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# समाचार पत्रों से चयित अंश Newspapers Clippings

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

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Wed, 14 Oct 2020

## **BrahMos test with indigenous components has gone up now: DRDO Chairman Dr G Satheesh Reddy**

*By Simran Kashyap*

New Delhi: DRDO Chairman Dr G Satheesh Reddy on Wednesday said that Most of the indigenous systems, incorporated now, have functioned to full satisfaction & the indigenous content has gone up in BrahMos now.

Speaking to media, Reddy said, "BrahMos is supersonic cruise missile. Test is done primarily to enhance indigenous content in missile. Many indigenous systems incorporated in BrahMos missile system have been flight tested, along with extended range."

"It was a successful mission. Most of the indigenous systems, incorporated now, have functioned to full satisfaction & the indigenous content has gone up in BrahMos now," DRDO Chief G Satheesh Reddy on test-firing of extended range BrahMos supersonic cruise missile on September.

India on Wednesday successfully test-fired the extended range BrahMos supersonic missile which can hit targets at more than 400 kilometers range. The missile was launched around 10.30 am from a mobile launcher at the Integrated Test Range (ITR) in Balasore district.

The tests were carried out under PJ-10 project of Defence Research and Development Organisation (DRDO). This was the second test firing of the supersonic missile. The airframe and booster of the missile are indigenous.

Since September 7, the DRDO has carried out ten test firings of a wide array of missiles-roughly one every three days. These missiles range from the nuclear-capable Shaurya-a ground-launched variant of the submarine-launched B-05 ballistic missile-the air-launched Anti Radiation Missile 'Rudram' and tactical missiles like the yet to be named laser-guided Anti Tank Guided Missile.

<https://www.oneindia.com/india/brahmos-test-with-indigenous-components-has-gone-up-now-drdo-chairman-dr-g-satheesh-reddy-3163151.html>



## Army introduces compulsory psychological training for all soldiers in Jammu and Kashmir

*Special emphasis has been laid on ensuring there are no civilian casualties during the operations since 5 August 2019, when the Modi government scrapped Article 370*

*By Snehesh Alex Philip*

Khrew, Kashmir: In a first, the Army has introduced a compulsory psychological training module for all soldiers posted in Jammu and Kashmir where they are heavily involved in anti-terrorism and anti-infiltration operations.

According to Army sources, the module has been introduced at the elite 15 Corps Battle School (CBS) in Khrew in Awantipora area of Pulwama district. The institute trains all soldiers — irrespective of the rank — under a reorientation programme after they are posted to the Line of Control (LoC) and in Jammu and Kashmir.

The reorientation programme for those posted at the Line of Control (LoC) lasts 14 days, and 28 days for those sent into the hinterland. The new psychological training module has been introduced as part of this regular programme.

A senior officer involved in the induction of troops into J&K and at the LoC said the psychological training period was introduced for the first time early this year.

The Defence Institute of Psychological Research (DIPR), a lab of the Defence Research and Development Organisation (DRDO), has designed this module. The lab conducts research in psychology for armed forces personnel.

DIPR officials had visited the CBS last year. Accordingly, specialised training was introduced for combat stress management in the CBS, with a focus on operations in Kashmir.

The institute spread over 150 acres has multiple firing ranges, obstacle courses and even a model village for the soldiers to get a sense of what to expect, and the sensitivities to be kept in mind, while operating in the hinterland.

Every month, about 3,000 soldiers undergo training at CBS.

### **Focus on ‘just conduct’**

Sources said the Army has been focusing on not just people-friendly operations in the hinterland but also on overall “just conduct” in soldiers’ dealing with the civilian population.

“While of course the soldiers undergo an initiation process and get physically trained for dynamics in the hinterland and the LoC, the idea is to increase the cognitive memory of the subconscious mind of the rules of engagement and just conduct,” said a second officer.

Sources said the Army conducts about 30,000 operations in the region annually, but even a single case of misconduct or violation of rules of engagement can be blown out of proportion casting aspersions on the other 29,999 operations.

These operations include not just encounters but also dominance patrol and search operations, besides others.

The sources said the five tenets of training at the CBS are — good faith, minimum force, impartiality, necessity of force and just conduct.



A view of the 15 Corps Battle School in Khrew in Jammu and Kashmir's Pulwama district. | Photo: Snehesh Alex Philip/ThePrint

## Avoiding collateral damage

Since 5 August 2019, when the Narendra Modi government scrapped Article 370 and divided the erstwhile state of J&K into two union territories, special emphasis has been laid on ensuring there are no civilian casualties during the operations.

“We have been extremely cautious of the dynamics in play. Every soldier has been told not to allow any chance of civilian casualty or undesired damage to property even at the cost of terrorists escaping in an operation,” a third officer said, adding that “not a single civilian should die due to security forces”.

The sources said 30 civilians have been killed in Kashmir since 1 January this year, of which 22 were killed by terrorists. Five were killed in ceasefire violations while three were killed in crossfire during encounters with security forces. None died in Army operations.

They said the Army is not looking at killing of a raw recruit as a kinetic success, adding that the focus is on ensuring more surrenders, which are often dubbed as arrests to ensure safety of the subject concerned.

<https://theprint.in/defence/army-introduces-compulsory-psychological-training-for-all-soldiers-in-jammu-and-kashmir/522598/>



Tue, 13 Oct 2020

## What is SMART test and why is it important?

*A successful flight test of the Supersonic Missile Assisted Release of Torpedo (SMART) from Wheeler Island off the coast of Odisha was conducted by the Defence Research and Development Organisation (DRDO). Let us read in detail about it*

*By Shikha Goyal*

SMART stands for the Supersonic Missile Assisted Release of Torpedo. The successful flight of SMART from Wheeler Island off the coast of Odisha was conducted by the DRDO. The test followed the successful test-firing of a nuclear-capable hypersonic missile 'Shaurya' which is indigenously developed.

Let us tell you that the Outer Wheeler Island in Bhadrak district is formally named as APJ Abdul Kalam Island by the Odisha government in 2017. It was a tribute to the former President on his second death anniversary.

### What is the SMART system?

For anti-submarine warfare operations (ASW) which is far beyond torpedo range, SMART is a missile assisted release of lightweight anti-Submarine Torpedo System.

Torpedos are self-propelled weapons that travel underwater to hit a target and are limited by their range. DRDO undertook a project to build capacity to launch torpedos assisted by missiles in the mid-2010. The first known flight test of the system was conducted on 4 October, 2020 (Monday).

### About Torpedo

It is a cigar-shaped, self-propelled underwater weapon. It was launched from a submarine, surface vessel, or airplane. With the hulls of surface vessels and submarines, it is designed for exploding upon contact. The first indigenous heavyweight ship is Varunastra that was launched as an anti-submarine electric torpedo.



SMART Test

### **What does the SMART system comprise?**

The mechanism is comprised in which the torpedo is launched. It was launched from a supersonic missile system with certain modifications. To a far longer range than its own, it would take the torpedo.

For example, a torpedo having a range of a few kilometres can be sent a distance to the tune of 1000 km by the missile system from where the torpedo is launched.

As per the DRDO official, the system also gives flexibility in terms of the missile system's launch platform.

### **Functioning of SMART**

When it had been launched from a warship or a truck-based coastal battery, it takes off like a regular supersonic missile. In the air, it covers most of its flight at lower altitudes with a two-way data link from the warship or an airborne submarine target detection system. The exact location of the hostile submarine is also provided by it basically to correct its flight path midway. When it comes closer to the submerged submarine, the missile will eject the torpedo system into the water. And then the torpedo will start moving towards its target to take out the submarine.

### **Technologies that are required for SMART are developed in:**

In various DRDO laboratories including Defence Research and Development Laboratory (DRDL) and Research Centre Imarat (RCI), both in Hyderabad; Aerial Delivery Research and Development Establishment (ADRDE) in Agra; and Naval Science and Technology Laboratory (NSTL) Visakhapatnam technologies are developed that are required for SMART.

### **What takes place at the test?**

As discussed above the test was conducted from the Wheeler Island off the coast of Odisha. As per DRDO, all the objectives of the mission like the missile's flight up to the designated range and altitude, separation of its nose cone, the release of the torpedo, and deployment of Velocity Reduction Mechanism (VRM) were met perfectly.

The lightweight category of an Anti-submarine torpedo was used. The test also follows another crucial test two days ago of the nuclear-capable Shaurya missile. It is a land-based parallel of the submarine-launched K-15 missile.

### **SMART Test significance**

The strategic capabilities of the country's maritime will strengthen and for stand-off capability, it is a major breakthrough in anti-submarine warfare.

In 2003, Project 28 was approved. It is a class of anti-submarine warship corvettes presently with the Indian Navy it is in service. It consists of INS Kamorta, INS Kadmatt, INS Kiltan, and INS Kavaratti.

