July
2020

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

Volume: 45 Issue: 164 15 July 2020

रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
Defence Scientific Information & Documentation Centre
मेटकॉफ हाउस, दिल्ली - 110 054
Metcalfe House, Delhi - 110 054

CONTENT

DRDO News

COVID-19: DRDO's Contribution

Outlook
THE FULLY LOADED MAGAZINE

Wed, 15 July 2020

DRDO develops software tool for tracking Covid patients in quarantine

Hyderabad: The Defence Research and Development Organisation (DRDO) has developed a software tool for enforcement of quarantine, which will be implemented in partnership with the Telangana Information Technology Association (TITA), an industry body of software professionals.

Both the organisations on Monday signed an agreement to implement the automated management of the software. The pilot for the implementation is likely to begin soon.

The DRDO has devised Smart Automated Management of Patients and Risks for Covid-19 (SAMPARC), an intelligent software for enforcement of quarantine or isolation.

The software tool will be a handy tool for law enforcement and health officials, as it would enable intelligent automated tracking of those in quarantine or isolation. It will also generate alerts if there are violations or wilful suppression of movement details. This is expected to reduce the tracking workload of law enforcement or health officials.

The online pact was signed by Dr Rituraj Kumar, Scientist G, Centre for AI & Robotics (CAIR) of the DRDO and Sundeep Kumar Makthala, Global President, TITA.

The SAMPARC solution can be deployed as a national service by the National Informatics Centre (NIC), or can be distributed as a state-wise or region-wise service.

Relying on the information provided by the police and health officials, it allows geofencing, face recognition, display of data on map (with hotspot information, if available).

The rollout of the solution involves no cost to the patient and local authority needs to position only a suitable computer and the software is based on a combination of open source software.

Details of the patient including name, cell phone number, IMEI of the phone, coordinates of the quarantine location, duration of quarantine, email id and optionally photographs of the patient for AI-based face detection.

The app has to be installed on the patient"s smartphone which would automatically send a protected message to the Covid server every 10 minutes. The app would run as a background service that would automatically restart even if the phone reboots. Based on the requirements of the authorities, the patient will be able to send selfies taken through the SAMPARC app to the server for automated AI based face recognition.

"The software would automatically generate an alarm if the patient violates the geofence of his quarantine location in four consecutive inputs received from the smartphone. It also sends out an alert if the selfie does not match the photo taken during registration. The software would display potential violations as a red symbol. Once the quarantine period is over, the patient would be removed from tracking and they can uninstall the SAMPARC app," explained Makthala

"We chose TITA as an implementing partner as it has been working at the grass root level and has implemented many programmes like digital literacy, rural citizens connect with doctors through Tconsult, etc," said Dr Kumar.

(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/drdo-develops-software-tool-for-tracking-covid-patients-in-quarantine/1894777

The Weather Channel

Wed, 15 July 2020

DRDO develops software tool for enforcement of quarantine during Covid-19

The Defence Research and Development Organisation (DRDO) has developed a software tool for enforcement of quarantine, which will be implemented in partnership with the Telangana Information Technology Association (TITA), an industry body of software professionals.

Both the organisations on Monday signed an agreement to implement the automated management of the software. The pilot for the implementation is likely to begin soon.

The DRDO has devised Smart Automated Management of Patients and Risks for COVID-19 (SAMPARC), an intelligent software for enforcement of quarantine or isolation.

The software tool will be a handy tool for law enforcement and health officials, as it would enable intelligent automated tracking of those in quarantine or isolation. It will also generate alerts if there are violations or wilful suppression of movement details. This is expected to reduce the tracking workload of law enforcement or health officials.

Union Home Minister Amit Shah, Defence Minister Rajnath Singh, Health Minister Harsh Vardhan, MoS Home Affairs G. Kishen Reddy and Delhi Chief Minister Arvind Kejriwal visited Sardar Vallabhbhai Patel hospital and reviewed the preparedness, in New Delhi on July 5, 2020. (IANS)

The online pact was signed by Dr Rituraj Kumar, Scientist G, Centre for AI & Robotics (CAIR) of the DRDO and Sundeep Kumar Makthala, Global President, TITA.

The SAMPARC solution can be deployed as a national service by the National Informatics Centre (NIC), or can be distributed as a state-wise or region-wise service.

