO) Chief, said these companies producing bullet-proof jackets for the army can get raw material from other sources that are the original equipment manufacturer (OEM) production agencies.

"Many times raw materials imported from China (to produce bullet-proof jackets) are not of good quality... We should avoid importing from Chinese sources because of inconsistencies of the raw material quality," he told PTI.

The Prime Minister's Office (PMO) had asked Niti Aayog to prepare a road map for "incentivising" domestic manufacturing of lightweight body armours and protective gears. The Bureau of Indian Standards has also finalised quality norms for body armours to be used by Indian forces.

"Our committee made very clear recommendations, we should use indigenous material as much as possible and wherever indigenous materials are not available and import is required then we should avoid import from China because of inconsistent quality," the eminent scientist emphasised.

India lost 20 of its army personnel, including a colonel, in the violent face-off on the night of June 15/16 on the border, the biggest confrontation between the militaries of India and China after their 1967 clashes in Nathu La when India lost around 80 soldiers while the death toll on the Chinese side was over 300.

The two armies were engaged in a standoff in Galwan and several other areas of eastern Ladakh since May 5 when their troops clashed on the banks of the Pangong Tso.

According to government projections, more than 3 lakh bullet-proof jackets will be required by Indian armed forces.

Indian companies were earlier procuring raw materials for bullet-proof jackets from the US and Europe. Now, most of them are being obtained from China due to lower prices.

Indian companies like Kanpur-based MKU and Tata Advanced Materials export body armour to armed forces of many countries.

If the lightweight bullet-proof vests and helmets are produced in bulk quantity within the country, it will ensure low-cost supplies and end the endless wait for foreign vendors to supply the equipment.

Meanwhile, according to sources, the government has sought product-wise details of cheap imports, comparison with domestic prices and tax disadvantage, if any, from industry to curb low quality inbound shipments especially from China and boost domestic manufacturing.

They said a high-level meeting to discuss ways to promote 'Atma Nirbhar Bharat' (self-reliant India), including cut in import dependence from China, also took place recently in the Prime Minister's office.

<https://www.theweek.in/wire-updates/business/2020/06/22/del87-biz-niti-bulletproof-jackets.html>



Tue, 23 June 2020

## **India-China standoff: Indian companies should stop importing Chinese raw material for bulletproof jackets, says VK Saraswat**

*Niti Aayog had been asked by the Prime Minister's Office (PMO) to prepare a plan to incentivise Indian manufacturers of protective gears and lightweight body armours*

Indian companies manufacturing bulletproof jackets for the Indian Army personnel should avoid importing the raw materials required for the jackets from China due to the “inconsistencies in the quality” of the materials, Niti Aayog member VK Saraswat said on Monday.

The remark made by Saraswat, a former Defence Research and Development Organisation (DRDO) Chief, gains significance in the light of the growing anti-China sentiments in the country and the clamour to boycott Chinese goods after the clash between Indian and Chinese troops in the Galwan Valley of Ladakh last week.

Saraswat was also quoted by PTI as saying that the companies procuring raw materials from China for manufacturing bulletproof jackets can also procure the materials from sources that are the original equipment manufacturer (OEM) production agencies.

The Niti Aayog member told PTI that many times the raw materials imported from China for manufacturing bulletproof jackets are not of good quality and Indian manufacturers should avoid importing from these sources due to the inconsistencies in the quality of the shipments.

Niti Aayog had been asked by the Prime Minister's Office (PMO) to prepare a plan to incentivise Indian manufacturers of protective gears and lightweight body armours. The quality norms for body armours to be used by the Indian Armed Forces have also been finalised by the Bureau of Indian Standards, the report added.

As much as possible, indigenous materials should be used, and when not possible – import from China must be avoided, the eminent scientist informed about the recommendations made by the committee.

As per government projections, the Indian Armed Forces will require over 3 lakh bulletproof jackets. The raw material for manufacturing these jackets was earlier procured from Europe and the US, but the Indian manufacturers switched to Chinese suppliers due to their lower prices.

If helmets and lightweight bullet-proof vests are produced within India, it will put an end to the long wait for supply from foreign manufacturers and also prove to be cost-effective, the report stated.

The PTI quoted sources as saying that the government has asked the industry to provide details of the cheap imports, and the tax advantage and comparison with domestic prices to boost domestic manufacturing and to curb the import of shipments from China.

Sources told PTI that at a recent meeting in the Prime Minister's office discussions were held to find ways to promote 'Atma Nirbhar Bharat' (self-reliant India), including cuts in import dependence from China.

Twenty Indian troops lost their lives in a violent face-off in the Galwan Valley of Ladakh on the night of June 15/16. It was the biggest confrontation between Indian and Chinese militaries since clashes in Nathu La in 1967 when India lost around 80 soldiers while the death toll on the Chinese side was over 300.

<https://www.financialexpress.com/defence/india-china-standoff-indian-companies-should-stop-importing-chinese-raw-material-for-bulletproof-jackets-says-vk-saraswat/2000113/>

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Tue, 23 June 2020

## **LAC face-off: India, China hold second round of Lt. Gen talks; Army Chief along with top army commanders review situation**

*The Army has already sent thousands of additional troops to forward locations along the border in the last one week. The IAF has also moved a sizable number of its frontline Sukhoi 30 MKI, Jaguar, Mirage 2000 aircraft and Apache attack helicopters to several key air bases including Leh and Srinagar following the clashes*

New Delhi: Indian and Chinese militaries on Monday held a second round of Lt General-level talks in an attempt to ease tensions between the two countries following the violent clashes in Galwan Valley that left 20 Indian Army personnel dead, even as country's top army leadership carried out a detailed review of the situation in eastern Ladakh.

The meeting began at around 11:30 am at Moldo on the Chinese side of Chushul sector in eastern Ladakh and continued till night.

The focus of the deliberations was on finalising modalities for disengagement of troops in eastern Ladakh, people familiar with the issue said.

The first round of the Lt Gen talks was held on June 6 at the same venue during which both sides finalised an agreement to disengage gradually from all standoff points beginning with Galwan Valley.

However, the situation along the border deteriorated following the violent clashes on June 15 as the two sides significantly bolstered their deployments in most areas along the 3,500-km de-facto border.

Though China has not revealed its casualty figure, there were reports that a commanding officer of the Chinese army was among those killed in the clashes. There is no official confirmation about it.

Separately, the top army commanders on Monday held a detailed deliberation on the eastern Ladakh standoff and on the overall situation along the Line of Actual Control (LAC) with China after the Galwan Valley clashes, official sources said.

On the first day of the two day conference, Army Chief Gen M M Naravane carried out a comprehensive review of India's security preparedness along the LAC with China in Ladakh, Arunachal Pradesh, Uttarakhand and Himachal Pradesh, they said.

The government has given "full freedom" to the armed forces, deployed along the 3,500-km de-facto border with China, to give a "befitting" response to any Chinese misadventure, government sources said after Defence Minister Rajnath Singh reviewed the situation in eastern Ladakh at a meeting with the top military brass on Sunday.



The Army has already sent thousands of additional troops to forward locations along the border in the last one week. The IAF has also moved a sizable number of its frontline Sukhoi 30 MKI, Jaguar, Mirage 2000 aircraft and Apache attack helicopters to several key air bases including Leh and Srinagar following the clashes.

The Indian delegation at the talks in Moldo was led by 14 Corps Commander Lt Gen Harinder Singh while the Chinese was headed by the Commander of the Tibet Military District.

Ahead of the meeting, sources said the Indian delegation would raise the Galwan Valley clashes, the most serious military confrontation between India and China in more than 50 years.

In a telephonic conversation with his Chinese counterpart Wang Yi on Wednesday, External Affairs Minister S Jaishankar called the clashes a "premeditated" action by Chinese PLA and held it directly responsible for the incident.

The Chinese soldiers used stones, nail-studded sticks, iron rods and clubs in carrying out brutal attacks on Indian soldiers after they protested the erection of a surveillance post by China on the Indian side of the Line of Actual Control in Galwan.

The sources said India would also seek restoration of status quo ante in all areas including the Pangong Tso where the two sides are on a standoff.

After the clashes, the two sides held at least three-rounds of Major-General level talks to explore ways to ease the situation between the two sides.

The two armies were engaged in a standoff in Galwan and several other areas of eastern Ladakh since May 5 when their troops clashed on the banks of the Pangong Tso.

The situation in eastern Ladakh deteriorated after around 250 Chinese and Indian soldiers were engaged in a violent face-off on May 5 and 6. The incident in Pangong Tso was followed by a similar incident in north Sikkim on May 9.

<https://economictimes.indiatimes.com/news/defence/lac-face-off-india-china-hold-second-round-of-lt-gen-talks-army-chief-along-with-top-army-commanders-review-situation/articleshow/76516741.cms>

**hindustantimes**

Tue, 23 June 2020

## **In marathon talks, India seeks de-escalation, Chinese retreat**

*The Indian side was demanding the pullback of Chinese troops from the Finger Area (a cluster of strategic features in the north bank of Pangong Tso) where the PLA has set up bunkers, pillboxes and observation posts, according to two officials aware of the developments*

*By Rahul Singh*

New Delhi: A week after a brutal clash between soldiers from the Indian Army and China's People's Liberation Army (PLA) in eastern Ladakh's Galwan Valley, top military officials from the two sides held a marathon meeting on Monday at Moldo on the Chinese side of the contested Line of Actual Control (LAC) with a focus on cooling tensions and thinning military build-up on both sides of the border.

The Indian side was demanding the pullback of Chinese troops from the Finger Area (a cluster of strategic features in the north bank of Pangong Tso) where the PLA has set up bunkers, pillboxes and observation posts, according to two officials aware of the developments. They said the army was also demanding the withdrawal of PLA troops from Galwan Valley, the site of the deadly clash on June 15, and the restoration of status quo ante in key strategic areas.

The meeting between delegations led by Lieutenant General Harinder Singh, commander of the Leh-based 14 Corps, and Major General Liu Lin, commander of the South Xinjiang military region, began around 11.30am and was on till 10.15pm, the officials cited above said.

There was no official word from the army till the time of going to print.

The two officials familiar with the talks at the military level said India was seeking an assurance from the Chinese side on ending aggression along the border, after the deadly brawl at Gawlan Valley on June 15 and another face-off Pangong Tso on May 5-6. During both skirmishes, Chinese soldiers gathered in large numbers and attacked Indian troops with stones, iron rods and nail-studded clubs.

India was also demanding the thinning of Chinese military deployments in “depth areas” on their side of the disputed border, the officials said. The aim of the talks was also to restore status quo in the Finger Area, Gogra Post-Hot Springs and Galwan Valley, they said.