The Indian Navy programme Project 75 entails building six Scorpene-Class attack submarines including Kalvari, Khanderi, Karanj, Vela, Vagir, and Vagsheer.

According to the DRDO Chairman Dr. G Satheesh Reddy, "SMART is a game-changing technology demonstration in anti-submarine warfare. India's anti-submarine warfare capacity building is crucial in light of China's growing influence within the Indian Ocean region."

<https://www.jagranjosh.com/general-knowledge/smart-test-1602488776-1>

## Parliament panel to visit Ladakh on October 28-29 amid India-China standoff

*The visit was finalised after Chowdhury wrote to Lok Sabha Speaker Om Birla last month suggesting that the PAC visit the Ladakh sector to interact with soldiers deployed there and understand their working conditions and requirements*

*By Rahul Singh*

New Delhi: A group of parliamentarians is set to visit the Ladakh sector to get first-hand insights into aspects related to high-altitude clothing for soldiers, housing and rations at a time when India and China are locked in a border row and efforts to reduce friction have made no headway, officials familiar with the developments said Tuesday.

The members of the Public Accounts Committee (PAC), headed by Congress MP Adhir Ranjan Chowdhury, are likely to visit Leh on October 28-29, the officials said.

The visit was finalised after Chowdhury wrote to Lok Sabha Speaker Om Birla last month suggesting that the PAC visit the Ladakh sector to interact with soldiers deployed there and understand their working conditions and requirements.

The committee is currently examining a recent report by the Comptroller and Auditor General (CAG) that had pointed out deficiencies in high-altitude clothing and equipment and the need to equip soldiers with proper gear.

The PAC discussed some issues related to rations and clothing with chief of defence staff (CDS) General Bipin Rawat during a meeting on September 6, the officials said. At this meeting, the PAC chairman asked the CDS to consider a tour for the MPs to the Ladakh sector, following which Chowdhury wrote to Birla. The PAC is expected to meet on October 23 to finalise its itinerary.

In a report tabled in Parliament in February, the national auditor had drawn attention to the shortage of essential gear, clothing and rations being faced by soldiers deployed in high-altitude areas such as Siachen and Ladakh.

There was a critical shortage of snow goggles and troops were not issued multi-purpose boots between November 2015 and September 2016, a press statement issued by the CAG had then said. However, reacting to the CAG report, senior army officials had said that the deficiencies had been taken care of and each soldier deployed in Siachen was supplied with gear worth Rs 1 lakh.

The MPs are likely to be briefed by senior army officials and Defence Research and Development Organisation (DRDO) Scientists during the visit. The PAC scrutinises the appropriation accounts of the government and the reports prepared by the CAG. The PAC's Leh



In a report tabled in Parliament in February, the national auditor had drawn attention to the shortage of essential gear, clothing and rations being faced by soldiers deployed in high-altitude areas such as Siachen and Lada(ANI File)

visit comes at a time when both Indian and Chinese forces have made arrangements for a long haul in the eastern Ladakh theatre.

<https://www.hindustantimes.com/india-news/parliament-panel-to-visit-ladakh-on-october-28-29-amid-india-china-standoff/story-DmxN35t5yORO9iqiFbw2MJ.html>

india.com

Wed, 14 Oct 2020

## Indian Army's Fire and Fury Corps in Leh gets Lt Gen PGK Menon as its new Head

*The officer commanded a Rashtriya Rifles unit in the Kashmir valley, an Infantry Brigade along the Line of Control in Jammu and Kashmir and an Infantry Division in the Eastern Sector, he said*

*Edited By Priyanka*

Srinagar: Lt Gen PGK Menon on Tuesday took over command of Leh-based Fire and Fury Corps of the Indian Army, a Defence spokesperson said here.

The officer commanded a Rashtriya Rifles unit in the Kashmir valley, an Infantry Brigade along the Line of Control in Jammu and Kashmir and an Infantry Division in the Eastern Sector, he said.

"The General Officer has had a distinguished career in the Indian Army, tenating a number of important command and staff appointments," the spokesperson said.

Before assuming command of the Fire and Fury Corps, Lt Gen Menon was tenating the appointment of Director General, Recruiting at New Delhi.

Lt Gen Menon exhorted all ranks to continue to discharge their duties with the same commitment and zeal and always be prepared to deal with any threat to national security, the spokesperson said.

He urged them to continue to keep 'Nation First' in all their endeavours.

Lt Gen Menon succeeded Lt Gen Harinder Singh, who in his farewell message conveyed his gratitude and deep appreciation to all ranks of the Fire and Fury Corps for their professionalism and steadfast dedication in the service of the nation even in the most hostile terrain, weather and altitude challenges faced by any army in the world. (With inputs from PTI)

<https://www.india.com/news/india/indian-armys-fire-and-fury-corps-in-leh-gets-new-head-in-lt-gen-p-g-k-menon-4172078/>



Lt Gen PGK Menon takes over the command of 'Fire & Fury Corps', from Lt Gen Harinder Singh. (Photo: ANI)



## Indian Army is always prepared; they usher on winters with strong foot, efficacy, and vigilance

*Even if the border stand-off was not there with China's PLA and Indian Army, it takes enough for our troops to keep themselves fully prepared for the harsh winter conditions annually*

*By Sayan Chatterjee*

New Delhi: The life of a soldier in harsh conditions is something we know little about from the civil side of the street. The close actuality we claim to know of our Army is as a battle-hardened force that stands tall and firm with the advent of winters every year securing our borders from any perceived threats at the highest of the highest battlefields within the territory of India.

Be it the contended Siachen Glacier, or Ladakh which has been there in the national news for quite some time now. Even if the border stand-off was not there with China's PLA and Indian Army, it takes enough for our troops to keep themselves fully prepared for the harsh winter conditions annually.

Yes, this year it comes to our notice catching the eyeballs because the Indian government has never deployed such large forces (Army, Air Force and Paramilitary Forces) in the Ladakh region like this before.

In the coming months, road facilities will be challenging in the Ladakh region, hence, the need for winter stocking is huge for the humans out there, be it a civilian or the military forces, but it shall iron out with the redeemer – our air warriors. IAF and Army Aviation Corps to fulfill the requirement for essential daily supply and movement of troops as and when required.

As reported by many, temperatures in the higher reaches of Ladakh have already started dipping below minus 5 degrees Celsius, to which the Army is in full swing procuring tents, fibreglass huts and special winter clothing for its troops. And this harshness of winter should not be of paramount concern for any neighbouring nation, as they are already aware of many corps from Indian Army who are specialized in mountain warfare. Some of them are even hushed in terms of their exposure to any public domain.

So, it is ideal for the neighbouring nations to know that Winter is coming, but at least they would know what snow could be there underneath. It is better to be realistic, so to understand the challenges (if any) realistically before we move to ponder on Indian Army's preparation.

### **Is winter challenging?**

The challenge is expected to be very distinct from what Indian soldiers have faced in previous years. But that does not mean the troops would stand in a position of a disadvantage as far as their operational readiness is concerned.

In general, the Indian Armed Forces were stationed at the bases and returned after patrolling on the LAC. But this year, many troops have been deployed in some overhead shelters on the LAC, where no one has stayed before since 1962. So, that features in as an unknown terrain, but that is where their yearlong training and experience factors in to withstand a challenge like this.

Challenges like limited road infrastructure, lack of drinking water, lack of medical facilities can easily be ruled out with the help of aerial supports. Yes, if mother nature goes harsh this year more



As reported by many, temperatures in the higher reaches of Ladakh have already started dipping below minus 5 degrees Celsius, to which the Army is in full swing procuring tents, fibreglass huts and special winter clothing for its troops. (Image: Facebook)

chances of frozen injuries and diseases like hypothermia can be envisaged. But that is not certain and equally impacting for any opponent out there as well.

Avalanche in eastern Ladakh all through this winter could be a possible challenge, along the Line of Actual Control.

Lack of fresh drinking water for the Indian troops, as rivers freeze and the lake water in the region, is not potable. So, getting drinking water for the troops, and fuel for cooking and to keep them warm, aside from the rations, will be the other logistical challenges in the approaching months.

Due to the Low temperatures and wind chill factor at high altitudes lowers the temperature by 1 degree Celsius for every 3 km/h wind speed. In such situations, the installation of a post requires logistic planning to avoid tentages being blown or huts being blocked by heavy snowfall. It becomes impossible for a Regimental Medical Officer (RMO) to take care of an entire battalion of about 900 soldiers, which is spread over multiple positions.