Relying on the information provided by the police and health officials, it allows geofencing, face recognition, display of data on map (with hotspot information, if available).

The rollout of the solution involves no cost to the patient and local authority needs to position only a suitable computer and the software is based on a combination of open source software.

Details of the patient including name, cell phone number, IMEI of the phone, coordinates of the quarantine location, duration of quarantine, email id and optionally photographs of the patient for AI-based face detection.

The app has to be installed on the patient's smartphone which would automatically send a protected message to the Covid server every 10 minutes. The app would run as a background service that would automatically restart even if the phone reboots. Based on the requirements of the authorities, the patient will be able to send selfies taken through the SAMPARC app to the server for automated AI based face recognition.

"The software would automatically generate an alarm if the patient violates the geofence of his quarantine location in four consecutive inputs received from the smartphone. It also sends out an alert if the selfie does not match the photo taken during registration. The software would display potential violations as a red symbol. Once the quarantine period is over, the patient would be removed from tracking and they can uninstall the SAMPARC app," explained Makthala

"We chose TITA as an implementing partner as it has been working at the grass root level and has implemented many programmes like digital literacy, rural citizens connect with doctors through Tconsult, etc," said Dr Kumar.

https://weather.com/en-IN/india/coronavirus/news/2020-07-14-drdo-software-tool-enforcement-quarantine-covid-19

THE TIMES OF INDIA

Wed, 15 July 2020

Beds to spare at Covid-19 centres as cases decline in Delhi

By Alok K Mishra

New Delhi: The falling number of Covid-positive cases in the city has resulted in the major makeshift care facilities witnessing a decline in occupancy.

Billed as the world's largest Covid care facility with 10,000 beds, Sardar Patel Covid Care Centre and Hospital at Radha Soami Satsang Beas in Chhatarpur currently has only 180 patients. Only 16 patients have been admitted in the DRDO-run 1,000 bedded facility near Dwarka, 72 in the 480-bedded Commonwealth Games Village unit and 20 in the 100-bedded facility at Shehnai banquet hall.

Patients who are not critical and don't have home isolation facilities are admitted in such makeshift centres. While 15 doctors have been deployed at CWG Village, Shehnai banquet hall has 12.

The Centre and Delhi government rushed to create makeshift Covid-19 facilities when the pandemic was on the verge of explosion in the capital. There was widespread anticipation among the authorities that cases would cross 5 lakh by July-end and the city may need 80,000 beds to treat the patients.

Later, it was found that the number of cases was far below what was anticipated. Delhi government had explained that its anticipation was based on details obtained from central government sources.

Though unused, officials at the makeshift facilities have been reassuring people in that enough healthcare facilities are available for them. This boosts the confidence of people testing positive for Covid-19.

Three patients were discharged from Sardar Patel Covid Care Centre and Hospital on Tuesday. The facility is being managed by Indo-Tibetan Border Police. "A team of 100 medical personnel has been deployed at the facility, including 40 doctors who work in shifts. All those currently admitted are showing signs of recovering. Only five people who turned critical were shifted to Safdarjung Hospital since July 5, when the facility became operational," said an ITBP official.

Yoga sessions are organised daily for patients, who practice it on their beds to destress and aid their healing process. The centre ahas facilities for recreation, newspapers and books.

Most of the beds at the CWG Village facility, which was created in record six days, are vacant. "We currently have 72 patients and all are in a stable condition. Around 50 beds are oxygen

supported, but till now only one patient has required the facility. Patients are discharged after nine days when they don't have fever for three days. No test is required before the discharge. By July 17, many patients might be discharged," said Dr Rajat Jain of Doctors For You, an NGO.

Even at the Covid-designated government hospitals, 10,900 of 15,000 beds are vacant. Since the threat of the virus and the possibility of cases peaking has not yet passed, these facilities continue to be important in Delhi's Covid-19 fight.

https://timesofindia.indiatimes.com/city/delhi/beds-to-spare-at-covid-19-centres-as-cases-decline/articleshow/76968629.cms

DRDO Technology News

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

Wed, 15 July 2020

15 HAL LCH deal by year end….?

In 2017, Then Indian army chief General Bipin Rawat had said Indigenous Attack/combat helicopters HAL Rudra and HAL Light Combat Helicopter have major shortcomings, that is in their current configuration both do not have suitable anti-tank guided missile (ATGM), which is the main weapon of any Attack/Combat helicopters around the world. Fast forward to 2020 and nothing much has changed since then as HAL Rudra MkIV and LCH Helicopters continue to be armed only with French Nexter 20mm turret gun and Belgian 70 mm rockets and waits for ATGM to be used as effective anti-armor, anti-bunker and anti-fortification role for the Strike Corps.