According to the officials, the army was especially concerned about the PLA’s presence in the Finger Area, especially Chinese activities between Finger 4 and Finger 8 over the last seven weeks, the officials said. Chinese military positions in the Finger Area restrict the scope of the Indian Army patrolling areas New Delhi considers its territory.

India also flagged concerns about a build-up of Chinese troops, armoured vehicles and artillery units in the Gogra Post-Hot Springs sector, north of Pangong Tso. The army wants the Chinese forces to move back from their current positions to areas where they were in early April.

This was the second meeting of two officers of corps commander rank who earlier met on June 6, when the two sides reached an understanding to implement a de-escalation plan to ease rising tensions along the contested border.

But tensions peaked in the aftermath of the June 15 skirmish. It was the first deadly conflict between Indian and Chinese soldiers along the LAC in 45 years. According to India’s assessment, while the army lost 20 soldiers, the PLA’s casualties was more than twice that; but Beijing was yet to confirm the fatalities on its side.

Meanwhile, both sides have marshalled thousands of soldiers on their respective sides of the LAC, and the military build-up comprised fighter jets, helicopters, tanks, artillery guns and missile systems.

In another significant development, India changed its rules of engagement at the LAC last week, giving complete freedom of action to commanders deployed along the border to handle situations at the tactical level. Commanders are no longer bound by restrictions on the use of firearms and have full authority to respond to extraordinary situations using all resources at their disposal, as reported by Hindustan Times on Sunday.

Defence minister Rajnath Singh on Sunday made a detailed assessment of the situation at the disputed border and was briefed by the military brass about the preparations of the armed forces and their readiness to respond to any provocative actions by the Chinese forces.

And on Monday, the army’s top brass made a detailed assessment of the ground situation in eastern Ladakh. The developments along the LAC and the army’s operational readiness to handle any situation were discussed at the army commanders’ conference chaired by Army Chief General Manoj Mukund Naravane.

General Naravane will visit Leh on Tuesday for a security review of the Ladakh sector. Senior officers will brief him on the latest developments along the border. This will be his second visit to Ladakh sector after the border standoff began in early-May. He had earlier visited Leh on May 22.

On June 13, General Naravane said disengagement of Indian and Chinese forces was taking place in a “phased manner” along the LAC with China where the situation is “under control.” He said the disengagement had begun as a result of military-level talks between the two sides, including the meeting between top Indian and Chinese commanders on June 6.

Intense negotiations through diplomatic and military channels, including three rounds of talks between major general-ranked officers, led to the release of 10 Indian soldiers detained by the Chinese side during the June 15 incident.

<https://www.hindustantimes.com/india-news/in-marathon-talks-india-seeks-de-escalation-chinese-retreat/story-LdO1m8CD5jUTNPHhugAIO.html>

## Rajnath to push for expedition of defence deals during Russia visit

New Delhi: Defence Minister Rajnath Singh left for a three-day visit to Russia on Monday amid heightened tensions between India and China along the Line of Actual Control. The minister will discuss various defence deals with his counterparts which both countries have agreed upon.

Among the defence deals to be discussed, Singh is likely to bring up expediting the delivery of S-400 anti-missile system to India.

Defence deals between India and Russia are set to cross \$16 billion. Moscow has stated that it is committed to the timely implementation of contracts, including the supply of S-400 air defence systems and production of Kalashnikov rifles and Kamov helicopters.

The two countries signed 14 memorandums of understanding (MoUs) during Defexpo 2020 in Lucknow in February this year that covered development and production of land, air and naval systems and hi-tech civilian products.

Russia's state-run Rosoboronexport inked deals with the Defence Research and Development Organisation (DRDO) for advanced pyrotechnic ignition systems, Hindustan Aeronautics Limited (HAL) for export of spares and services to friendly countries, and Bharat Heavy Electricals Limited (BHEL) for land systems.

A separate MoU was signed by Russian Helicopters and Indo-Russian Helicopters Ltd for localisation of component to be used in Kamov Ka-226 helicopters. India has plans to buy 200 Ka-226 helicopters.

Indian Air Force (IAF) signed a Rs 1500 crore deal with Russia for buying R-27 air-to-air missiles. The missiles will be fitted on the IAF's multi-role Su-30MKI fighter jets. The missiles will further boost the air-to-air combat capability of the Indian Air Force.

After holding talks with top Russian military brass, Singh will attend a grand military parade in Moscow to mark the 75th anniversary of the Soviet victory over Nazi Germany in the Second World War.

On Wednesday, External Affairs Minister S Jaishankar will also attend the Russia-India-China meet. The Chinese and Russian Foreign Ministers will also be present.

The Defence Minister's visit to Russia comes as a standoff between India and China has escalated in which 20 Indian Army personnel were killed by Chinese troops in eastern Ladakh's Galwan Valley on June 15.

Before leaving for Moscow, Singh tweeted: "Leaving for Moscow on a three-day visit. The visit to Russia will give me an opportunity to hold talks on ways to further deepen the India-Russia defence and strategic partnership. I shall also be attending the 75th Victory Day Parade in Moscow."

A tri-service 75-member Indian military contingent has already reached Moscow and will participate in the parade alongside armed forces personnel from at least 11 countries.

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

<https://www.outlookindia.com/newsscroll/rajnath-to-push-for-expedition-of-defence-deals-during-russia-visit/1874048>

# Rajnath Singh's Russia visit: India to urge Russia to rush delivery of S-400 system

*The government has begun the process of filling up gaps in defence preparedness, making good pending purchases, shoring up supplies and improving inventory profile based on worst-case scenarios, including a two-front fight. According to people aware of the details, Russia appears to have bunched the delivery of India's S-400 with a couple of other countries*

*By Pranab Dhal Samanta*

New Delhi: India will press Russia to consider expediting the delivery of the S-400 Triumf anti-missile system during defence minister Rajnath Singh's three-day visit to Russia starting Monday. The urgency comes amid heightened tensions along the India-China border.

<p><b>India Has Already Made Large Payments For The Missile Defence System</b></p>			<p><b>CHINA ANGLE</b></p> <p>Beijing has strong defence relationship with Moscow; has already acquired S-400 system</p> <p>China keen to deepen ties and gain access to high-end Russian tech, especially for jet engines</p>
<p><b>THE PROBLEM</b></p> <p>Russia believed to have delayed delivery of S-400 to Dec 2021</p>	<p><b>INDIA'S REQUEST</b></p> <p>New Delhi wants to see if delivery can be expedited</p>		<p>Assurance for supply of spares</p> <p>Reliability of supplies is the other key issue</p> <p>Speeding up supply of spares for existing fleet</p> <p>Steady supplies under any political condition</p>

Moscow is believed to have delayed delivery of the \$5.4-billion system to December 2021 due to Covid-19 constraints. India had completed large payments for the system last year.

China, which also enjoys strong defence ties with Russia, has already acquired the S-400 system from its northern neighbour and this fact may have added to India's concerns. Besides, sources said, armed forces have been told to be ready for all eventualities. The government has begun the process of filling up gaps in defence preparedness, making good pending purchases, shoring up supplies and improving inventory profile based on worst-case scenarios, including a two-front fight.

According to people aware of the details, Russia appears to have bunched the delivery of India's S-400 with a couple of other countries.

New Delhi is keen to explore if a delinking of delivery is possible and a faster schedule can be worked out given the historical military relationship between the two countries.

Reliability of supplies is the other key issue on top of Singh's agenda. There are two parts to the segment — one, speed up availability of spares for existing Sukhoi and MiG fleets and second, gain an assurance that Indian supplies will not be impacted in changing political environment.

ET has learnt that this issue was discussed in detail at the highest level after India lost 20 soldiers to violence on the Line of Actual Control (LAC) with China. At that point, it was felt that a quick reach-out to Russia was necessary for defence preparedness.

While the Moscow Victory Day parade was a planned event, there were doubts of a ministerial-level representation because of the Covid-19 pandemic. However, after consultations with Prime Minister Narendra Modi, it was decided that Singh must undertake the visit as that was the best opportunity to engage the Russian government at this critical juncture.

Chinese defence minister Wei Fenghe is also likely to be present at the event. Beijing has been pushing Moscow to deepen defence cooperation and obtain access to high-end Russian technology, especially in making jet engines. China, in fact, has been quite keen to develop its defence industry on the back of Russian capabilities.

Singh is slated to have a separate bilateral meeting with his Russian counterpart Sergei Shoigu during his visit. Much of these issues will be discussed at length with him, especially on hastening deliveries for weapon systems and spares. He is also to meet deputy prime minister Yury Borisov, who also deals with military and aerospace affairs.

<https://economictimes.indiatimes.com/news/defence/rajnath-singhs-russia-visit-india-to-urge-russia-to-rush-delivery-of-s-400-system/articleshow/76501432.cms>

# ThePrint

Tue, 23 June 2020

## Army Commanders meet in Delhi to discuss India-China tensions, 'escalatory trends' at LAC

*Second phase of Army Commanders' Conference has begun in Delhi.*

*Discussion on operational preparedness along LAC, 'Tour of Duty' on the agenda*

*By Amrita Nayak Dutta*

New Delhi: As the commander of the Indian Army's 14 Corps meets his Chinese counterpart at Moldo across the Line of Actual Control, the top leadership of the Army has convened in New Delhi for the Army Commanders' Conference, where the main point of discussion will be the India-China tensions, which have worsened since the killing of 20 Indian soldiers in Galwan Valley a week ago.

Top Army sources told ThePrint that only operational matters and human resource issues will be discussed on Day One of the two-day conference Monday, as will the proposed recruitment model 'Tour of Duty', under which civilians are to be allowed to voluntarily serve in the Army for three years.



The conference is attended by top Army officials to brainstorm on new security and administrative issues, and plan roadmaps. It was set to take place in April but was postponed due to the Covid-19 outbreak and the consequent nationwide lockdown. Its first phase was held between 27 and 29 May.

### **Troop build-up in Eastern Ladakh**

Army sources said the deliberations will touch upon the current situation in Eastern Ladakh, the "escalatory trends" at the border, the Army's future course of action along the LAC, its current deficiencies, and the means to overcome them.

"It may also be discussed whether the Army would adopt a 'hot war' posture and the required emergency purchases, including more anti-riot gear and protective equipment for the troops at the border," an Army source said.

The sources further said the situation in Ladakh had necessitated a massive troop build-up along the LAC, which comes under the Eastern and Northern commands.

The source quoted above said the immediate reserve formations have been mobilised, and redeployment of other formations is likely to be discussed.

The officers will also discuss concerns about what Pakistan could be planning, considering the Army's attention at the LAC.

### **HR issues**

Apart from promotion boards, other HR issues to be discussed include the new recruitment proposal 'Tour of Duty', under which civilians can volunteer to serve in the Army for three years.