Whilst explaining this curiosity, Maj. Arun Prakash Ambathy (Veteran, Indian Army) said, “Winters is one of our central themes of warfare. What is so unusual about it? All facets of our strategic planning, preparation, training, and administrative deployments are made keeping the adversities in mind. Indian Armed Forces are always winter-ready. We do not need to separately train ourselves to face the winters. On a lighter note, we say to winters that here we are to meet you. Not the climate to us”!

### **How the Indian Army is preparing?**

Apart from a large number of Indian Air Force transport aircraft, such as the US-built C-17 and C-130J and the Russian-built IL-76, India has deployed more than 6,000 army trucks to supply fuel and food to Ladakh.

The fuel required for all military equipment in Ladakh, from heaters to tanks and is being transported to Ladakh and stored at designated locations in the area. Each of these dumps has the capacity to store 4 lakh litres of fuel. Over the years, India has built several undisclosed fuel pumps in Ladakh.

A special winter-grade diesel and kerosene, which remains unaffected to -33 ° C, is being stored in Ladakh for use during harsh winters. This special grade of fuel was launched by the Indian Oil Corporation last year.

The army not only needs to bring fuel and ration to Ladakh and store it, but it should distribute to its posts and camps in the forward areas which is done through aerial routes using army and air force helicopters.

The advanced winter stocking for 30,000 troops, amounting to 35,000 tonnes of rations and kerosene oil, were already reported back a couple of months ago. Besides food and kerosene oil, the troops would need special tents and shelters, as well as adequate numbers of extreme cold conditional (ECC) clothing.

The army has stocked high-energy rations, and in winter, soldiers have been given special winter clothes and prefabricated tents to survive the winters. The crucial thing to note in all these preparations is that much of the route leading to Ladakh gets snowed-in after October, and therefore most of the supplies will have to be brought to the LAC in advance. At the same time, you cannot lose sight of Kargil and the Line of Control and Siachen Glacier. They will also continue to need the supplies to sustain the winter.

During winter, all surface sources of freshwater freezes, the army has engaged geologists to search for underground sources of water as well. We can say in the summer season, the Chinese Army could stay in front of the Indian Army for some time, but if we talk about the winter season, we do not think that the Chinese army will be able to stay in front of the Indian Army much longer. Every conquest needs preparation, and it seems the Indian Army with its glorious lineage is quite rationally prepared.

Furthermore, increased importance has always been placed on mental health for our Indian warriors. Not only is it a measure of overall fitness, but also a measure of overall health. To obtain

the dexterity needed to deal with the psychological pressures in any adverse conditions. Indian Army is skilled to train their mind as they do for their physical regime.

Mental toughness and resilience are tremendously important for both men and women in the Indian Armed Forces, and that is what makes them ever ready to succeed under stressful situations. The mental toughness of a soldier in India is an attitude and self-esteem, and nothing less.

*(The writer is a Delhi-based independent contributor to print and online publications. He is a DCC qualified defence beat writer)*

<https://www.thestatesman.com/features/indian-army-always-prepared-usher-winters-strong-foot-efficacy-vigilance-1502929352.html>

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## Snipers Only Shoot to Kill

*Indian forces have traditionally neglected the sophisticated weapons, but the Army, ITBP and NSG are seeking to swiftly acquire them before the end-December deadline foreclosing the import of sniper rifles kicks in*

*By Rahul Bedi*

Chandigarh: Sniping is a highly skilled, precision killing business for most armed forces, but one that has been employed desultorily by India's military, and even more randomly by its paramilitaries, deployed widely along its restive borders and against terrorists on internal security (IS) duties.

But official sources said in recent months, the Army, the Indo-Tibetan Border Police (ITBP), employed along the disputed – and now restive – Line of Actual Control (LAC) with China, and the National Security Guard (NSG) are seeking to up their sniping activity by importing small numbers of specialist rifles.

All three organisations are seeking to swiftly acquire these sophisticated weapons before the end-December deadline foreclosing the import of sniper rifles by the Ministry of Defence (MoD) kicks in. Sniper rifles are included in the MoD's 'negative list', issued in early August that embargoes the import of 101 defence items in a bid to fast-track the government's Atamirbhar Bharat initiative to achieve self-sufficiency in armaments.

Earlier, in February 2019, the Army had inducted some 30-odd bolt-action .338 Scorpion TGT sniper rifles from Victrix Armaments of Italy and M95 rifles from the US company Barrett as an 'emergency purchase', employing them along the Line of Control (LoC) in Kashmir to counter sustained sniping by the Pakistani Army.

### Failed tenders

Alongside, India's MoD is reportedly poised to resurrect its earlier 2018 request for proposal (RfP), or tender, to import 5,719 8.6mm sniper rifles and 5 million rounds of specialised ammunition for both the Army and the Indian Air Force (IAF). The previous RfP had included the import of an equal number of rifles, but double the amount of ammunition or 10.5 million rounds. It had also required transferring technology to the state-owned Ordnance Factory Board (OFB) and domestic private sector companies, to locally manufacture an additional 4.60 million 8.6mm ammunition rounds, which posed problems and was eventually responsible for the tender being scrapped.

All four overseas vendors declined to bid on the grounds that transferring technology for the ammunition for a mere 4.6 million rounds was 'commercially unviable'. The proposed delivery



A Barrett M95 sniper. Photo: Outisnn/Wikimedi Commons CC BY SA 3.0

schedule of the rifles – 5,507 for the Army and 212 for the IAF's Garud Commando force – stipulated by the MoD too posed glitches. The tender had required the shortlisted manufacturer to deliver the first lot of 707 rifles within six months of the contract being signed, and the remaining 4,472 supplied in batches of 1,200 units each over the next 30 months, unaware that such distinct weapons are not bulk-produced.

“The RfP was badly conceived, particularly with regard to the ammunition component, leaving the MoD no choice but to withdraw it,” said Brigadier Rahul Bhonsle (retd), director of Security Risks Asia, a New Delhi-based defence management consultancy. A follow-on RfP is likely to be issued sometime soon, he added.

A previous sniper rifle tender in 2009-2010 was similarly terminated due to the Army's laughable and amateurish qualitative requirements (QRs) drawn up for them, that failed in mandating accuracy standards at a minimum range of 800 metres and absurdly required them to be fitted with a bayonet.

It was incomprehensible to the handful of vendors to determine why the rifle, purposed for employment at a distance of over 800 metres, needed a bayonet that is normally used by infantry soldiers in close combat. The unclear RfP also failed to differentiate between a bolt action or semi-automatic sniper rifle model, a critical QR determinant.

The Indian Navy, on the other hand, was more professional in its approach and in late 2016, acquired 177 Sako TIKKA t3 TAC 7.62x51mm bolt action sniper rifles from Italy's Beretta for Rs 20 crore. Selected over UK's Steel Core Designs Thunderbolt SC-76 model, the Sako rifle was acquired to upgrade the Navy's Marine Commando (MARCOS) firepower and included 100,000 rounds of 7.62x51mm expert Match grade ammunition. In recent years, the secretive MARCOS have been increasingly employed on anti-piracy missions in the Gulf of Aden and the Strait of Malacca and, on occasion even on counter-terrorist operations in Kashmir.

Meanwhile, the ITBP, ranged beside the Army along the LAC in eastern Ladakh against China's People's Liberation Army (PLA), for its part recently tendered for 358 7.62x51mm bolt-action sniper rifles based on QR's formulated by the NSG with its relatively extended sniping experience. Its RfP requires the proposed rifles to be fitted with integrated telescopic sights, including for low-light conditions, and the ability to function in temperatures as low as minus 30 degrees Celsius, that prevail in the upper Himalayan reaches of eastern Ladakh during winter. Presently, the ITBP employs the Austrian Steyr SSG-69 bolt-action rifle with a 3,700 metre kill range and the 7.62x54mm Soviet-designed semi-automatic Dragunov SVD sniping rifle with a 1,300 metre range, that first entered Indian Army service in the mid-1980s.

Nonetheless, despite inducting the Dragunov sniper rifle, its employment over decades by the Army was at best ad hoc, confined largely to picking off low-value targets along the LoC in a tit-for-tat competition that raged along the unresolved restive mountainous frontier. But despite inducting the Dragunov sniper rifle, its employment over decades was at best ad hoc, confined largely to picking off low-value targets along the LoC. For, unlike their Western counterparts, the 3,500-4,000 army snipers – around 10 per infantry battalion – remain little better than amateurs compared to their Western, and even Chinese counterparts.

They lack adequate training, suitable weaponry and specialised supplementary paraphernalia like accurate imported Match ammunition, hand-held laser range finders, night sights and related hardware, essential to accomplish this highly skilled and deathly mission. Army shooters were routinely issued inefficient OFB-produced ammunition, which experts dismissed as 'wholly inaccurate' and one that defeated the very purpose of sniping.