DRDO developed Helina and SANT anti-tank guided missile system was supposed to provide lethal aerial firepower against the armored thrust of the rivals but DRDO has not been able to clear this trial phase of these missiles and enter production. DRDO officials have claimed both the missiles are ready for production and have cleared all trials but there seem to be some bottleneck issues with the production of the missile which is yet to resolve.

Army already has 60 HAL Rudra MkIV and the chorus has been growing to induct HAL developed LCH also and it seems, Army will clear that proposal to induct 10 LCH and 5 for Air force soon, but both Helicopters will continue to come without any decent ATGM integrated into them.

Army has been proposing the integration of American AGM-114 Hellfire air-to-surface missile (ASM) and buys interim stock for both HAL Rudra and LCH fleet but it has some opposition from DRDO which claims its Army which is delaying ordering locally developed Helina and SANT anti-tank guided missile system over imported ATGM.

Army also has been offered helo-launched Spike ER and the MBDA PARS L3 anti-tank guided missile from other foreign vendors but turf war is yet to be resolved between Army and DRDO due to which one of the main weapon systems for Gunship Helicopters are still missing but sources has confirmed that talks are underway to keep both Army and DRDO happy and a deal to arm this gunships with ATGM will be cleared by end of this year.

https://www.defenceaviationpost.com/2020/07/15-hal-lch-deal-by-year-end/

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Wed, 15 July 2020

Indian forces to acquire Heron drones, Spike anti-tank guided missiles from Israel

Synopsis

The Heron unmanned aerial vehicles are already in the Air Force, Navy, and the Army and are being used extensively at the moment by both Army surveillance and Target acquisition batteries and Air Force in the Ladakh sector.

New Delhi: Engaged in a boundary dispute with China in eastern Ladakh, India is planning to enhance its surveillance capabilities and firepower by placing orders for Heron surveillance drones and Spike anti-tank guided missiles from Israel under the emergency financial powers granted by the government.

The Heron unmanned aerial vehicles are already in the Air Force, Navy, and the Army and are being used extensively at the moment by both Army surveillance and Target acquisition batteries and Air Force in the Ladakh sector.

Super heron and Panther by IAI aerospace

"There is a need for acquisition of Heron UAVs to add to the existing fleet of these drones for meeting the requirements of our Air Force fleet. We are planning to place orders for these UAVs," government sources told here without specifying the numbers to be procured.

The Heron has been in service with the three defence wings for several years now and can fly continuously for more than two days at a stretch providing reconnaissance from an altitude of more than 10 kilometres.

The forces are also working towards inducting an armed version of the UAV, as well as upgrading the existing fleet into combat UAVs under the ambitious 'Project Cheetah' spearheaded by the Indian Air Force.

On the other hand, the Army is planning to place orders for more Spike anti-tank guided missiles which were received by it last year from Israel under the emergency financial powers granted to the services in the Post-Balakot air strikes scenario.

Last time, the Army had gone in for 12 launchers and 200 Spike missiles.

"We are planning to acquire more of these anti-tank missiles for tackling any threat from the enemy armoured regiments," the sources said.

In the meanwhile, DRDO is working towards developing the indigenous Man-Portable Anti Tank Guided Missile (MP-ATGM) which will meet the bulk requirement of over 50,000 of these missiles needed by the Infantry units.

The defence forces have also initiated requirements for acquiring Spice-2000 bombs, assault rifles, ammunition and missiles, and some platforms for meeting the requirements in case the situation escalates further on the Line of Actual Control.