The proposal — which was being studied by the Army — is aimed at attracting youth to join, and at reducing defence pensions.

As reported by ThePrint, the idea is expected to be tested on around 100 officers and 1,000 jawans in the first go.

The proposal had stated that pension savings for just 1,000 jawans could add up to around Rs 11,000 crore, which could be given towards the modernisation of the Army.

Chief of Defence Staff Gen Bipin Rawat had said the military is also working on making the Short Service Commission more attractive, to encourage more people to join.

<https://theprint.in/defence/army-commanders-meet-in-delhi-to-discuss-india-china-tensions-escalatory-trends-at-lac/446436/>



Tue, 23 June 2020

## Top Indian Army officers discuss crisis situations on Northern, Western fronts

New Delhi: Indian Army Chief, Gen Manoj Mukund Naravane on Monday chaired the second phase of the Army Commanders Conference to review the operational situation on both the Northern and Western fronts.

All top commanders, including Northern Command chief Lt Gen Y.K. Joshi, are taking part in the two-day meet.

The army commanders have come together to discuss the whole gamut of India's operational situation on both the Northern and Western fronts.

The two day second phase of the conference follows the first phase held from May 27 to May 29.

During the first phase, Indian Army top leadership had discussed China's transgression attempts in Ladakh and Sikkim regions.

The conference was originally scheduled for April but postponed due to Covid-19 pandemic. Later, it was decided to organise it in two phases across May and June.

After the conference ends on Tuesday, Gen Naravane would leave for Ladakh and Kashmir to take stock of volatile ground situation in both places.

The army Chief's visit comes amid heightened threat in eastern Ladakh region where over thousands of Indian soldiers have been deployed a few metres away from Line of Actual Control against the toops of China's People's Liberation Army.

Gen Naravane will review the force preparedness as well deployment across the Line of Actual Control with China and the Line of Control with Pakistan.

On Monday, Corps Commanders from both Indian and Chinese sides met at Moldo on Monday to resolve the border issue and ease tension in Eastern Ladakh.

This is the second such meeting after the first one on June 6 to defuse the tensions.

The meeting between 14 Corps commander, Lt Gen Harinder Singh and South Xinjiang Military District chief Major Gen Liu Lin is on the lines of the one they held at the Chushul-Moldo border personnel meeting point in eastern Ladakh on June 6.

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

<https://www.outlookindia.com/newscroll/top-indian-army-officers-discuss-crisis-situations-on-northern-western-fronts/1873967>

## Army Chief MM Naravane to visit Leh, Kashmir on June 23 to take stock of LAC situation

*The Army Chief will review the force preparedness as well the deployment across the Line of Actual Control with China and Line of Control (LoC) with Pakistan*

*Edited By Ankita Bhandari*

New Delhi: Indian Army Chief General MM Naravane will visit Leh and Kashmir to take stock of the ground situation this week. He is expected to visit the regions on Tuesday.

The Army Chief will review the force preparedness as well the deployment across the Line of Actual Control with China and Line of Control (LoC) with Pakistan. He is likely to visit on Tuesday.



General Naravane's visit to Leh comes amid the heightened threat in eastern Ladakh region where over thousands of Indian Army men have been deployed a few metres away from the Line of Actual Control (LAC), following the bloody clash with the Chinese People's Liberation Army (PLA) a week ago.

Earlier in the day (June 22), Naravane discussed the security situation with the top Army commanders in Delhi. According to Army officials, all commanders are in the national capital for the second phase of the commanders' conference. Army Commanders Conference is being held on June 22-23 to review the operational situation on both the northern and western fronts.

On the other hand, corps commanders of the two countries' military met at Moldo-Chushul Valley on the Chinese side to resolve the border issues and ease the tension in eastern Ladakh. This was the second such meeting after the first one took place on June 6 to defuse the tensions.

The ground situation is volatile in Ladakh, and Pangong Tso can be another flashpoint after the Galwan Valley patrolling point 14 where a barbaric attack was carried on Indian troops by the Chinese army on the night of June 15.

At Pangong Tso, there is an attempt of the PLA to alter the Line of Actual Control unilaterally. The prolonged camping and a heavy presence of Chinese troops around the Pangong Lake, at a point which has been under Indian control, has emerged to be the biggest roadblock for a possible resolution to the ongoing tussle between India and China at the LAC.

The Chinese have built defences in several parts between Finger 4 and Finger 8, which have been grey zones in the past. The Chinese action in Pangong Lake is seen as an attempt to change the status quo.

The Indian Army has also enhanced deployment in the Hot Springs, Demchok, Koyul, Fukche, Dopsang, Murgo and Galwan.

In the midst of the growing tensions, India is exploring all possible military options as a response, if the Chinese aggression continues. India has also ramped up preparations on its side along the 826-km front of the Line of Actual Control in Ladakh.

<https://zeenews.india.com/india/army-chief-mm-naravane-to-visit-leh-kashmir-on-june-23-to-take-stock-of-lac-situation-2291369.html>

## India deploys specialised mountain forces to check China's LAC transgressions

*The Modi government is very unhappy that the Chinese President Xi Jinping broke all the promises by not reining his favourite PLA western theatre commander Gen Zhao Zongqi, people aware of the development said*

*By Shishir Gupta*

New Delhi: India has deployed its specialised high altitude warfare forces along the 3,488 km Line of Actual Control (LAC) to repel any transgression by the Chinese People's Liberation Army (PLA) in either western, middle or eastern sectors.

Top government sources confirmed that Indian Army has been directed to safeguard the LAC from any cross-border aggression by the PLA, which is showing hostile intent by amassing troops in a bid to cow down the Narendra Modi government.

It is understood that specialised forces trained over the past decades for fighting on the northern front have been pushed up to the frontier to impose military costs if the red flag goes up. Unlike the PLA which moves in infantry combat vehicles and paved metalled roads to move, the Indian mountain troops are trained in guerrilla warfare and fighting in high altitude as shown by them in Kargil War.



The Indian mountain troops are trained in guerrilla warfare and fighting in high altitude. (Pic Courtesy: Indian Army)

“The art of mountain fighting is the toughest as the cost of human casualties is 10 to each troop of the adversary sitting on a height. The troops from Uttarakhand, Ladakh, Gorkha, Arunachal and Sikkim have adapted to the rarefied heights over centuries and hence their capability of fighting in close quarter combats is without match. The artillery and the missiles have to have pin-pointed accuracy or else they miss the mountain target by miles,” said a former Indian Army Chief.

The other thing that works for the army is that the Tibetan plateau is flat on the Chinese side while the Indian side starts from K2 peak in Karakoram, to Nanda Devi in Uttarakhand, to Kanchenjunga in Sikkim and Namche Barwa across Arunachal Pradesh border. “In mountains, it is not only difficult to capture territory but more difficult to hold it,” a China expert with South Block said.

While India has noted with appreciation the voices coming out in its support from the Trump administration, including the President himself, the mood in Delhi is more like “atmanirbhar (self-reliant) Bharat” with no intent of asking anyone for military or diplomatic support. “I have my battalions lined up with armoured personnel carriers and artillery. India will not instigate or precipitate any skirmish but will reply to any transgression. The days of LAC nibbling are over. This is a battle of nerves and India is prepared to wait, come snow come sunshine,” said a senior minister.

The Modi government is very unhappy that the Chinese President Xi Jinping broke all the “peace and tranquility” promises by not reining his favourite PLA western theatre commander Gen Zhao Zongqi, who is insistent on imposing 1960 eastern Ladakh map based on exaggerated territorial claims on India. This map where China claims territory upto Kongka La was unveiled by then Chinese premier Chou En Lai.

Incidentally, Chou En Lai, the premier during 1962 conflict, had close links with President Xi Jinping's family and Foreign Minister Wang Yi's wife is the daughter of secretary of the former



premier. External Affairs Minister S Jaishankar father K Subrahmanyam was involved in India's war effort as an officer in the Defence Ministry.

It was only to set aside these historical baggage that Prime Minister Narendra Modi had initiated the Wuhan and Chennai understandings so that the two leaders could promote the bilateral relations post-Doklam. It is quite evident that President Xi had no such plans and has used tensions in East Ladakh to divert global attention from failure of China to alert the world about coronavirus. In the same way, another paramount leader used the 1962 conflict to deflect attention from the famine, due to failure of Great Leap Forward movement, in which millions of Chinese died.

<https://www.hindustantimes.com/india-news/india-deploys-specialised-mountain-forces-to-check-china-s-transgressions-along-lac/story-ABqjJTtoNSziOIQGfsCtPOI.html>



Tue, 23 June 2020

## Government to expedite works on 32 road projects along border with China: Officials

*The decision was taken at a high-level meeting convened by the Ministry of Home Affairs (MHA), and attended by the CPWD, BRO and ITBP among others*

New Delhi: Amidst the continuing standoff between the Indian Army and China's PLA, the Centre on Monday reviewed ongoing road projects along the Sino-Indian border, and decided to expedite work on 32 of them, officials said.

The decision was taken at a high-level meeting convened by the Ministry of Home Affairs (MHA), and attended by the Central Public Works Department (CPWD), Border Roads Organisation (BRO) and the Indo-Tibetan Border Police (ITBP) among others.

"Works will be expedited on 32 road projects along the border with China and all concerned agencies will extend cooperation to fast-track the projects," an official privy to the meeting told PTI.



An Indian army convoy moves on the Srinagar- Ladakh highway at Gagangeer, northeast of Srinagar, India, Wednesday, June 17, 2020. (Photo | AP)

A total of 73 roads are being constructed along the Sino-Indian border.

Of these, the CPWD is working on 12 and the BRO on 61, under the direct supervision of the MHA, which is the nodal authority for all border infrastructure-related projects.

The move comes amidst the ongoing row between the Indian Army and China's People's Liberation Army (PLA) in Ladakh sector.

Twenty Indian Army personnel were killed in a clash with the PLA in the night of June 15-16 in the Galwan Valley in Ladakh.

At least three vital roads are being constructed by the BRO in Ladakh, another official said.

Apart from the roads, priority will also be given to projects related to development of other border infrastructure like power, health, telecom and education.

According to the MHA officials, there has been a surge in works related to roads along the Sino-Indian border in recent years.

The formation-cutting works were completed for 470 km roads along the border in 2017-20, in comparison to just 230 km in 2008-17, the officials said.

Surface-clearing has been done for 380 km of roads in 2017-20, in comparison to just 170 km in 2008-17, they added.

Six road tunnels were constructed in 2014-20 in comparison to just one in 2008-14.

Besides, additional 19 road tunnels are under planning stage, they said, adding a total of 14,450 metres of border road bridges were completed in 2014-20 in comparison to 7,270 metres in 2008-18.

A total of 4,764 kms of roads were constructed in 2014-20 in comparison to 3,610 kms in 2008-14.