All that is required of the army's Non-Commissioned Officer (NCO) snipers is merely good marksmanship, and one that gets them temporarily tasked with sniping in careers spanning variegated assignments. Not for them the kudos, fearful glamour or mystique attached to snipers in foreign armies or the *esprit d corps* of belonging to an elite band.

### **‘No attempt at building up the ethos’**

A special badge to boost the snipers’ image, similar to what prevailed in other world armies, was introduced in the late 1990s by army chief General S. Padmanabhan, but was withdrawn soon after, as it proved unworkable. Earning the prestigious badge required three confirmed sniper kills. But senior officers said non-snipers or part-time snipers, using assault and other rifles, frequently claimed the designated scalps, thereby becoming eligible for the insignia, which was considered improper.

And with the insignia’s abandonment went whatever fleeting support there had been from the Army Headquarters in promoting the tactical efficaciousness of snipers and establishing a dedicated corps of military ‘hit men’ who potentially can alter, not only the course of battles and politics, but also history with their kills.

“There has been no attempt at building up the ethos of sniping in the army or any of the other security agencies barring some Special Forces units, the NSGs Special Action Group (SAG) and the Special Group (SG) of the shadowy Special Frontier Force (SFF),” lamented a retired three-star special forces officer. Training of infantry snipers remains rudimentary, he declared, adding that their skilful employment can impose caution, cause attrition and demoralise the enemy.

After all, snipers – an 18th century term derived from the game bird, snipe, that is difficult to hunt as it efficiently uses camouflage to remain undetected – can end up saving many lives with one well-aimed round by relieving hijacks, hostage situations and even apocalyptic incidents like the November 2008 Mumbai terrorist strike that claimed 166 lives.

Through history, snipers have been grudgingly, albeit fearfully glorified, and in recent years their lethal calling has been the focus of several hauntingly successful Hollywood movies like *The Deer Hunter* in 1978, which ended up as a metaphor for the Vietnam War itself. *Enemy at the Gates* is another fictionalised biopic of the legendary Soviet sniper Vasily Zaytsev and WW2 hero participating in the Battle of Stalingrad in 1942-43.

Years later, renegade snipers from opposing sides dominated Yugoslavia’s civil war and these shooters emerged, in a sense, as the deadly leitmotif of the bitter ethnic clash in Eastern Europe through the 1990s that claimed thousands of lives. And, closer home in something long forgotten, many officers from the hapless expeditionary Indian Peace Keeping Force (IPKF) to Sri Lanka in the late 1980s were assassinated by rebel Tamil Tiger snipers using assault rifles. Ironically, some of these snipers had been instructed by India’s Research and Analysis Wing or RAW. The Tiger rebels invariably targeted Indian Army officers, confident that neutralising them would demoralise the Force.

“The sub-conventional warfare that India today faces mandates acquiring certain specialist skills,” retired Lieutenant General Vijay Kapur said, adding that snipers should constitute an essential part of this unconventional response. It is high time, the military analyst declared, that the Indian Army awoke to this reality.

### **Indian Army’s training for snipers**

The Indian Army treats sniping training cursorily. Two man sniper teams – the shooter and his interchangeable buddy or spotter – attend 4-6 weeks elementary and inadequate training capsules at the Infantry School at Mhow in Madhya Pradesh. Unlike in India, the latter in foreign armies is an equally skilled marksman but one who specialises in target and atmospheric observation, handling location security and communications and, in some instances even directing artillery fire and close air support from forward positions.

This instruction at Mhow includes a combination of firing practice and rudimentary attempts to mentally attune the marksman and his buddy to patiently await their quarry through aerobic and yoga lessons and breathing exercises to enhance concentration. Professional snipers abroad, however, are tutored, amongst other rigours, in the art of camouflage and deception, trained to stop breathing and reduce their heartbeats to the barest minimum whilst firing, as even the minutest unsynchronised twitch or movement can prove calamitous in securing their target. They are also trained to control their bladders and Pakistan’s Pathan tribesmen, who were considered by the

British as the world's most patient and competent snipers, use leaves to urinate so as not to make a noise or leave any tell-tale sign of their presence.

Despite a tradition of mythological marksmen like Dronacharya and Arjuna, the Army also had no nucleus of sniper instructors, as none had been nurtured as no foreign, friendly military was willing to instruct Indian soldiers in this speciality. The handful of NSG shooters who, some years ago had undergone sniping instruction abroad in countries like Israel, were too few in number to institutionally amplify this expertise in any meaningful manner. And the first two special forces officers who, after much negotiation and persuasion, attended a snipers intervention course in France in the late 1970s, with the intent of returning home on specialised appointment, were soon diverted to other assignments that did not require their newly acquired skills.

One rare instance, however, of India's security forces having effectively employed sniping involved NSG sharpshooters during Operation Black Thunder in May 1988 to lift the siege of the Golden Temple in Amritsar by Sikh terrorists. Crouched atop buildings overlooking the Temple complex, NSG sharpshooters with their favoured 7.62X51mm German Heckler & Koch gas-operated semi-automatic PSG1 A1 sniper rifles, eliminated at least five of the besieging well-armed, trained and committed Sikh separatists, successfully bringing the operation to fruition, with no casualties to the security forces. The PSG1 A1s were successfully employed once again by the NSG's SAG army commandoes during the 2008 Mumbai terrorist siege.

### **Bolt-action vs semi-automatic-recoil rifles**

Meanwhile, in professional sniping circles, the rivalry between a bolt-action and a semi-automatic-recoil or gas operated-sniper rifle has never been satisfactorily resolved, and it's unlikely it ever will. Experts maintain both types had operational advantages and disadvantages and that large numbers of each kind had been inducted for military and law enforcement tasks around the world.

Users claim that the bolt-action sniper rifle, considered by many shooters as the 'purist's' weapon, is easier to maintain, more reliable, accurate and lighter and with fewer moving parts in its mechanism, is easy to assemble. Whilst firing, its only moving parts were the pin and spring, greatly mitigating any chance of either a malfunction, or any of its rounds being thrown off target.

But some Western, particularly US Army snipers aver that semi-automatic sniping rifles had a definite tactical advantage over the bolt action model. They reason that fundamentally with a semi-automatic rifle, the shooter can keep his eye on the target through his telescope, if a second shot is needed, which he could immediately take.

In contrast, the bolt-action rifle shooter can do one of two things when he misses: chamber a new round into the breech, taking his eye off his objective, thus temporarily losing sight of it; or alternately, continue to observe his target and then cycle the bolt later, but once again crucially losing sight of it. Either way, the bolt-action rifle marksman is unable to take a follow-up shot instantly with the necessary sight correction, by which time his quarry – in all probability, alerted to the danger – shifts or worse, disappears.

Specialists claimed that because of this drawback, many militaries and law enforcement agencies worldwide have switched to semi-automatic sniper rifles, due largely to the rapidity of firing additional, follow-up rounds without reloading. A police semi-automatic sniper rifle, for instance, can be used in situations requiring a single shooter to engage multiple targets in quick succession; his military equivalent can be equally effective using this model in a target-rich environment.

A riveting 1944 German army snipers training black and white film, stresses how the sharpshooter must evaluate the minutest details in his environment, developing primeval instincts of the hunter in the fatal battle of nerves with his victim. He needs to be precise, for once he reveals his firing position, he is vulnerable and needs to either make a getaway or shift location swiftly as the enemy would be seeking him. In multiple target situations, however, snipers can use relocation effectively, not only to spawn chaos and confusion in enemy ranks, but also to eliminate the wind factor which may be more advantageous elsewhere.

The police or paramilitary sniper, on the other hand operating in a controlled environment, tries to get as close to his quarry as is possible and fires normally from a comfortable or flat surface. However, unlike the military sniper, the inherent disadvantage he operates under is that a miss could mean hostage deaths; a miss by a military sniper, on the other hand, could go unnoticed, resulting in no immediate crisis except to the shooter.

In short, one man's fate comes from another man's – or sniper's – wait.

<https://thewire.in/security/indian-army-snipers-loc-feature>

# THE ECONOMIC TIMES

Wed, 14 Oct 2020

## Experts debate the necessity of second Mountain Strike Corps for China border

### Synopsis

**The 17 MSC got stalled due to a financial crunch, and is operational today with just one Division, as against originally envisaged two Divisions. The only operational Division under the 17 MSC is the 59 Div with both—the Div and the Corps headquartered in Panagarh. The 59 Div has six Brigades under it, of which three are Infantry and one each of Engineers, Air Defence and Artillery.**

New Delhi: The very first China-centric Mountain Strike Corps (MSC) which was envisaged a decade ago had its blueprint rolling in 2013 with an initial raising cost of approximately Rs 65,000 crore. But with the India-China border standoff entering its sixth month now, experts are talking about the requirement of a second MSC for China.