China has done massive build up along the LAC with the deployment of 20,000 troops and its heavy weaponry and fighter aircraft since May 5 and India has also responded in equal measure to the Chinese force mobilisation.

https://economictimes.indiatimes.com/news/defence/indian-forces-to-acquire-heron-drones-spike-anti-tank-guided-missiles-from-israel/articleshow/76959494.cms

THE HINDU

Wed, 15 July 2020

Army to place repeat order for Spike missiles from Israel

The emergency procurement comes in the backdrop of continuing tensions on LAC with China

By Dinakar peri

New Delhi: The Army is set to place a repeat order for Spike-LR (Long Range) Anti-Tank Guided Missiles (ATGM) from Israel as part of emergency procurement, a defence source said on Tuesday. The decision comes days after the Army's decision to place a repeat order for 72,400 Sig Sauer assault rifles from the U.S.

Spike long-range anti-tank guided missile. Photo: Twitter/@RAFAELdefense

The emergency procurements come in the backdrop of continuing tensions on the Line of Actual Control (LAC) with China.

The Spike order will be a repeat order for 12 launchers and around 250 missiles under emergency procurement, the source stated. Last year, the Army procured 12 launchers and around 250 missiles from Israel under the new financial powers for emergency procurements sanctioned by the Defence Ministry after the Balakot air strike. According to the manufacturer, Rafael Advanced Defence Systems, the Spike LR is a 4th Gen missile, which can engage a target with precision at ranges up to 4 km.

Under the new emergency powers, armed forces were given a free hand to procure equipment worth up to ₹300 crore on a priority basis with deliveries stipulated to be completed in three months but extendable up to six months. Entirely new systems not in use were also allowed to be procured under the new powers last year.

Under a ₹700 crore deal in February 2019 with Sig Sauer of the U.S., the Army procured 72,400 SIG-716 assault rifles which have been provided to frontline troops involved in counter-insurgency operations. The remaining demand for assault rifles was to be met through the licence manufacture of Russian AK-203 rifles in India through a joint venture. However, the final deal has been stuck over the issue of pricing. An in-principle decision has been taken to place a repeat order and it is being processed, the source stated.

The Army has a much larger requirement for ATGMs which will be met through indigenous Man Portable ATGM under development by the Defence Research and Development Organisation (DRDO) after an earlier tender was cancelled.

https://www.thehindu.com/news/national/army-to-place-repeat-order-for-spike-missiles-from-israel/article32083307.ece

Defence News

Defence Strategic: National/International

INDIA TODAY

Wed, 15 July 2020

New ballistic helmets for the Army

The new helmets, when they arrive, will provide protection from even AK-47 slugs

By Sandeep Unnithan

Delhi: In a major step towards enhancing the personal protection of its soldiers, the Indian Army has begun the process to acquire 100,000 'AK-47 protected' helmets. It will be one of the world's largest procurements of these specialised ballistic helmets.

A ballistic helmet capable of stopping AK-47 rounds in service with a European counter-terrorist force.

On June 23, the army's Infantry Directorate kicked off the process by issuing a Request for Information (RFI) on Indian and global helmet manufacturers. The directorate also conducted a preliminary meeting with a handful of helmet manufacturers in New Delhi on July 13. The Request for Proposals will be issued in February next year. The budget for the procurement is not known but assuming each helmet costs Rs 50,000, the army could be looking at a Rs 500 crore order. The new helmets will replace the 'bulletproof patka' that has been in service since the 1990s and the stopgap helmet supplied by the Kanpur-based MKU in 2018.

Each AK-47 bullet flies at nearly twice the speed of sound and delivers a massive 2,000 joules of kinetic energy that can inflict fatal trauma even on victims wearing body armour and helmets. Recent advances in ballistic technologies, though, have created helmets capable of reducing the impact of an AK-47 round to less than 10 joules.

The army's new helmet will also have to support various accessories like night-vision goggles, a torch, visors and face shields. More importantly, it has asked for the new helmet to protect against the AK-47's 7.62x39 mm Mild Steel Core and Hard Steel Core bullets from 10 metres. Mild steel core bullets are most commonly used, while hard steel core rounds are those designed to penetrate metal and body armour.

In two firefights in the Kashmir Valley, one in Pulwama in 2017 and another at Lethpora in 2018, militants had used armour-piercing AK-47 bullets. On June 20 this year, BSF jawans in Kathua shot down a Pakistani hexacopter carrying a US-built M4A1 Colt carbine and two magazines with 60 M855A1 Enhanced Performance Rounds (EPR). These are regular 5.56x45 mm NATO rounds with a steel penetrator tip that can easily penetrate the Level III body armour worn by Indian security forces.