Similarly, the budget for the road projects has also been increased in recent years.

Budget for road projects per year between 2008 and 2016 was in the range of Rs 3,300 crore to Rs 4,600 crore.

In 2017-18, Rs 5450 crore were earmarked for road projects for the border areas, Rs 6,700 crore in 2018-19, Rs 8,050 crore in 2019-20, Rs 11,800 crore in 2020-21.

<https://www.newindianexpress.com/nation/2020/jun/22/government-to-expedite-works-on-32-road-projects-along-border-with-china-officials-2159934.html>

**HUFFPOST**

Tue, 23 June 2020

## How India can deter an aggressive China: Former Indian Navy Chief explains

*Admiral Arun Prakash (Retd), former Chief of Naval Staff, says the Indian Navy is well-positioned to threaten China's shipping routes in the Indian Ocean and hence its economy*  
By Akshita Jain

The clash last week between Indian and Chinese soldiers in the Galwan Valley in eastern Ladakh has prompted a discussion on the best way for India to respond to an aggressive China.

The 15 June incident left 20 Indian soldiers dead and unconfirmed reports say there are casualties on the Chinese side as well.

The clash also earned China condemnation from countries including the US. Calling China a “rogue state”, US Secretary of State Mike Pompeo accused it of undoing the gains made through institutions such as NATO. “The PLA (People’s Liberation Army) has escalated border tensions with India, the world’s most populous democracy. It’s militarising the South China Sea and illegally claiming more territory there, threatening vital sea lanes,” Pompeo said.

Admiral Arun Prakash (Retd), former Chief of Naval Staff, told *HuffPost India* in an email interview that China’s actions in the South China Sea are also a cause of concern for India because a substantial proportion of its seaborne trade and energy traffic transits through these waters.

A Vietnamese fishing vessel was rammed and sunk by the Chinese vessel in April and Beijing has also declared two new administrative districts in the South China Sea, prompting a protest from Vietnam.

Following the face-off, several analysts highlighted the need for New Delhi to strengthen the Quad (see here and here) and its maritime capabilities to put pressure on Beijing (see here and here).

Strengthening the Quad —comprising India, US, Japan and Australia— will certainly send a message of deterrence to China, said Admiral Prakash, adding that India could take the lead and motivate Quad members to become more active and visible as a grouping.

**1. US has been encouraging India to play a more prominent role in the Indo-Pacific region. Can India still manage to take on a proactive role while it's dealing with China in Ladakh as well as another upset neighbour Nepal?**

If any service is to play a role in the Indo-Pacific, it will be the Indian Navy (IN), which is not directly impacted by developments in either Ladakh or Nepal. However, it must be borne in mind that America's underlying motivation in inviting India to play a 'more prominent role' in the Indo-Pacific is selfish. It needs to relieve some of the operational load being borne by an over-stretched US Indo-Pacific Command in facing up to an overbearing China. India's concerns and interests lie mainly in the Indian Ocean Region (IOR), where its naval assets are mainly deployed, but it does have a peripheral interest in the larger Indo-Pacific. However, given India's current confrontation with China, IN deployments in the Indo-Pacific, jointly with the US Navy would send the right signals to China at this juncture.

**2. The US has called India "a pillar of our common vision for free and open Indo-Pacific". Can the US be a reliable partner for India in the Indo-Pacific?**

The phrase "common vision for a free and open Indo-Pacific" is somewhat vague and rhetorical. Many other Indo-Pacific nations could have the same vision. Each nation, however, must always act in its own national interest. Under the current Trump regime, US actions have been erratic and whimsical and it cannot be seen as a 'reliable partner'.

**3. China has ramped up activities in the South China Sea. While some observers have said that Beijing is taking advantage of the Covid-19 crisis, others have claimed these are part of a long-term strategy. How concerned should India be about China's moves in the SCS?**

While India may not have any direct stakes in the South China Sea, a substantial proportion of its seaborne trade and energy traffic transits through these waters. Therefore peace, tranquility and freedom of navigation are issues of concern to India. China has been pursuing its hegemonic objectives for many years, as part of a long-term strategy, but Covid-19 seems to have lent added impetus to its nefarious activities and India does have cause for concern.

**4. Do you think strengthening the Quad can be a way to deter China?**

It could certainly send a message of deterrence to China and it needs to be done. But China sees the Quad as a US-inspired attempt at 'containment' and has repeatedly expressed displeasure about this concept. Therefore, each Quad member (other than USA) is individually apprehensive about China's adverse reaction at a formal constitution of the Quad. Perhaps India should take the lead and motivate Quad members to become more active and visible as a grouping.

**5. Some Indian analysts suggest that India should look at alternative ways to counter China's aggression in Ladakh. One of the ways suggested is to use its naval power and put pressure on China in the Indian Ocean. How can this be achieved and is it an effective strategy?**

It is certainly a viable strategy, if you consider that: China's economy (No. 2 in the world) is underpinned by its status as the world's No.1 manufacturing and trading nation. China's booming economy and industry are entirely dependent on imported energy (oil and gas) as well as imported raw materials like iron ore, coal, copper & plastic and grains etc. The crucial fact is that over 90% of China's energy, raw material and exports travel by sea on merchant shipping. These merchant ships travel along 'sea lanes' which run from South China Sea, via Malacca Strait, across the Indian Ocean to Africa, Middle East and Europe. Thus, for thousands of miles, these sea lanes and China's shipping traffic are vulnerable to interference, interdiction or capture. Any interruption to China's shipping will upset its economy. This thought has worried China's leaders for decades, leading Hu Jintao (Xi Jinping's predecessor) to speak of the 'Malacca Dilemma'. The Indian Navy is in 'home waters' in the Indian Ocean and well-positioned to threaten China's shipping and hence its economy.

## 6. How can India materialise Modi government's SAGAR vision? Have any steps been taken in this direction?

So far, 'SAGAR' remains a slogan and lacks a viable strategy for its elaboration and implementation.

## 7. Where do you think India's strategy faltered in dealing with China along the LAC?

The fact that we have not been able to find a solution to this 70-year old boundary dispute indicates a lack of resolve and determination on part of India's politicians as well as diplomats. There are no other neighbouring nations anywhere else who have left their boundaries undetermined, unmarked and unresolved, and failed to even exchange maps. Such a situation is like a ticking time-bomb ready to explode any time, and should have been resolved decades ago through continuous negotiations.

[https://www.huffingtonpost.in/entry/india-aggressive-china-former-indian-navy-chief-admiral-arun-prakash\\_in\\_5ef04f73c5b6cef846ab8703](https://www.huffingtonpost.in/entry/india-aggressive-china-former-indian-navy-chief-admiral-arun-prakash_in_5ef04f73c5b6cef846ab8703)



**DEFENCE AVIATION POST**  
Your Connect To The World Of Defence And Aviation

*Tue, 23 June 2020*

## A Flawed and a glamorous Indian Naval strategy

There is a glaring disparity and a growing gap between the Indian Navy (IN) and People's Liberation Army Navy (PLAN). The Indian Naval fleet has an assortment of 18 conventional and nuclear submarines. According to the annual report to the US Congress PLAN has more than 60 submarines and places a high priority on modernization of its submarine force. In contrast the IN doesn't have the critical mass of submarines. Adding to the shortfall is a fleet of old conventional submarines. And the gap is increasing due to delays in submarine projects.

After the Doklam crisis a belligerent China has once again threatened the peace by clashing with India troops at Pangong lake in Ladakh and the Nuka La area in Sikkim. This has led to the death of 20 Indian soldiers including a Colonel. China has increased troop deployments and is constructing military infrastructure on the border. Strategically in response to China threat the Indian Army (IA) is upgrading military infrastructure and the Indian Air Force (IAF) has deployed air assets in the Himalayas. But the IN is constructing and inducting Aircraft Carriers



(ACs) instead of investing in submarines. The IN has inducted the former Russian AC Gorshkov while another is being indigenously constructed and two more are on the drawing boards. The IN is inducting Scorpene class submarines while the size of its submarine fleet is depleting. India's naval fleet largely consists of old Kilo class submarines close to the end of their operational framework. A majority of them have completed 80% of their service lives and a few have been upgraded. This has led to a huge gap in India's undersea strategy considering two hostile neighbors on its flanks.

<https://www.defenceaviationpost.com/2020/06/a-flawed-and-a-glamorous-indian-naval-strategy/>

Tue, 23 June 2020

## Antra Mehta becomes first woman fighter pilot from Maharashtra, Tenth in India

By Anushika Srivastava

Antra Mehta, a flying officer with the Indian Air Force is ready to soar high in the sky, but this time, as a fighter pilot. Mehta is the first woman fighter pilot from Maharashtra, and she is the 10th woman pilot across India. The Nagpur girl is an engineer and also a national level basketball player, Times Of India reported. Her advanced training will continue at the Air Force station in Bidar and Kalaikonda.

### The Passing Out Parade

A passing out parade was held at Dundigal, Hyderabad, where the 'Wings' and 'Brevets' were presented to the cadets successfully completing the Flying and Navigation training, respectively. At the academy in Hyderabad Antra was trained to fly the Pilatus PC7. Further, appearing for stage two at the Fighter Training Wing, she flew Kiran MK1 aircraft.



**Antra Mehta is the first woman fighter pilot from Maharashtra, and she is the 10th woman pilot across India.**

### What You Should Know About Her

- Antra Mehta is the first woman fighter pilot from Maharashtra and the tenth woman fighter pilot in India.
- Antra hails from Nagpur in Maharashtra.
- She is an engineer and also a national level basketball player.
- Currently, she can fly aircraft like Pilatus PC7 and Kiran MK1.
- She has been trained at the Air Force Academy, Hyderabad.

She completed her schooling from Mount Carmel High School and her engineering from Shri Ramdeobaba Kamla Nehru College of Engineering. She, as reported by TOI, always aspired to join IAF.

### The First Batch of Women Fighter Pilots

Bhawana Kanth, Mohana Singh and Avani Chaturvedi were the first women to be inducted as women fighter pilots in the IAF. For the first time, when this position was opened for women, six women had entered the training but only three could qualify for further levels.

It was in 2015 when the then Defence Minister Late Manohar Parrikar had issued a statement approving induction of women as fighter pilots in the IAF. Manohar Parrikar had described the trio's induction as 'Red Letter Day' and said that his ministry is working towards bringing total gender parity in the armed forces. "We feel quite fortunate at being the first ones. Anybody could have got the opportunity, but we have got it. We are very happy," said Bhawana Kanth when she became the first woman to be commissioned in IAF.

Among these three women, Flight Lieutenant Bhawana Kanth became the first woman fighter pilot who is capable of undertaking any mission during the daytime.