The 17 MSC got stalled due to a financial crunch, and is operational today with just one Division, as against originally envisaged two Divisions. The only operational Division under the 17 MSC is the 59 Div with both the Div and the Corps headquartered in Panagarh. The 59 Div has six Brigades under it, of which three are Infantry and one each of Engineers, Air Defence and Artillery (which has recently been added).

There are mixed voices from military experts about the need for a second MSC.

Former governor of Arunachal Pradesh and Army Chief J.J. Singh is of the opinion that a second mountain strike corps is a need of the hour, "This was a well thought out strategy. In fact Panagarh was chosen as headquarter of the MSC during my time and Pranab Mukherjee was the Defence Minister then. What is effective at the Ladakh Line of Actual Control (LAC) is not effective at the McMahon Line. The terrain and conditions are separate, therefore physical challenges are different, hence different kind of capabilities are required. About costs, we are a big country, and we have to defend our borders. This is a large unresolved border approximately 4,000 kms, and at some places it merges with Pakistan. Thinking of expenditure at the cost of losing sovereignty is not a wise idea."

However not all senior military experts support the idea and rather back modernization over manpower.

Former General-Officer-Commanding of the Srinagar-based 15 Corps Lt-Gen Satish Dua says, "Force structures are decided by operational requirement which depends on threat analysis, which in turn is a function of terrain and force application. Plains and deserts can't be compared with



Indian Army troops during a mock drill practice in Leh

mountains. It is not about number of forces arrayed against an adversary. Forces are adequate, we need to modernize them more. Capability building is more important than bean count."

Former Northern Army Commander retired Lt-Gen D.S. Hooda opines the same line of thought, "There should be more enhanced capability, more fire power, better infrastructure, radar surveillance, electronic warfare and cyber capabilities rather than more boots on ground. There is a cost to it, therefore having greater fighting capabilities rather than additional soldiers is a better idea."

Major General B.K. Sharma, Director, United Service Institution of India, however, differs and argues for an optimum mix, "While theaterization is the long term solution, but in the interim, besides additional forces for Eastern Ladakh, we need two MSC one for Ladakh and Middle Sector and another for the Eastern command."

Sharma adds: "However, any force structuring and development should have an optimum mix of boots on ground and high-end technology. The new strike corps must be equipped with optimum ISR, long range targeting platforms, high mobility transportation means, EW, AD and dynamic logistic support capabilities to operate in super high altitude terrain on sustained basis, as PLA enjoys significant competitive advantage in the technologically empowered Rocket Force and Strategic Support Force."

A second Corps would be considered wishful as the present MSC, raised for an offensive role, has remained unfinished due to fund-crunch. A second one would be in the same mould, hence it is imperative to calculate costs.

A three-star officer offers a cost-effective solution, "Composite Brigades with support elements in permanent positions can be used as a modular concept. These composite brigades can be deployed within a short duration. The Chinese PLA follows this concept which they call the Combined Arms Brigade. A composite brigade with fighting elements from all arms permanently together is easier to deploy as it trains together and has a common command and control. A more modernized army compared to a manned army is the need of the hour. This has been tried successfully by the Indian Army in the form of the Integrated Battle Groups (IBG)."

A composite brigade concept was tested in 2019 by the then Army Chief General Bipin Rawat in the form of IBG in a training exercise in the eastern sector with the aim to ratify quick mobilization and launching an offensive in the high altitude mountainous terrain, as the 17 Corps though headquartered in the East, is responsible for the entire 4,000-kilometer India-China border which includes the eastern McMahon Line in Arunachal Pradesh and the LAC in Ladakh. The three IBGs anticipated under the 17 Corps are equivalent to a Brigade in manpower and capability, aimed at striking swiftly and launching controlled offensives in high altitude.

<https://economictimes.indiatimes.com/news/defence/experts-debate-the-necessity-of-second-mountain-strike-corps-for-china-border/articleshow/78638401.cms>



## Indian Navy Ship-Builder behind lethal Warships & Submarines goes public amid ongoing stand-off with China

By Smiriti Chaudhary

Mazagon Dock Shipbuilders launched its Initial Public Offer (IPO) on the Indian stock exchanges opening at 216.25 rupees, 49% higher than its opening price of 145 rupees on Monday.

Mazagon Dock Shipbuilders Limited is a major manufacturer of Indian Navy warships and submarines. Under Modi government's push to 'Make in India' campaign and 'Atmanirbhar Bharat' (self-reliant India), the company's IPO saw the highest demand so far this year and was oversubscribed 157.4 times between September 29 and October 1.

In the backdrop of India China conflict on the border and China's growing expansionism in the Indian Ocean and the South China Sea, the state-owned company got an extra push.

Investor confidence reflects the heightened wish to counter China and maintain a strong maritime force in case the situation escalates any further.

*"Mazagon Dock is the most important state-run enterprise for the defence of India as it is the only submarine builder for the navy," N.C. Bipindra, a New Delhi-based defence and strategic affairs analyst told NAR.*

Bipindra also said that the Mazagon shipyard builds at least 50% of the Indian Navy warships and submarines, while three other government-owned warship builders take care of the rest of the requirements of the Indian Navy.

*"Mazagon Dock arms the Indian Navy with the most modern warships and submarines, which enables India to defend and protect its maritime interests not only in the Indian Ocean region but also beyond, in the South China Sea."*

*"The Atmanirbhar plan will positively impact private and public shipyards. Also, manufacturing of ships has been placed under the negative list," Vice Admiral Narayan Prasad, chairman and managing director at the shipyard under the Ministry of Defence, had told BloombergQuint in an interview.*

*"Future order books worth Rs 90,000 crore for submarines and destroyers are in the offing for the shipping defence industry.*

<https://eurasianimes.com/indian-navy-ship-builder-behind-lethal-warships-submarines-goes-public-amid-ongoing-stand-off-with-china/>



Wed, 14 Oct 2020

## After submarine, India agrees to supply more military equipment to Myanmar; move aimed at countering China's influence

The recent visit of Indian Army Chief General Mukund Naravane and Foreign Secretary Harsh Vardhan Shringla to Myanmar could result in New Delhi supplying military equipment to the Tatmadaw (Myanmar's military).

During the visit of the Army Chief and the Foreign Secretary, India agreed to provide artillery guns, ammunition for T-72 tanks, radars, sonars and 500 bullet proof jackets to Myanmar's military, *StratNews Global* reports.

The move, reports say, is aimed at countering Chinese influence in Myanmar.

China has been growing its influence in countries around India. Supplying military equipment to these countries is one of doing so.

In recent years, China has supplied submarines and surface warships to the Bangladesh Navy. It has also been a major supplier to the Tatmadaw.

Maintaining relations with Myanmar's military is important because it remains one of the most influential player in the country's politics.

This is not India's first effort towards reducing Myanmar's military dependence on China. India is currently in the process of transferring one of its Russian-origin conventional submarines to the Myanmar Navy. The boat has been refurbished in India by the Visakhapatnam-based Hindustan Shipyard Limited.

India's decision to supply a submarine to Myanmar despite facing a shortage of under sea platforms itself points towards its willingness and the necessity to prevent China from gaining a foothold in the Indian Ocean Region.

In 2017, India had supplied torpedoes to the Myanmar Navy. It has also sold sonars and radars to Myanmar in the past for its Kyan Sittha-class frigates.

<https://swarajyamag.com/insta/after-submarine-india-agrees-to-supply-more-military-equipment-to-myanmar-move-aimed-at-countering-chinas-influence>



Myanmar Army Chief calls on Prime Minister Modi.

## The Tribune

Wed, 14 Oct 2020

### Seoul seeks closer defence ties with India

*Wants support for WTO DG position, bats for two-plus-two talks*

New Delhi: South Korea has suggested the revival of in-person diplomacy, including two-plus-two talks with India, during a meeting of its first Vice Foreign Minister Choi Jong-kun with Indian ambassador in Seoul Sripriya Ranganathan.

Seoul's proposal for a two plus two with India or a simultaneous meeting of foreign and defence ministers from both countries has been aired at a time when the US is keen on an informal expansion of Quad. The countries that could be a part of an extended Quad include South Korea.

During the talks, South Korea also sought Indian support for its Trade Minister Yoo Myung-hee candidature for the WTO DG's post. Yoo has entered the final round of the selection process and is competing with Ngozi Okonjo-Iweala of Nigeria. The WTO is expected to announce the decision on the new leader around early November.

Ranganathan and Choi also agreed to continue efforts to deepen bilateral cooperation, especially in defence and people-to-people exchanges, according to a South Korean Foreign Ministry statement. "Delighted to call on the first Vice Foreign Minister and hear firsthand his thoughts on how best to strengthen the already robust India-ROK relationship even more," said Ranganathan in a social media post.