When the army was inducted to fight the insurgency in Jammu and Kashmir in the early 1990s, its soldiers were equipped with the Model 1974 fibreglass helmets, which offered inadequate protection against bullets and splinters. An improvised low-cost solution, the 'bulletproof patka' helmet was designed by Major General V.K. Datta in the early 1990s, and is still the standard issue

in counterinsurgency operations. It is a circular sheet of armoured steel wrapped in canvas. While it protected the soldier from the bullet itself, it was less successful in protecting the wearer from the trauma of the bullet's impact. Additionally, bullets ricocheting from the helmet could also injure soldiers standing near the wearer.

In 2018, the army placed a Rs 170-crore order for 158,000 helmets from Kanpur-based firm MKU. The helmets were, however, found to offer inadequate protection against the AK-47 bullets commonly used by militants. A stop-gap AK-47 protector—a modular ceramic add-on plate produced and designed by another manufacturer—was then issued to troops.

https://www.indiatoday.in/india-today-insight/story/new-ballistic-helmets-for-the-army-1700612-2020-07-14

ZEENEWS

Wed, 15 July 2020

Here's why India's Rafale fighter jet is a better choice for dogfight than Pakistan's US-made F-16

According to reports, the warplanes that rained bombs at al-Watiya airbase in western Libya were Rafale jets, which means that the attack was carried out either by France or Egypt as they are the only two countries within the range of the base that possess this type of aircraft

Edited By Tanweer Azam

Highlights

1. ***The bombings of Turkish airbase by Rafale jets reveal that Pakistan Air Force's F-16s are no match for the French fighter jets.***
2. ***The first batch of six Rafale fighter jets is most likely to arrive in India on July 27.***
3. ***The delivery of aircraft was earlier supposed to have been done by May end, but this got delayed due to the COVID-19 crisis.***

According to reports, the warplanes that rained bombs at al-Watiya airbase in western Libya were Rafale jets, which means that the attack was carried out either by France or Egypt as they are the only two countries within the range of the base that possess this type of aircraft.

Pakistan must be following this development closely as India is also getting the Rafale fighter jets and the bombings on Turkish airbase reveal that Pakistan Air Force's F-16s are no match for the French fighter jets. The PAF's F-16s, which are supplied by United States of America are the most sophisticated fighter jets of PAF but with Indian Air Force getting Rafale, the PAF will not be able to carry out any aggressive move against India.

Notably, the first batch of six Rafale fighter jets is most likely to arrive in India on July 27. The delivery of aircraft was earlier supposed to have been done by May end, but this got delayed due to the COVID-19 crisis.

On June 2, Defence Minister Rajnath Singh held a telephonic conversation with his French counterpart Florence Parly during which she conveyed that the Rafale jets will be delivered to India as scheduled notwithstanding the coronavirus pandemic in France.

The first squadron of the aircraft will be stationed at Ambala air force station, considered one of the most strategically located bases of the IAF. India had signed an inter-governmental agreement with France in September 2016 for procurement of 36 Rafale fighter jets at a cost of around Rs 58,000 crore.

Here is a comparative study of the features between Rafale and the US-made F-16 in possession of Pakistan. (With inputs from quora.com)

Rafale:

- Rafale can fly up to 2,000 nautical miles at a stretch.
- Rafale's maximum cruise altitude is 50,000 feet.

The rate of climb is 60,000 feet per minute.

- Cruise speed long range is 1,032 knots.
- Cruise speed normal range 750 knots.
- Max speed winner is Rafale 579 knots. The Rafale reaches a maximum speed that is 410 knots faster than the F-16.
- Maximum thrust is 34,000 (lbf / pound-force). Rafale produces 5,000 more pound-forces of thrust than the F-16.
- Take-off Weight for Rafale is 54,000 (lbs)
- Exterior Dimensions: Height 17.52 feet., wingspan 35.43 feet, total length 50.10 feet.

Rafale is 0.79 feet longer than the F-16.

Rafale has a 2.62 foot wider wingspan than the F-16.

Rafale is 0.82 feet taller than the F-16.