<https://www.shethepeople.tv/news/antra-mehta-first-woman-fighter-pilot-maharashtra/>

## Opinion | Catapult India's armed forces to the space age

*Letting our soldiers use heavier tactical means along the LAC should send Beijing a signal of Indian resolve against its aggression, but our defence still needs a high-tech makeover*

China's contempt for international norms and agreements in pursuit of hegemony is no secret. So, its so-called People's Liberation Army (PLA), whose violent face-off of mid-June with our troops in Ladakh left dozens dead on both sides, should not be surprised by New Delhi's decision to harden the Indian Army's rules of engagement along the Line of Actual Control (LAC) and thus let it strike adversaries faster and harder in defence of our territory. On Sunday, defence minister Rajnath Singh gave the chiefs of India's armed forces approval for a new tactical approach. This lets our ground commanders at the LAC, which separates the two countries, deploy a wide range of tactics against Chinese aggression without waiting for an okay from higher-ups. Significantly, reports suggest that it could even mean the use of firearms, barred by "peace and tranquillity" pacts signed in 1996 and 2005 by New Delhi and Beijing. The latter, it would seem, has been served a notice: The PLA will not get to barge into India without risking a serious escalation of armed hostilities. China will not be able to get away with its brute misadventures.

In terms of weaponry, this month's brawl between Indian and Chinese soldiers seemed to display Stone Age characteristics. While the dignity of death must minimize the revelation of details, what happened in Ladakh is unclear. It was not modern combat, for sure. No bullet was fired, according to the official accounts of both. The post-mortem reports of our martyrs revealed bone fractures and stab wounds. News reports spoke of injuries inflicted by rocks and clubs studded with nails or wrapped in barbed wire. The letter of past bilateral agreements was adhered to, it seems, but their spirit was flouted in a way that can only be described as primitive. The deals of 1996 and 2005 were aimed at averting skirmishes that could push India and China towards a war. As peace assurers, they have proven faulty. Hardware does not always define a level of hostility, while actions and their outcomes do.

Our response, however, should go beyond allowing LAC patrols the use of heavier arms. We should also empower our forces with livewire information drawn from satellite cameras. The LAC needs to be kept under close watch. Scanty data on actual positions in this theatre of action has made it hard for analysts to assess the situation, even as India's government spars with the Opposition over whether China is in occupation of Indian land in Galwan Valley or not. The Centre's divergent claims have stretched its credibility. Again, this lack of clarity in the age of technology seems like a throwback to olden days. Terrain scans may need to be kept confidential for a fixed period, but these should always be available, especially to fighters on the frontier. Fully-networked defence capabilities have been hyped as a "revolution in military affairs". True or not, every fighting force needs to be at the cutting edge of digital advancements. The US and China have invested big money in computer systems that use hi-tech tools to feed their infantry actionable inputs of data while on the move. India, saddled with two nuclear-armed adversaries, has learnt that it cannot rely on its arsenal of nukes to deter high-altitude intrusions. Boots on the ground still count. All the more so in tough terrain. Let's equip our soldiers well, and we could catapult the LAC theatre straight to the space age.

<https://www.livemint.com/opinion/online-views/catapult-india-s-armed-forces-to-the-space-age-11592840967576.html>

## Naval group in talks with both MDL and L&T for submarine project, says exclusivity needed

*The Rs 45,000 crore project has recently moved onto the next step with the shortlisting of two Indian shipyards – MDL and L&T – and five foreign companies they can collaborate with to acquire design and manufacturing technology*

*By Manu Pubby*

New Delhi: Leading naval manufacturer Naval Group has confirmed that it is in touch with both the Indian shipyards shortlisted for the ambitious P 75I submarine contract but believes that an exclusive arrangement needs to be worked out to take ahead the project.

The Rs 45,000 crore project has recently moved onto the next step with the shortlisting of two Indian shipyards – MDL and L&T – and five foreign companies they can collaborate with to acquire design and manufacturing technology.

The project is being processed on the Strategic Partnership model that will require the winning Indian company to manufacture six submarines in India. However, given that only two Indian shipyards are shortlisted, they have a choice of multiple foreign collaborators, leading to a potential clash of commercial interests.

Naval Group, which has manufactured the Scorpene class of submarines in India with MDL, says that the 'industrially secure way' would be to have an exclusive arrangement with just one Indian Strategic Partner.

"An exclusive arrangement with one SP might give more time to both the Original equipment manufacturer and the SP to prepare a thorough and exhaustive response to the RFP and thus provide Indian Navy with an offer with best possible solutions to all the identified requirements and minimum risks for the program over the long term. Indeed, exclusivity with a shipyard may be best cost effective and industrially secure way of responding to P75(I)," Alain Guillou, Senior Executive Vice President, Naval Group has said.

The senior executive said that the company was in touch with both the Indian companies since the shortlisting. "Like many other OEMs, we are having discussions with both SPs (L&T and MDL), who have been shortlisted rightly by the experienced Indian Navy and the government. MDL remains at core of Indian naval ship and submarine building while L&T is undoubtedly one of the biggest and qualified Indian national industrial for several sectors including strategic naval projects," he said.

Besides the Naval Group, TKMS (Germany), Navantia (Spain), Rubin Design Bureau (Russia) and DSME (South Korea) have been shortlisted for the mega project. The next stage will be preparation of techno-commercial bids by the Indian companies in collaboration with a foreign partner of their choosing.

There are still doubts however if the foreign players will need to make offers with both Indian yards or can choose to have an exclusive arrangement with just one. "As OEM, we are not in position to comment and we shall follow the process as per SP guidelines. However it is true that the time required and the associated costs to make an offer of such magnitude are very high, sometimes as high as several millions of Euros. In addition to this the confidentiality of data related to the performances and subsequent "Chinese wall" arrangement to deal between partners will cost time, dedications and efforts of all parties involved," Guillou said.



The country's second Scorpene-class submarine, INS Khanderi, can be seen in this picture (Representative image)

While technically, all five foreign technology collaborators have an equal chance of forming a winning partnership with the Indian company, the contest is expected to be a straight face off between the French Naval Group and Russia's Rubin Design Bureau.

If the process goes smoothly, the final winner could be shortlisted within two years after an exhaustive trial and evaluation exercise. However, complications in the future include the ability of foreign collaborators to adhere with Indian conditions for technology transfer, delivery timelines and the responsibility for performance.

<https://economictimes.indiatimes.com/news/defence/naval-group-in-talks-with-both-mdl-and-lt-for-submarine-project-says-exclusivity-needed/articleshow/76510517.cms>

## Science & Technology News



Tue, 23 June 2020

### Scientists provide new explanation for the far side of the Moon's strange asymmetry

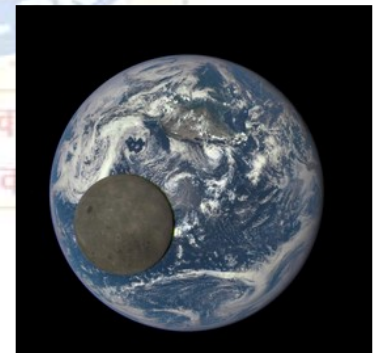
*Earth's Moon has a 'near side' that is perpetually Earth-facing and a 'far side', which always faces away from Earth. The composition of the Moon's near side is oddly different from its far side, and scientists think they finally understand why*

The Earth-Moon system's history remains mysterious. Scientists believe the two formed when a Mars-sized body collided with the proto-Earth. Earth ended up being the larger daughter of this collision and retained enough heat to become tectonically active. The Moon, being smaller, likely cooled down faster and geologically 'froze'. The apparent early dynamism of the Moon challenges this idea.

New data suggest this is because radioactive elements were distributed uniquely after the catastrophic Moon-forming collision. Earth's Moon, together with the Sun, is a dominant object in our sky and offers many observable features which keep scientists busy trying to explain how our planet and the Solar System formed. Most planets in our solar system have satellites. For example, Mars has two moons, Jupiter has 79 and Neptune has 14. Some moons are icy, some are rocky, some are still geologically active and some relatively inactive. How planets got their satellites and why they have the properties they do are questions which could shed light on many aspects of the evolution of the early Solar System.

The Moon is a relatively cold rocky body, with a limited amount of water and little tectonic processing. Scientists presently believe the Earth-Moon system formed when a Mars-sized body dubbed Theia - who in Greek mythology was the mother of Selene, the goddess of the Moon - catastrophically collided with the proto-Earth, causing the components of both bodies to mix.

The debris of this collision are thought to have fairly rapidly, perhaps over a few million years, separated to form the Earth and Moon. The Earth ended up being larger and evolved in a sweet spot in terms of its size being just right for it to become a dynamic planet with an atmosphere and oceans. Earth's Moon ended up being smaller and did not have sufficient mass to host these characteristics. Thus retaining volatile substances like water or the gases that form our atmosphere,



**IMAGE:** The composition of the Moon's near side is oddly different from that of its far side, and scientists think they finally understand why. [view more](#)



or retaining sufficient internal heat to maintain long-term planetary volcanism and tectonics, are idiosyncratic to how the Earth-Moon forming collision occurred. Decades of observations have demonstrated that lunar history was much more dynamic than expected with volcanic and magnetic activity occurring as recently as 1 billion years ago, much later than expected.

A clue as to why the near and far side of the Moon are so different comes from strong asymmetry observable in its surface features. On the Moon's perpetually Earth-facing near side, on any given night, or day, one can observe dark and light patches with the naked eye. Early astronomers named these dark regions 'maria', Latin for 'seas', thinking they were bodies of water by analogy with the Earth. Using telescopes, scientists were able to figure out over a century ago that these were not in fact seas, but more likely craters or volcanic features.

Back then, most scientists assumed the far side of the Moon, which they would never have been able to see, was more or less like the near side.

However, because the Moon is relatively close to the Earth, *only* about 380,000 km away, the Moon was the first Solar System body humans were able to explore, first using non-crewed spacecraft and then 'in person'. In the late 1950s and early 1960s, non-crewed space probes launched by the USSR returned the first images of the far side of the Moon, and scientists were surprised to find that the two sides were very different. The far side had almost no maria. Only 1% of the far side was covered with maria compared with ~31% for the near side. Scientists were puzzled, but they suspected this asymmetry was offering clues as to how the Moon formed.

In the late 1960s and early 1970s, NASA's Apollo missions landed six spacecraft on the Moon, and astronauts brought back 382 kg of Moon rocks to try to understand the origin of the Moon using chemical analysis. Having samples in hand, scientists quickly figured out the relative darkness of these patches was due to their geological composition and they were, in fact, attributable to volcanism. They also identified a new type of rock signature they named KREEP - short for rock enriched in potassium (chemical symbol K), rare-earth elements (REE, which include cerium, dysprosium, erbium, europium, and other elements which are rare on Earth) and phosphorus (chemical symbol P) - which was associated with the maria. But why volcanism and this KREEP signature should be distributed so unevenly between the near and far sides of the Moon again presented a puzzle.