Choi concurred with the Indian envoy on the need to continue close communication via virtual meetings between the two governments and agreed to seek ways to resume high-level talks.

Separately, South Korean President Moon Jae-in, in a special missive, said, "India means a lot to us, given the fact that it is the world's second most populous nation and a key partner for my administration's New Southern Policy."

<https://www.tribuneindia.com/news/nation/seoul-seeks-closer-defence-ties-with-india-155342>



Wed, 14 Oct 2020

## **Exclusive: Indian armed forces devise 'BR' plan to counter China and Pakistan**

*Amid simmering tensions between India and China along Line of Actual Control (LAC) in Eastern Ladakh, Indian armed forces have devised a 'BR' plan to tackle both China and Pakistan*

*By Krishna Mihan Mishra, Edited By Tanweer Azam*

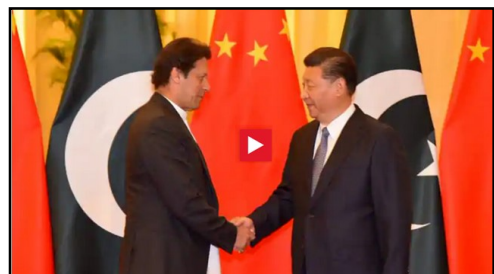
### **Highlights**

- 1. Amid simmering tensions between India and China along Line of Actual Control (LAC) in Eastern Ladakh, Indian armed forces have devised a 'BR' plan to tackle both China and Pakistan.**
- 2. It is to be noted Indian Army and Indian Air Force is on full alert to counter any threat emanating from China and Pakistan at the borders.**
- 3. Army sources have informed Zee News that Bhisma Tanks are being deployed at the LAC to counter Chinese People's Liberation Army.**

Amid simmering tensions between India and China along Line of Actual Control (LAC) in Eastern Ladakh, Indian armed forces have devised a 'BR' plan to tackle both China and Pakistan.

It is to be noted Indian Army and Indian Air Force is on full alert to counter any threat emanating from China and Pakistan at the borders and now India has come up with BR plan to teach a lesson to Beijing and Islamabad if they plan to indulge in some unwanted activities along the LAC and LoC respectively.

Army sources have informed Zee News that Bhisma Tanks are being deployed at the LAC to counter Chinese People's Liberation Army. India Army has already deployed powerful Bhisma tanks at a height of around 17,000 feet in Eastern Ladakh to send a clear message to China that it will face huge losses if it tries to change the status quo at the LAC. On the other hand China has deployed T-63 and T-99 tanks near the LAC but experts maintain that Indian Bhisma tanks are much more powerful than the Chinese tanks.



The R or Rafale plan of India is also giving sleepless nights to both Chinese and Pakistan forces. Few days ago, Pakistan Army Chief General Bajwa has said expressed his fear about Rafale fighter jets, which India has acquired from France. Recently, Pakistan Air Force chief said that India is planning to use Rafale fighter aircraft to launch attack on Pakistan.

Meanwhile, the 7th Corps Commander level meeting between India and China to address the situation at LAC in Eastern Ladakh ended at around 11:30 PM on Monday (October 12) after around 11 hours.

Before the meeting, it was said that India will press for early and complete disengagement of troops by China from all friction points in eastern Ladakh during the talks at Chushul.

In a related development, Union Defence Minister Rajnath Singh said on Monday at China is creating a dispute at the LAC as if it was part of a "mission". Singh, however, asserted that Prime Minister Narendra Modi-led government at the Centre is committed face the situations along the frontiers resolutely.

<https://zeenews.india.com/india/exclusive-indian-armed-forces-devise-br-plan-to-counter-china-and-pakistan-2316997.html>

## Science & Technology News



Wed, 14 Oct 2020

# Gaganyaan: ISRO's human spaceflight project launch soon, says Dr K Sivan

*India has signed 250 documents in the field of Space cooperation with 59 countries, these are to advance India's capabilities and also to help other space-aspiring nations to benefit from space, said ISRO Chairman Dr. K. Sivan*

*By Sidharth M P, Edited By Tanweer Azam*

### **Highlights:**

- **India has signed 250 documents in the field of Space cooperation with 59 countries, said ISRO Chairman Dr. K. Sivan.**
- **He added that India's major cooperation in the space technology field was with Russia, USA, France Japan and Israel, elaborating on the ongoing and future projects.**
- **The Chairman of India's space agency was speaking at the plenary session of the International Astronautical Congress (IAC) 2020.**

India has signed 250 documents in the field of Space cooperation with 59 countries, these are to advance India's capabilities and also to help other space-aspiring nations to benefit from space, said ISRO Chairman Dr. K. Sivan. He added that India's major cooperation in the space technology field was with Russia, USA, France Japan and Israel, elaborating on the ongoing and future projects. The Chairman of India's space agency was speaking at the plenary session of the International Astronautical Congress (IAC) 2020.

According to Sivan, India's human spaceflight programme Gaganyaan has been going strong, with astronauts being trained by Russia and critical medical technologies being provided by France. However, he said that owing to Covid-19 the Gaganyaan project would see a small shift. "We had initially targeted an August 2022 launch and there is a small shift in targeting. We are trying to take the help of other space-faring nations for getting things done," he said.

In his Independence Day speech in 2018, Prime Minister Narendra Modi had said that when the country is celebrating its 75th year of Independence in 2022, an Indian son or daughter will be flying into space as a part of the Gaganyaan Human Spaceflight mission. This is India's most ambitious and challenging mission yet.

Elaborating on the work with foreign space agencies, Sivan said that partnerships ranged from cooperation in human spaceflight to planetary exploration and joint experiments. “We have a NASA-ISRO Synthetic Aperture Radar NISAR satellite, we are also working with United States Geological Survey(USGS) for sharing of satellite data. France is a major partner and we have launched two joint satellites Megha tropiques and Saral and the retired mission is underway. ISRO is partnering with Japanese space agency JAXA to build joint Lunar polar exploration mission. Our cooperation with German Agency DLR is on robotics and Artificial Intelligence. In the field of electric propulsion system and deep space network antenna support we are working with Israeli Space Agency (ISA)” he stated.



When asked about the upcoming rocket launches this year, Dr. Sivan said that the agency is planning for the launch of PSLV rocket in November. This would also be the maiden launch of this year, as ISRO’s launches were affected after Covid-19 lockdown measures had brought in several travel restrictions. Given that India’s space activities are spread across centers in various parts of the country, it had become challenging for officials and scientists to travel to carry out work.

“For India’s Space port, people have to travel from other ISRO facilities located far away to carry out the work, hence there are some delays in the missions. We are planning to have the PSLV C-49 launch in November first week. Subsequently, all missions will be as planned” he said.

Adding that International cooperation was hallmark of Indian space programme, Sivan, who also serves as Secretary, Department of Space said that ISRO had imparted a 2-month long hands-on training in nano satellite building for 60 officials from 33 countries.

<https://zeenews.india.com/india/gaganyaan-project-big-update-on-launch-of-isros-human-spaceflight-programme-2317009.html>

## New facility to revolutionize particle accelerators now in operation

A new facility that could pave the way for a future generation of particle colliders and powerful light sources has turned on at the Department of Energy's SLAC National Accelerator Laboratory. Operating as a DOE user facility, FACET-II is the only facility in the world capable of providing high-energy electron and positron beams for researching a vast array of revolutionary accelerator technologies that could shrink future accelerators by factors of 100 to 1,000 and sharpen their capabilities.

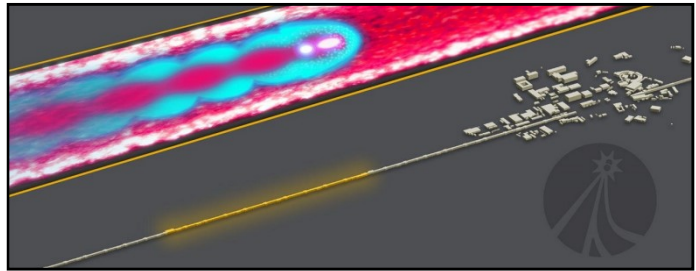
"Particle accelerators are the ultimate microscopes," says Mark Hogan, FACET-II project scientist. "We can use them to make high-energy beams that we can collide to understand the tiniest particles and the forces that hold the universe together, or we can wiggle the beams back and forth to create powerful bursts of X-rays that allow us to take pictures of ultrasmall, ultrafast atomic processes to understand biology and chemistry.

FACET-II will help us develop new technologies that are going to allow us to build machines that are smaller, less expensive and more powerful."