Armament: Guns: 1× 30 mm (1.18 in) GIAT 30/M791 autocannon with 125 rounds

Missiles:

Air-to-air:

MBDA MICA IR or EM or Magic II and

MBDA Meteor in the future

Air-to-ground:

MBDA Apache or

MBDA Storm Shadow-SCALP EG or

AASM-Hammer or

GBU-12 Paveway II, GBU-22 Paveway III or GBU-49 Enhanced Paveway II

GBU-24 Paveway III

AS-30L

Air-to-surface:

MBDA AM 39-Exocet anti-ship missile

MBDA CVS401-Perseus in the future

Deterrence:

ASMP-A nuclear missile

Pakistan's F-16:

- F-16 can fly 2,280 nautical miles.
- The maximum cruise altitude is 50,000 feet.
- The rate of climb is 60,000 feet per minute.
- Cruise speed long range is 1,303 knots.
- Cruise speed normal range is 330 knots.
- Maximum thrust is 29,000 (lbf / pound-force)
- Take-off Weight for F-16 is 54,000 (lbs)
- The F-16 weights 6,000 pounds less than the Rafale.

Armament:

Guns: 1 × 20 mm (0.787 in) M61A1 Vulcan 6-barrel Gatling cannon, 511 rounds

Rockets:

4 × LAU-61/LAU-68 rocket pods (each with 19/7 × Hydra 70 mm rockets, respectively)

4 × LAU-5003 rocket pods (each with 19 × CRV7 70 mm rockets)

4 × LAU-10 rocket pods (each with 4 × Zuni 127 mm rockets)
Missiles:
Air-to-air missiles:
2 × AIM-7 Sparrow
6 × AIM-9 Sidewinder
6 × AIM-120 AMRAAM
6 × IRIS-T
6 × Python-4
Air-to-ground missiles:
6 × AGM-65 Maverick
4 × AGM-88 HARM
AGM-158 Joint Air-to-Surface Standoff Missile (JASSM)
Anti-ship missiles:
2 × AGM-84 Harpoon
4 × AGM-119 Penguin

https://zeenews.india.com/india/heres-why-indias-rafale-fighter-jet-is-a-better-choice-for-dogfight-than-pakistans-us-made-f-16-2295618.html

Wed, 15 July 2020

Know the Indian Army | Army Air Defence: The 'Sentinel of the Sky' protect air space from low flying enemy aerial attacks

The Air Defence traces back its lineage to the Regiment of Artillery and for many decades post independence was an integral part of the Corps until October 1993

New Delhi: The Corps of Army Air Defence (AAD) is a Combat Support Arm of the Indian Army, which has the role of defending the air space of our nation from low flying aerial strikes/attacks by enemy aircrafts and missiles (especially those below 5000 feet) and protecting strategically located military installations like airfields, dams and ammunition depots.

The brave-heart 'Air Defence Gunners' of the AAD have participated in all wars and operations including the 1962 India-China War, 1965 and 1971 India-Pak Wars and the Liberation of Goa. They played a pivotal role in protecting the strategically located airfields in Punjab, Haryana, Jammu and Kashmir during the Indo-Pak Wars.

Over the decades, the military warfare has undergone a tectonic change from the erstwhile conventional tactics.

The Role and Significance of Air Defence Artillery In Warfare

The dynamics of warfare underwent a major change in the Second World War with armies not only engaged in defensive and offensive operations on ground during war but also having to play a key role in air defence operations to secure and protect the air space from the enemies air strikes.

Over the decades, the military warfare has undergone a tectonic change from the erstwhile conventional tactics to a highly mechanized, technological and information oriented system.

With the advent of non conventional and stealth based attacks carried out through highly precision guided missile systems and unarmed aerial vehicles, the ever growing dominance of air superiority has further been bolstered, leading to the Air Defence Artillery playing a pivotal role in complimenting a nation's Air Force in safeguarding the air space.

A Brief History Of Air Defence In Indian Army

The very genesis of the Air Defence Arty in Indian military history took place in 1939 during the erstwhile Colonial era when the British Army had to raise anti-aircraft (AA) units to counter the air strikes by the Axis coalition, particularly from the Japanese in the Far East.

In August 1940, the British Ministry of Defence decided to separate the anti-aircraft units from the artillery department of the army into an independent branch.

After the partition in 1947, the units of the British Indian Army were divided between the newly formed nations, India and Pakistan. Of the Air defence artillery units that remained in the aftermath of World War II only two units, the 26 and 27 Low Altitude Airship Regiments, were transferred to India.