Now, using a combination of observation, laboratory experiments and computer modelling, scientists from the Earth-Life Science Institute at Tokyo Institute of Technology, the University of Florida, the Carnegie Institution for Science, Towson University, NASA Johnson Space Center and the University of New Mexico have brought some new clues as to how the Moon gained its near- and far-side asymmetry. These clues are linked to an important property of KREEP.

Potassium (K), thorium (Th) and uranium (U) are, importantly for this story, radioactively unstable elements. This means that they occur in a variety of atomic configurations that have variable numbers of neutrons. These variable composition atoms are known as 'isotopes', some of which are unstable and fall apart to yield other elements, producing heat.

The heat from the radioactive decay of these elements can help melt the rocks they are contained in, which may partly explain their co-localisation.

This study shows that, in addition to enhanced heating, the inclusion of a KREEP component to rocks also lowers their melting temperature, compounding the expected volcanic activity from simply radiogenic decay models. Because most of these lava flows were emplaced early in lunar history, this study also adds constraints about the timing of the Moon's evolution and the order in which various processes occurred on the Moon.

This work required collaboration among scientists working on theory and experiment. After conducting high temperature melting experiments of rocks with various KREEP components, the team analysed the implications this would have on the timing and volume of volcanic activity at the lunar surface, providing important insight about the early stages of evolution of the Earth-Moon system.

ELSI co-author Matthieu Laneuville comments, 'Because of the relative lack of erosion processes, the Moon's surface records geological events from the Solar System's early history. In particular, regions on the Moon's near side have concentrations of radioactive elements like U and Th unlike anywhere else on the Moon. Understanding the origin of these local U and Th enrichments can help explain the early stages of the Moon's formation and, as a consequence, conditions on the early Earth.'

The results from this study suggest that the Moon's KREEP-enriched maria have influenced lunar evolution since the Moon formed. Laneuville thinks evidence for these kinds of non-symmetric, self-amplifying processes might be found in other moons in our Solar System, and may be ubiquitous on rocky bodies throughout the Universe.

### Reference

Stephen M. Elardo<sup>1,2,3\*</sup>, Matthieu Laneuville<sup>4</sup>, Francis M. McCubbin<sup>5</sup> and Charles K. Shearer<sup>6</sup>, Early crust building enhanced on the Moon's near side by mantle melting-point depression, *Nature Geoscience*, DOI: 10.1038/s41561-020-0559-4

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[https://eurekaalert.org/pub\\_releases/2020-06/tiot-spn061720.php](https://eurekaalert.org/pub_releases/2020-06/tiot-spn061720.php)



Tue, 23 June 2020

## First detection of X-Rays from a newborn star – clues to our Sun's earliest phase of evolution

- *Astronomers have reported the first detection of X-rays from the earliest phase of evolution of a star like our Sun.*
- *This discovery from NASA's Chandra X-ray Observatory may help answer questions about the Sun and Solar System as they are today.*
- *The X-ray flare came from the young "protostar" HOPS 383, about 1,400 light years from Earth, during Chandra observations taken in December 2017.*
- *This result may reset the timeline for when astronomers think Sun-like stars start blasting X-rays into space.*

By detecting an X-ray flare from a very young star using NASA's Chandra X-ray Observatory, researchers have reset the timeline for when stars like the Sun start blasting high-energy radiation into space. This is significant because it may help answer some questions about our Sun's earliest days as well as some about the Solar System today.

This artist's illustration depicts the object where astronomers discovered the X-ray flare. HOPS 383 is called a young "protostar" because it is in the earliest phase of stellar evolution that occurs right after a large cloud of gas and dust has started to collapse. Once it has matured HOPS 383, which is located about 1,400 light years from Earth, will have a mass about half that of the Sun.

The illustration shows HOPS 383 surrounded by a donut-shaped cocoon of material (dark brown) — containing about half of the protostar's mass — that is falling in towards the central star. Much of the light from the infant star in HOPS 383 is unable to pierce through this cocoon, but X-rays from the flare (blue) are powerful enough to do so. Infrared light emitted by HOPS 383 is

scattered off the inside of the cocoon (white and yellow). A version of the illustration (image on top of page) with a region of the cocoon cut out shows the bright X-ray flare from HOPS 383 and a disk of material falling towards the protostar.

Chandra observations in December 2017 revealed the X-ray flare, which lasted for about 3 hours and 20 minutes. The flare is shown as a continuous loop in the inset box of the illustration. The rapid increase and slow decrease in the amount of X-rays is similar to the behavior of X-ray flares from young stars more evolved than HOPS 383. No X-rays were detected from the protostar outside this flaring period, implying that during these times HOPS 383 was at least ten times fainter, on average, than the flare at its maximum. It is also 2,000 times more powerful than the brightest X-ray flare observed from the Sun, a middle-aged star of relatively low mass.



Credit: NASA/CXC/M. Weiss

As material from the cocoon falls inward toward the disk, there is also an exodus of gas and dust. This “outflow” removes angular momentum from the system, allowing material to fall from the disk onto the growing young protostar. Astronomers have seen such an outflow from HOPS 383 and think powerful X-ray flare like the one observed by Chandra could strip electrons from atoms at the base of it. This may be important for driving the outflow by magnetic forces.

Furthermore, when the star erupted in X-rays, it would have also likely driven energetic flows of particles that collided with dust grains located at the inner edge of the disk of material swirling around the protostar. Assuming something similar happened in our Sun, the nuclear reactions caused by this collision could explain unusual abundances of elements in certain types of meteorites found on Earth.

No other flares from HOPS 383 were detected over the course of three Chandra observations with a total exposure of just under a day. Astronomers will need longer X-ray observations to determine how frequent such flares are during this very early phase of development for stars like our Sun. A paper describing these results appeared in the journal of *Astronomy & Astrophysics*. The authors of the paper are Nicolas Grosso (Astrophysics Laboratory of Marseille at Aix-Marseille University in France), Kenji Hamaguchi (Center for Research and Exploration in Space Science & Technology and NASA’s Goddard Space Flight Center in Greenbelt, MD), David Principe (Massachusetts Institute of Technology), and Joel Kastner (Rochester Institute of Technology).

Reference:

“Evidence for magnetic activity at starbirth: a powerful X-ray flare from the Class 0 protostar HOPS 383” by Nicolas Grosso, Kenji Hamaguchi, David A. Principe and Joel H. Kastner, 15 June 2020, *Astronomy & Astrophysics*.

[DOI: 10.1051/0004-6361/202038185](https://doi.org/10.1051/0004-6361/202038185)

[arXiv: 2006.02676](https://arxiv.org/abs/2006.02676)

NASA’s Marshall Space Flight Center manages the Chandra program. The Smithsonian Astrophysical Observatory’s Chandra X-ray Center controls science and flight operations from Cambridge and Burlington, Massachusetts.

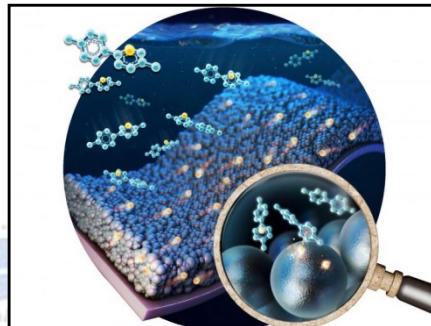
<https://scitechdaily.com/first-detection-of-x-rays-from-a-newborn-star-clues-to-our-suns-earliest-phase-of-evolution/>

## New processing technology for maximizing energy densities of high-capacity lithium-ion batteries

*A novel pretreatment strategy resolves a long-standing issue of silicon anode materials.*

*This solution-based strategy enables simple and safe processing for large-scale production*

A team of Korean researchers has developed a processing technology for maximizing energy densities of high-capacity batteries. The joint research team, which consists of Dr. Lee, Minah of the Center for Energy Storage Research and Dr. Hong, Jihyun of the Center for Energy Materials Research, both of the Clean Energy Institute, Korea Institute of Science and Technology (KIST), announced the development of a technology that provides a simple solution to a persistent issue associated with silicon-based anode (-) materials.



Recently, silicon anode materials capable of storing four times more lithium ions than graphite anode materials in lithium-ion batteries have gained growing attention due to their potential to improve the mileage of electric vehicles. But when charged in the initial cycle, a battery with a silicon-based anode loses more than 20% of the lithium ions it uses for electricity storage, which results in an issue of reduced battery capacity. To resolve this issue, a method of “lithium pre-loading,” or “pre-lithiation,” which is adding extra lithium before battery assembly to compensate the lithium loss during battery cycling, has been studied. Methods applied so far such as using lithium powder have the drawbacks regarding a safety hazard and high cost.

Dr. Lee and Dr. Hong of KIST have developed a technology that enables the pre-loading of lithium ions using a lithium-containing solution rather than the lithium powder, to prevent lithium loss in a silicon-based anode. Submerging an electrode in the tailored solution just for five minutes is enough to achieve a successful lithium pre-loading, by which electrons and lithium ions are inserted in the silicon-based anode through a spontaneous chemical reaction. What made this simple process possible was that unlike the conventional method of adding lithium powder to an electrode leading heterogeneous lithium distribution, the tailored prelithiation solution rapidly seeps into an electrode ensuring homogeneous delivery of lithium into silicon oxide.

The prelithiated silicon-based anode developed by the research team loses less than 1% of active lithium in the first charge, yielding a high initial battery efficiency of 99% or higher. A battery manufactured with the prelithated anode exhibited an energy density 25% higher than that of a comparable battery using a graphite anode available on the market (406 Wh/kg ? 504 Wh/kg).

Dr. Lee, who headed the research, commented “By incorporating a \*computational materials science technique into the design of an optimal molecular structure, we were able to improve the efficiency of a high-capacity silicon-based anode by leaps and bounds with the simple method of just controlling the solution temperature and reaction time. As this technology is readily applicable to the \*\*roll-to-roll process used in existing battery manufacturing facilities, our method has potential to achieve a breakthrough in the implementation of silicon-based anodes for practical batteries.” Co-lead researcher Dr. Hong said, “This collaborative work could be realized because KIST encourages joint research between members from different research teams.” He went on to add, “this prelithiation technology can increase the mileage of electric vehicles by a minimum of 100 km on average.”

\*Computational materials science: A research method which predicts the composition and structure of a substance through computer simulations.