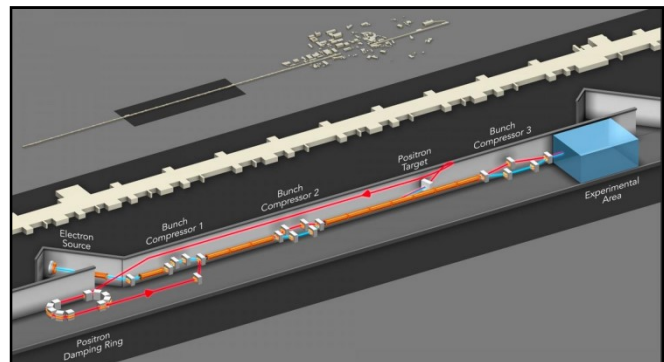
### Surf's up

The project is an upgrade to the Facility for Advanced Accelerator Experimental Tests (FACET), a DOE Office of Science user facility that operated from 2011 until 2016, when the facility was decommissioned to make way for upgrades to the lab's X-ray free-electron laser, the Linac Coherent Light Source (LCLS). FACET-II builds on the successes of FACET, where scientists demonstrated that a technique called plasma wakefield acceleration can boost the energy of electrons and their antimatter particles, positrons. In this method, researchers send a bunch of high-energy particles through a hot ionized gas, or plasma, creating a plasma wake for a trailing bunch to "surf" on, ramping up to extremely high energies in a short distance.

In conventional accelerators, particles draw energy from a radiofrequency field inside metal structures. Since these structures can only support a limited energy gain per distance before breaking down, accelerators need to be extremely long to reach higher energies and are expensive to build. The plasma wakefield approach has the potential to dramatically shrink the size and cost of particle accelerators. Future plasma accelerators could, for example, unfold the same acceleration power as SLAC's 2-mile-long copper linear accelerator (linac) in just a few meters.



FACET-II is the only facility in the world capable of providing high-energy electron and positron beams for researching a vast array of revolutionary accelerator technologies that could shrink future accelerators by factors of 100 to 1,000 and sharpen their capabilities. Credit: Greg Stewart/SLAC National Accelerator Laboratory



FACET-II uses the middle third of the lab's 2-mile-long linear accelerator (SLAC ground plan at top). It sends a beam of electrons (blue line) from the electron source (bottom left) to the experimental area (bottom right), where it arrives with an energy of 10 billion electronvolts. The design allows for adding the capability to produce and accelerate positrons (bottom, red line) later. Credit: Greg Stewart/SLAC National Accelerator Laboratory

## **The next generation**

Over the course of two years, crews at SLAC installed a state-of-the-art high brightness electron source and new electron bunch compressor systems for producing intense beams. They also upgraded the facility's control systems and installed tools to analyze the beam properties.

FACET-II will produce beams of highly energetic electrons like its predecessor, but with even better quality. The new facility uses one-third of the SLAC linac—sending electrons from the source at one end to the experimental area at the other end—to generate an electron beam with an energy of 10 billion electronvolts. Its design also allows researchers to add the capability to produce and accelerate positrons, which would allow researchers to gain more insights into plasma wakefield acceleration and inform the development of plasma-based electron-positron particle colliders that would enhance our understanding of nature's fundamental particles and forces.

"If we're going to use plasma wakefield acceleration to make an electron-positron collider for high energy physics, we first need to understand how to accelerate positrons in plasma," Hogan says. "SLAC is the only laboratory with the infrastructure needed to provide positron beams for this research. We hope to bring this capability online in the next few years, which will set FACET-II apart from any other facility in the world."

The facility will also help scientists design a new generation of light sources, such as brighter-than-ever X-ray lasers, and lead to improvements to existing X-ray lasers, such as LCLS. These powerful discovery machines provide scientists with unparalleled views of the ever-changing atomic world and open up new avenues that range from high-energy physics to medicine and provide potential benefits for research in materials, biological and energy science.

"Turning on FACET-II is like opening a door that no one's ever looked behind," says project director Vitaly Yakimenko, FACET division director and deputy director for science in SLAC's Accelerator Division. "It will produce electron beams a hundred times more intense than anything that came before and create entirely new scientific opportunities."

## **Pushing innovation**

As a DOE user facility, FACET-II will operate roughly six months a year, delivering beam to about 25 experiments and hosting approximately 250 researchers from universities, industry and other national laboratories. In the coming months, the FACET-II program advisory committee will check the readiness of initial experiments that were chosen for beam time and review a second round of proposals to go into the queue for upcoming science. Through January, teams will work on bringing all the pieces of FACET-II online and getting the beam to the right energy and quality. As teams install new experimental hardware, users will work in parallel to make sure that everything is working properly and picking up the right signals.

In the first experiments, expected to kick off this coming February, researchers will investigate ways to preserve beam quality, improve plasma wakefield acceleration techniques and generate and accelerate positrons. They will also develop Trojan Horse-II, an update to an existing technique that can produce an intense electron beam by "sneaking" electrons into plasma.

FACET-II could also potentially provide insight into new and unexpected physics such as gamma ray bursts, the most energetic form of electromagnetic radiation, and strong-field quantum electrodynamics (QED), both of which play an important role in extreme astrophysical phenomena such as cosmic rays and exploding stars.

Other science goals include compact wakefield accelerators that use certain electrical insulators instead of plasma, as well as machine learning techniques that will accurately measure and simulate the physics of these powerful electron beams to help researchers understand and control the ultrashort bunches, increasing the efficiency and scientific productivity of the user programs.

"Our lab was built on accelerator technology and continues to push innovations in the field," says Bruce Dunham, head of SLAC's Accelerator Directorate. "FACET-II is a groundbreaking facility that will help keep us at the forefront of accelerator science."

Provided by [SLAC National Accelerator Laboratory](https://phys.org/news/2020-10-facility-revolutionize-particle.html)

<https://phys.org/news/2020-10-facility-revolutionize-particle.html>

## Finding the right color to control magnets with laser pulses

Scientists have discovered a new way to manipulate magnets with laser light pulses shorter than a trillionth of a second.

The international team of researchers, led by Lancaster and Radboud Universities, also identified the light wavelength or color which enables the most efficient manipulation. The finding is published in *Physical Review Letters*.

Magnets have fascinated people since ancient times, but until a hundred years ago the theoretical understanding of magnetism remained very elusive. The breakthrough in understanding occurred with the development of quantum mechanics and the discovery of the fact that each electron has an intrinsic magnetic moment or spin.

The spin can be seen as an elementary "needle of a compass," typically depicted as an arrow showing the direction from North to South poles. In magnets all spins are aligned along the same direction by the force called exchange interaction. The exchange interaction is one of the strongest quantum effects which is responsible for the very existence of magnetic materials.

The strength of the exchange interaction can be appreciated from the fact that it generates magnetic fields 10,000 times stronger than the Earth's magnetic field. Another manifestation of its strength is the fact that it can drive spins to rotate with a period of one trillionth of a second and even faster.

Manipulating the exchange interaction would be the most efficient and ultimately fastest way to control magnetism. To achieve this result, the researchers used the fastest and the strongest stimulus available: ultrashort laser pulse excitation.

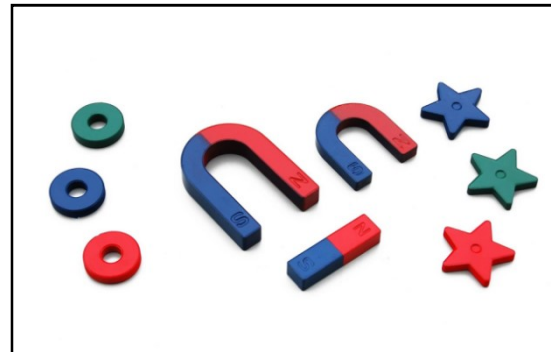
However, in order to detect/observe the effect of light on magnetism one would need an ultrafast magnetometer—a device which would be able to trace the dynamics of spins with less than a trillionth of a second resolution. This is much faster than the temporal resolution of modern electronics.

But the authors have found a solution to this problem, as lead researcher Dr. Rostislav Mikhaylovskiy from Lancaster University explains: "The spins oscillate at Terahertz frequencies almost a trillion times faster than the standard power line frequency of 50 Hz. Thanks to such high frequencies of oscillations, the spins act as efficient antennas emitting electromagnetic radiation. By analyzing the properties of the emitted radiation we can extract information about the ultrafast magnetization dynamics triggered by the optical steering of the exchange forces."

By systematically varying the color of the excitation laser pulses from red to blue, the scientists were able to identify the light wavelength for which the effect of light on magnetism is the strongest.

Dr. Mikhaylovskiy said: "It was very important to see that the effect of light on the exchange interaction really exists. By tuning the wavelength or color of light we started to understand how to enhance this effect."