\*\*Roll-to-roll: Application of the mass-printing technology to manufacturing

Reference:

“Molecularly Tailored Lithium–Arene Complex Enables Chemical Prelithiation of High-Capacity Lithium-Ion Battery Anodes” by Juyoung Jang, Inyeong Kang, Jinkwan Choi, Dr. Hyangsoo Jeong, Prof. Kyung-Woo Yi, Dr. Jihyun Hong and Dr. Minah Lee, 13 May 2020, *Angewandte Chemie: International Edition*.

[DOI: 10.1002/anie.202002411](https://doi.org/10.1002/anie.202002411)

<https://scitechdaily.com/new-processing-technology-for-maximizing-energy-densities-of-high-capacity-lithium-ion-batteries/>



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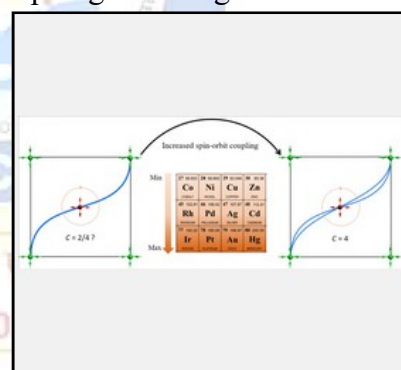
## A fresh twist in chiral topology

The concept of chirality is well-established in science: when an object cannot be superimposed on its mirror image, both the object and its mirror image are called chiral. In drug industry, for instance, more than 50% of the pharmaceutically active molecules used nowadays are chiral molecules. While one of the "enantiomers" is life-saving, its counterpart with opposite handedness may be poisonous. Another concept which has found widespread interest in contemporary materials science is topology as many so-called topological materials feature exotic properties. For example, topological materials can have protected edge states where electrons flow freely without resistance, as if a superconducting path of electrons were created at the edge of a material. Such unconventional properties are a manifestation of the quantum nature of matter. The topological materials can be classified by a special quantum number, called the topological charge or the Chern number.

Chiral topological materials have particularly unique properties which may be useful in future devices for quantum computers which could speed up computations considerably. An example for such a property is the long-sought large quantized photogalvanic current. Here a fixed dc current is generated in a chiral topological material once exposed to a circularly-polarized light, which is independent of the strength of incident radiation and its direction can be manipulated by the polarization of incident light. This phenomenon relies on the fact that the material possesses a high topological charge of 4, which is the maximum possible value in any material.

Solid-state chemists and physicists from the Max Planck Institute for Chemical Physics of Solids (MPI CPfS), the Leibniz Institute for Solid State and Materials Research (IFW), the Helmholtz-Zentrum Dresden-Rossendorf (HZDR), the Helmholtz-Zentrum Berlin fuer Materialien und Energie (HZB) and the University of Science and Technology of China, Hefei succeeded to realize this peculiar electronic state for the first time in the new chiral topological compound PtGa. Their results have been published in *Nature Communications*1.

In the study, the researchers have used exceptionally strong spin-orbit coupling in PtGa as the key parameter to clearly resolve and count the number of special topological surface states, called the Fermi arcs, which determine the topological charge. "PtGa is the best compound existing in nature with chiral B20 structure to observe spin-split Fermi arcs and realize the maximal Chern number 4 as it has the strongest spin-orbit coupling." says Kaustuv Manna, one of the authors of the study who works as a scientist at Max Planck Institute for Chemical Physics of Solids Dresden.



**Image: Counting of the topological charge, called the Chern number (C). Strong spin-orbit coupling is induced by heavier elements as indicated by the deeper background color of the pictured elements. Stronger... view more**

Theoretical calculations performed by Yan Sun and his colleagues suggested that the compound PtGa is a highly promising candidate to observe the high topological charge which was experimentally verified by Mengyu Yao and his colleagues who performed detailed angle-resolved photoemission spectroscopy (ARPES) studies. ARPES is a powerful tool to investigate the behavior of electrons in solids.

"The work by Yao et al. reveals that PtGa is a topological semimetal with a maximal chiral charge and has the strongest spin-orbital coupling among all chiral crystals identified up to date. This observation is significant and has great implications for its transport properties, such as magnetotransport." explains Ming Shi, a professor and senior scientist at Paul Scherrer Institute, Switzerland.

The study is an example for an excellent collaboration between research groups covering different areas of expertise. Within the excellence cluster ct.qmat, scientists are cooperating to investigate fundamentally new states of matter. "We are focusing on novel materials whose observed properties and functions are driven by quantum mechanical interactions at the atomic level, with semimetals such as PtGa being one of the most exciting examples," says Jochen Wosnitza, Director of the Dresden High Magnetic Field Laboratory (HLD) at HZDR, referring to one of the cluster's main research topics. Institutes participating in the cluster and collaborating on the current publication include the DRESDEN-concept partners MPI CPfS, IFW, and HZDR.

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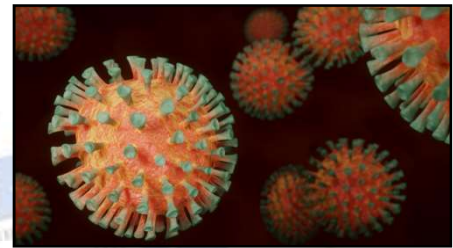


Tue, 23 June 2020

## Indian scientists find COVID-19 gene in wastewater, hailed by global community

Scientists in India have for the first time detected genetic material of the SARS-CoV-2 virus in wastewater, a breakthrough that paves the way for using wastewater-based epidemiology (WBE) for real-time surveillance of COVID-19 in the country.

The study, led by scientists in IIT-Gandhinagar, found that increased “gene copies” of the virus in Ahmedabad’s wastewater matched the incidence of the disease in the city. With this, India “joins the ranks of a handful of countries doing WBE on COVID-19”, Andrew Singer, an environmental microbiologist at the UK Centre for Ecology & Hydrology, said on Twitter.



Representative image/Credit: Pixabay Image

WBE is a promising approach to understand the status of disease outbreak in a certain catchment by monitoring viral load in wastewater.

Recent studies had reported that the novel coronavirus (SARS-CoV-2) is present in the faeces of infected individuals. Genetic material (RNA) from the virus has been found in sewage entering treatment plants.

Because treatment plants collect wastewater across large regions, measuring the level of RNA in untreated wastewater may provide a valuable insight into the percentage of people infected within a region, the researchers said.

In the latest study released on June 18, scientists from the Indian Institute of Technology (IIT) in Gandhinagar collaborated with the Gujarat Biotechnology Research Centre (GBRC) and the Gujarat Pollution Control Board (GPCB). They studied samples of wastewater collected on May 8 and May 27 from the Old Pirana Waste Water Treatment Plant (WWTP) in Ahmedabad.

The plant receives up to 106 million litres per day (MLD) of influent from the Ahmedabad Civil Hospital which is treating COVID-19 patients, explained Manish Kumar of the Discipline of Earth Sciences, IITGN, who led the research effort.

All the three SARS-CoV-2 genes -- ORF1ab, N and S -- were found in the wastewater coming into the treatment plant, said the researchers, who have submitted their study for publication in the international journal ‘Science of the Total Environment’.

They noted that no gene was spotted in the effluent leaving the plant after treatment.

The scientists said the gene copy loading - the quantity of the genetic material of the virus - detected on May 27 was almost 10 times more than that detected on May 8.

This corresponded broadly with the trajectory of the incidence of the disease. The number of active COVID-19 patients in the Ahmedabad city was two times higher on May 27 than on May 8, they said.

According to the scientists, WBE was an effective tool during outbreaks of other viruses such as poliovirus and hepatitis A.

The Ahmedabad study aims at assisting concerned authorities and policymakers to formulate or upgrade COVID-19 surveillance to have an explicit picture of the phase of the pandemic, the researchers added.

Kumar cited reports to say a WBE study has indicated the presence of the coronavirus in Italy in December 2019, way before the first confirmed case in the country.

“Developing an advanced surveillance system for environmental samples using biotechnological approaches is the need of the hour. This can help us track real time situations not only for the current pandemic but also for seasonal epidemics,” Madhvi Joshi, joint director of GBRC and one of the authors of the paper, told PTI.

According to the researchers, the number of gene copies was found comparable to that reported in the untreated wastewaters of Australia, China and Turkey, and lower than that of the US, France and Spain.

Prosun Bhattacharya of Sweden’s KTH Royal Institute of Technology noted that WBE can be unimaginably impactful in the war against COVID-19 with the right information about the catchment and number of people residing in the vicinity.

He added that the research by Kumar and his colleagues has put India on the world map pertaining to WBE surveillance.

Estimates based on European and North American data suggest that each person infected with SARS-CoV-2 will excrete millions if not billions of viral genomes into wastewater per day, they said.

This translates to between 0.15 and 141.5 million viral genomes per litre of wastewater generated, the researchers said.

While infectivity of SARS-CoV-2 through wastewater has not yet been reported, the virus potentially enters the wastewater stream from patient excretions and thus can be a great tool for pandemic monitoring, the researchers said.

Using reverse transcription PCR (RT-qPCR) -- a laboratory technique of molecular biology -- researchers should be able to detect the novel coronavirus with high sensitivity, Kumar said.

“The findings reported by Kumar and colleagues demonstrate the successful detection of SARS-CoV-2 in wastewater -- a highly valuable contribution to global SARS-CoV-2 surveillance research efforts,” Kyle Bibby, associate professor and leader of Global Collaboration on WBE, University of Notre Dame in the US, told PTI.

Bibby heads the WBE global collaboration comprising over 50 institutes and researchers.

The group is compiling and sharing all the results obtained through WBE surveillance for the global comparison, according to an article published in the journal Environmental Science & Technology.

“I would like to congratulate India as one of the elite nations in world-wide efforts in detecting and quantifying SARS-CoV-2 genetic materials in their sewage samples. Kumar and his colleagues showed the capabilities of wastewater-based epidemiology (WBE) in India, the second most populated nation with rapidly growing numbers of COVID-19 confirmed cases,” said Keisuke Kuroda, associate professor in Environmental and Civil Engineering at Toyama Prefectural University, Japan.

“This report will surely facilitate a nationwide initiative for detecting the early warning signals of COVID-19 outbreaks in various communities,” Kuroda told PTI.

Ryo Honda of Japan’s Kanazawa University, who is leading a task force on wastewater surveillance in Japan, said the study is an important step for WBE of COVID-19 in India.

<https://www.deccanherald.com/science-and-environment/indian-scientists-find-covid-19-gene-in-wastewater-hailed-by-global-community-852453.html>



## Nigerian scientists claim to have discovered COVID-19 vaccine

*A team of Nigerian scientists recently announced the discovery of a coronavirus vaccine that may help prevent the SARS-CoV-2 virus infection even as the global race to find a safe COVID-19 jab intensifies*

### Key Highlights

- **The preventive vaccine, which has been developed locally in Africa for Africans, would also work for other races**
- **Lead researcher says it would take at least 18 months before the vaccine would become available for widespread use**
- **WHO's latest data shows as many as 13 experimental coronavirus vaccine are currently being tested in humans**

Ede, Osun: A team of Nigerian scientists claimed to have discovered a unique vaccine that may help prevent the novel coronavirus infection, according to local media. The discovery of the vaccine was announced on Friday by Nigerian Universities' Scientists, under the aegis of COVID-19 Research Group, even as researchers all over the world race against time to find a cure for the SARS-CoV-2 virus, which has so far killed at least 465,300 people globally.

Dr Oladipo Kolawole, a specialist in Medical Virology, Immunology and Bioinformatics, at Adeleke University, Ede in Osun, and leader of the research team, said during a news conference that the vaccine was being developed locally in Africa for Africans, reported *The Guardian Nigeria*. According to Kolawole, the unnamed vaccine, when unveiled, would also work for other races.

Kolawole, however, said that it would take a minimum of 18 months before the vaccine would become available to the public for widespread use since a lot of analysis and trials as well as approvals by medical authorities were required.

Kolawole said the research initially received funding - roughly 7.8 million Nigerian nairas (\$20,000) - from the Trinity Immunodeficient Laboratory and Helix Biogen Consult, Ogbomosho. He further added that the team had been working extensively by exploring the genome of the SARS-CoV-2 virus from samples across Africa to select the best potential vaccine candidates.

He added that the researchers had been able to pick the best potential COVID-19 vaccine candidates and had made the possible latent constructs after trying out some selected processes of vaccine development.

Meanwhile, Prof Solomon Adebola, the Acting Vice-Chancellor of the university, said the university was poised to assist in the funding of the research with a view to bringing the vaccine to the limelight, the report added.

"We are glad that a vaccine that will provide a solution to a global problem like coronavirus pandemic is coming from the garden. It is our passion to be a solution provider to such a global pandemic, and we are ready to throw our weights behind the team and make the vaccine a reality," Adebola said.

Furthermore, prof Julius Oloke, the Head, Coordinating Unit of the Research Group and Vice-Chancellor of Precious Cornerstone University, Ibadan, said the vaccine was real.

"The vaccine is real. We have validated it several times. It is targeted at Africans, but will also work for other races. It will work. It cannot be faked. This is a result of the determination. It took a



Nigerian scientists claim to have discovered COVID-19 vaccine | Photo Credit: iStock Images

lot of scientific efforts. The population of those that need vaccines is more than those that need drugs. That is why the research focussed on a vaccine,” he was quoted as saying by the report.

As per the World Health Organization (WHO), at least 13 experimental COVID-19 vaccines are currently being tested in humans and more than 120 candidates are in earlier stages of development.

<https://www.timesnownews.com/health/article/nigerian-scientists-claim-to-have-discovered-covid-19-vaccine/609878>



Tue, 23 June 2020

## Antibody levels in recovered COVID-19 patients decline quickly: Research

*The research highlights the risks of using COVID-19 ‘immunity passports’ and supports the prolonged use of public health interventions such as social distancing and isolating high-risk groups, researchers said*

Levels of an antibody found in recovered COVID-19 patients fell sharply in 2-3 months after infection for both symptomatic and asymptomatic patients, according to a Chinese study, raising questions about the length of any immunity against the novel coronavirus.

The research, published in Nature Medicine on June 18, highlights the risks of using COVID-19 ‘immunity passports’ and supports the prolonged use of public health interventions such as social distancing and isolating high-risk groups, researchers said.

Health authorities in some countries such as Germany are debating the ethics and practicalities of allowing people who test positive for antibodies to move more freely than others who don’t.

The research, which studied 37 symptomatic patients and 37 asymptomatic patients, found that of those who tested positive for the presence of the IgG antibody, one of the main types of antibodies induced after infection, over 90 per cent showed sharp declines in 2-3 months.

The median percentage decrease was more than 70 per cent for both symptomatic and asymptomatic patients.

For neutralising serum antibodies, the median percentage of decrease for symptomatic individuals was 11.7 per cent, while for asymptomatic individuals it was 8.3 per cent.

The study was conducted by researchers at Chongqing Medical University, a branch of the Chinese Center for Disease Control and Prevention and other institutes.

Jin Dong-Yan, a virology professor at the University of Hong Kong who was not part of the research group, said the study does not negate the possibility that other parts of the immune system could offer protection.

Some cells memorize how to cope with a virus when first infected and can muster effective protection if there is a second round of infection, he said. Scientists are still investigating whether this mechanism works for the new coronavirus.

“The finding in this paper doesn’t mean the sky is falling,” he said, also noting that number of patients studied was small.

<https://www.expresspharma.in/covid19-updates/antibody-levels-in-recovered-covid-19-patients-decline-quickly-research/>

# Your risk of severe COVID-19 may be affected by blood type, new genetic analysis suggests

*People with blood type O may have a reduced risk of developing severe symptoms*

*By Mindy Weisberger*

Genes associated with certain blood types may increase the risk of severe COVID-19 infections, leading to respiratory failure and death, a new study suggests.

The study authors found that people with blood type A were 50% more likely than people with other blood types to experience severe COVID-19 symptoms and respiratory failure. By comparison, people with blood type O had a 50% reduced risk of developing severe symptoms of COVID-19 — the disease caused by the novel coronavirus — or those severe enough to require oxygen or a ventilator.

Scientists uncovered the connection between blood type and COVID-19 outcome using a genome-wide association study. By looking at the single-letter changes in many genes across a large population, researchers can pinpoint gene variants that may be tied to disease risk, according to the National Human Genome Research Institute.

Two prior studies have hinted at the possibility of a link between blood types and risk factors for COVID-19, Live Science previously reported. Different teams of researchers found that people with blood type A had a higher risk of developing COVID-19, compared with people who had other blood types, and that people with blood type O were less likely to contract the disease.

However, these studies were released on the preprint database medRxiv — on March 27 and on April 11 — and were not peer-reviewed.

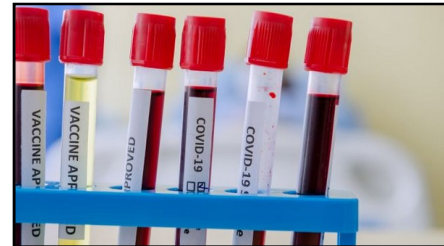
In the new study, researchers identified two regions in the genome where genetic variants were linked to severe cases of COVID-19 and a higher risk of death; in one of these regions was a gene that determines blood type. They published their findings online June 17 in the *New England Journal of Medicine*.

The researchers sampled the genomes of 1,610 COVID-19 patients and more than 1,300 healthy blood donors from Italy and Spain, and analyzed more than 8 million single-letter changes in the DNA code, called single nucleotide polymorphisms, or SNPs (pronounce "snips"). There are millions of SNPs sprinkled throughout a person's genome, and they can be used as markers for locating genes associated with disease, according to the U.S. National Library of Medicine.

The study authors pinpointed regions of the genome that were linked to respiratory failure from COVID-19 — symptoms severe enough to require supplemental oxygen or the use of a mechanical ventilator. One signal originated in a region that included genes linked to immune response in the lungs. The other signal came from a region that also codes for blood type, enabling the researchers to confirm "a potential involvement of the ABO blood-group system in COVID-19," they wrote in the study. This link suggests that blood type may be connected to the severity of respiratory symptoms.

The other region they identified contained six genes, some of which interact with the ACE2 receptor that SARs-CoV-2 targets, while others are tied to chemicals that interact with immune cells in the lung. It's not clear which of these genes play a role in disease susceptibility.

"A genetic test and a person's blood type might provide useful tools for identifying those who may be at greater risk of serious illness," Francis Collins, director of the National Institutes of Health, said in a statement about the new study.



Scientists identified a genetic link between blood type and susceptibility to severe respiratory distress from COVID-19.

"The hope is that these and other findings yet to come will point the way to a more thorough understanding of the biology of COVID-19," Collins said.

However, many other factors also determine how dramatically an individual is affected by the illness.

Underlying health conditions such as heart disease, chronic lung disease and diabetes greatly increase the chances of getting very sick or dying from COVID-19. Indeed, while older people are generally considered to be more vulnerable to severe cases of COVID-19, that could be explained by the chronic medical conditions that often accompany aging, Live Science previously reported.

<https://www.livescience.com/covid-19-blood-type.html>

## Tulane News

Tue, 23 June 2020

### Tulane University researchers develop synthetic antibody against COVID-19

By Keith Brannon

Scientists working to develop drugs against COVID-19 are focused on interrupting its interaction with ACE2, an enzyme the spike protein on the surface of the coronavirus latches onto, like a key, to enter and infect healthy cells.

Researchers at Tulane University School of Medicine have designed a synthetic protein that acts as a decoy to intercept and neutralize the virus before it can attach to ACE2 to cause infection. The protein, MDR504, effectively blocked the SARS-COV-2 virus in cell cultures, according to early research published on bioRxiv, a preprint server for scholarly articles in the health sciences that are not yet peer-reviewed.

"Unlike other agents in development against the virus, this protein is engineered to go to the lungs to neutralize the virus before it can infect lung cells," said lead study author Dr. Jay Kolls, John W Deming Endowed Chair in Internal Medicine at Tulane.

Researchers fused a modified version of the ACE2 protein to the end of an antibody to create MDR504. In the study using a mouse model, they showed that the drug circulated in blood and lung tissue at levels likely to be effective against the virus.

In addition to a treatment, the drug could be used as a pre- or post-exposure therapy for healthcare workers, first responders and vulnerable populations at highest risk. It also could be used to prevent infection in patients with underlying illness who couldn't receive a vaccine.

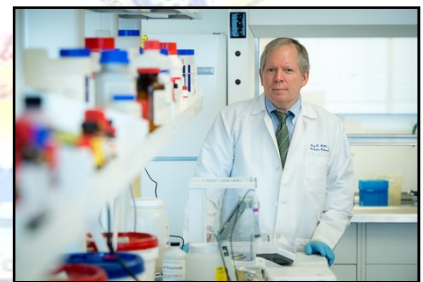
Preliminary research shows that the drug could work at relatively low doses, Kolls said.

"Based on our data, we think it would work as an injection either once every two weeks or maybe even once a month," Kolls said.

The concept behind the compound is similar to Enbrel, which is used to treat arthritis and other autoimmune disorders.

Tulane and Kolls are working with MDR Logix, LLC, a New Orleans based biotech company, to commercialize the discovery to begin a phase I clinical trial.

<https://news.tulane.edu/pr/tulane-university-researchers-develop-synthetic-antibody-against-covid-19>



Jay Kolls, MD, professor of medicine and pediatrics and the John W. Deming Endowed Chair in Internal Medicine. (Photograph by Paula Burch-Celentano)