This exciting discovery opens a new research line at Lancaster University led by Dr. Mikhaylovskiy. The next step is to perform systematic studies of the ultrafast control of magnetism



The spin can be seen as an elementary "needle of a compass", typically depicted as an arrow showing the direction from North to South poles. Credit: Lancaster University



in a broad spectral range, to compare the efficiencies of the pumping in the far-, mid-infrared and visible ranges and thus to identify the most efficient as well as the fastest approach for the manipulation of spins. To this end a new laser system capable of producing laser pulses in all these frequency ranges has been commissioned.

**More information:** R.V. Mikhaylovskiy et al. Resonant Pumping of d–d Crystal Field Electronic Transitions as a Mechanism of Ultrafast Optical Control of the Exchange Interactions in Iron Oxides, *Physical Review Letters* (2020). [DOI: 10.1103/PhysRevLett.125.157201](https://doi.org/10.1103/PhysRevLett.125.157201)

**Journal information:** *Physical Review Letters*  
<https://phys.org/news/2020-10-magnets-laser-pulses.html>



Wed, 14 Oct 2020

## Imaging light waveforms in air plasma

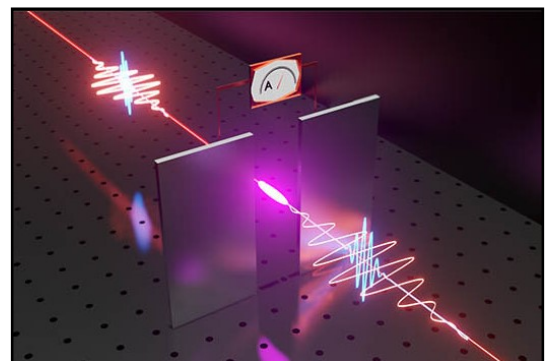
An international team that includes physicists at LMU has developed a new method with which to characterize the ultrafast oscillation of the electrical fields associated with light.

The electric field associated with visible light oscillates at frequencies on the order of hundreds of billions of times per second. This means a single oscillation of the field lasts for a few femtoseconds (1 fs is equivalent to  $10^{-15}$  sec). Precise measurements of the extraordinarily rapid rate of change of the electric field during a single oscillation are an essential prerequisite for an understanding of the ultrafast motions of the electrons in atoms, molecules and condensed matter.

A collaborative project carried out by groups of physicists based at LMU Munich, the Max Planck Institute for Quantum Optics, and the National Research Council of Canada's Joint Attosecond Science Laboratory at the University of Ottawa has resulted in the development of a new method, which that enables the evolution of the electric field over the course of single ultrafast oscillations to be displayed on an oscilloscope. While the conventional technique is carried out under high vacuum, the new method works in ambient air. It is based on the use of a two-pulse sequence.

A pump pulse first strips electrons from molecules in the ambient air. This is followed after a variable delay by the pulse to be measured. The shape of its electric-field waveform is revealed by monitoring the currents induced by its interaction with the free electrons in the air plasma. The relative simplicity of this approach should make a valuable tool for the exploration of ultrafast dynamics in the subatomic domain, and the development of ultrafast electronics with switching frequencies in the petahertz range ( $10^{15}$  Hz).

**More information:** A. Korobenko et al. Femtosecond streaking in ambient air, *Optica* (2020). [DOI: 10.1364/OPTICA.398846](https://doi.org/10.1364/OPTICA.398846)  
<https://phys.org/news/2020-10-imaging-waveforms-air-plasma.html>



Credit: Ludwig Maximilian University of Munich

## **Covid-19 reinfection casts doubt on virus immunity: Study**

*A study published in The Lancet Infectious Diseases journal charts the first confirmed case of Covid-19 reinfection in the United States -- the country worst hit by the pandemic -- and indicates that exposure to the virus may not guarantee future immunity*

Peris: Covid-19 patients may experience more severe symptoms the second time they are infected, according to research released Tuesday confirming it is possible to catch the potentially deadly disease more than once.

A study published in The Lancet Infectious Diseases journal charts the first confirmed case of Covid-19 reinfection in the United States -- the country worst hit by the pandemic -- and indicates that exposure to the virus may not guarantee future immunity.

The patient, a 25-year-old Nevada man, was infected with two distinct variants of SARS-CoV-2, the virus that causes Covid-19, within a 48-day time frame.

The second infection was more severe than the first, resulting in the patient being hospitalised with oxygen support.

The paper noted four other cases of reinfection confirmed globally, with one patient each in Belgium, the Netherlands, Hong Kong and Ecuador.

Experts said the prospect of reinfection could have a profound impact on how the world battles through the pandemic.

In particular, it could influence the hunt for a vaccine -- the currently Holy Grail of pharmaceutical research.

“The possibility of reinfections could have significant implications for our understanding of Covid-19 immunity, especially in the absence of an effective vaccine,” said Mark Pandori, for the Nevada State Public Health Laboratory and lead study author.

“We need more research to understand how long immunity may last for people exposed to SARS-CoV-2 and why some of these second infections, while rare, are presenting as more severe.”

- Waning immunity? -

Vaccines work by triggering the body’s natural immune response to a certain pathogen, arming it with antibodies it to fight off future waves of infection.

But it is not at all clear how long Covid-19 antibodies last.

For some diseases, such as measles, infection confers lifelong immunity. For other pathogens, immunity may be fleeting at best.

The authors said the US patient could have been exposed to a very high dose of the virus the second time around, triggering a more acute reaction.

Alternatively, it may have been a more virulent strain of the virus.

Another hypothesis is a mechanism known as antibody dependent enhancement -- that is, when antibodies actually make subsequent infections worse, such as with dengue fever.

The researchers pointed out that reinfection of any kind remains rare, with only a handful of confirmed cases out of tens of millions of Covid-19 infections globally.

However, since many cases are asymptomatic and therefore unlikely to have tested positive initially, it may be impossible to know if a given Covid-19 case is the first or second infection.

In a linked comment to The Lancet paper, Akiko Iwasaka, a professor of Immunobiology and Molecular, Cellular and Developmental Biology at Yale University, said the findings could impact public health measures.

“As more cases of reinfection surface, the scientific community will have the opportunity to understand better the correlates of protection and how frequently natural infections with SARS-CoV-2 induce that level of immunity,” she said.

“This information is key to understanding which vaccines are capable of crossing that threshold to confer individual and herd immunity,” added Iwasaka, who was not involved in the study.

<https://www.hindustantimes.com/world-news/covid-19-reinfection-casts-doubt-on-virus-immunity-study/story-7VZkl8v7cUO9BFp8ESr3HL.html>

## Business Today

Wed, 14 Oct 2020

### COVID-19 vaccine: Harsh Vardhan says cure to be ready from more than one source in early 2021

*"We're expecting that early next year we should have vaccine in the country from maybe more than one source," says union health minister Harsh Vardhan*

*By Chitranjan Kumar*

India will have a vaccine for the novel coronavirus by early next year and it will possibly come from several sources, Union Health Minister Harsh Vardhan said on Tuesday. In a meeting of the group of ministers, the health minister stated that expert groups are formulating strategies to plan on how to roll out the distribution of the COVID-19 vaccine in the country.

"We're expecting that early next year we should have vaccine in the country from maybe more than one source. Our expert groups are formulating strategies to plan on how to roll out the distribution of the vaccine in the country," news agency ANI tweeted quoting Harsh Vardhan.

The Central Drugs Standard Control Organisation (CDSCO) has granted license for manufacturing of COVID-19 vaccine for preclinical test, examination and analysis to the seven manufacturers in India. These companies are Pune-based Serum Institute, Cadila Healthcare, Bharat Biotech, Reliance Life Sciences, Aurbindo Pharma, and Gennova Biopharmaceuticals.

Bharat Biotech's vaccine candidate 'Covaxin', being indigenously developed in collaboration with Indian Council of Medical Research (ICMR), has started phase 2 clinical trials and is the process to start phase 3 study. The Hyderabad-based vaccine maker has applied for the permission to conduct phase 3 randomised double-blind placebo-controlled multicentre trial of its COVID-19 vaccine candidate.

A DNA vaccine, which has been developed by Cadila Healthcare, has conducted pre-clinical toxicity studies on small animals like mice, rats, rabbits and guinea pigs. Its phase 2 clinical trials is ongoing.

Meanwhile, Serum Institute of India (SII) and ICMR have partnered for clinical development of two global vaccine candidates, including ChAdOx1-S, which is a non-replicating viral vector vaccine developed by University of Oxford/AstraZeneca. This vaccine is undergoing phase 3 of clinical trials in Brazil. Phase 2 studies have been initiated by ICMR at 14 clinical trial sites.

<https://www.businesstoday.in/current/economy-politics/more-than-one-covid-19-vaccine-by-early-2021-harsh-varadhan/story/418700.html>