The Indo-Pak 1971 War was an inflection point of sorts in reassessing the role of Air Defence in India's military structure. All through the 70s, a major exercise was undertaken to bolster and modernize the air defence weaponry with the induction of new weapon systems like ZSU-23-4B "Shilka", ZU-23-2B guns, 9K33 Osa systems, 9K38 Igla surface-to-air missiles and 9K35 Strela-10 missiles.

Here are some interesting facts about the Corps of Army Air Defence

History and Formation

The Air Defence traces back its lineage to the Regiment of Artillery and for many decades post independence was an integral part of the Corps until October 1993. In 1994, it was bifurcated from the Artillery and the Corps of Air Defence Artillery (AD Arty) came into existence on 10 January, 1994.

Army Air Defence College

The Army Air Defence College (AADC) (previously Air Defence and Guided Missile School and Centre) located at the Gopalpur cantonment in Odisha is the premier training school of the Air Defence Corps. The establishment runs courses and programes for gunnery, advanced gunnery, and leadership.

Raising Day of Army Air Defence (AAD)

10th January is annually celebrated as the Raising Day of AAD Corps at all major air defence formations / units throughout the nation.This is the day on which the Corps of Air Defence Artillery came to existence as an independent Corps of the Indian Army.

Regimental Crest

The crest of the Corps of Air Defence depicts the very ethos and spirit of the combat arm. It portrays a missile in silver tint, with radar antennae in gold colour fixed on the either side. At the bottom, the motto "आकाशे शत्रुन् जहि" in English "Akashe Shatrun Jahi" is imprinted.

Regimental Motto

The AAD Motto "आकाशे शत्रुन् जहि" (Akashe Shatrun Jahi), means "Kill the Enemy in the Sky". It was adopted as the regimental motto in 1996.

Regimental Flag

The regimental flag of the Corps of Air Defence consists of two horizontal halves. The upper and lower halves comprise sky blue and red colors respectively.

The sky blue color in the upper half portrays the clear blue skies in which the Air Defence operates to thwart enemy attacks. The red coloured lower half represents the firepower of the guns

and missiles. The regimental crest find an ideal place in the center, positioned between the two halves.

https://news.abplive.com/news/india/know-the-indian-army-army-air-defence-the-sentinel-of-the-sky-protect-air-space-from-low-flying-enemy-aerial-attacks-1286529

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Wed, 15 July 2020

Keep Hindustan Aeronautics Ltd out of Naval helicopter plan, private companies tell govt

By Manu Pubby

Synopsis

Four Indian companies – Bharat Forge, Tata Aerospace and Defence, Mahindra Defence Systems and Adani Defence – are contending for the Make in India programme to manufacture 111 naval utility helicopters under the strategic partnership (SP) model in collaboration with a foreign technology provider.

New Delhi: The private sector wants the Centre to bar Hindustan Aeronautics Ltd (HAL) from a ₹21,000 crore plan to manufacture naval utility helicopters (NUH), saying that the state-owned company has an undue advantage as it has access to government-funded infrastructure and the ability to cross-subsidise the bid through other nominated orders.

The companies were responding to a question posed by the defence ministry in May on allowing HAL in the competition, which was reserved for the private sector as reported by ET. They said the monopoly of the state-owned enterprise needs to be broken and a level playing field is needed for all bidders.

Four Indian companies – Bharat Forge, Tata Aerospace and Defence, Mahindra Defence Systems and Adani Defence – are contending for the Make in India programme to manufacture 111 naval utility helicopters under the strategic partnership (SP) model in collaboration with a foreign technology provider.

As part of a re-evaluation in May, the defence ministry asked the contenders if the programme had export potential and raised the prospect of HAL being given a chance to be part of it.

'HAL Running at Full Capacity'

Sources have also told ET that a proposal has been floated to give HAL a chance to provide an indigenously developed naval version of the advanced light helicopter by developing a few prototypes for evaluation by the service in a three-year timeframe.

In response to the defence ministry's queries, it's learnt that the private sector competitors have pointed out that the only large aerospace company India has developed in over seven decades is HAL as it has been given nominated orders and that healthy competition can only be ensured by encouraging others as well.

Among the responses are suggestions that while HAL will remain a major helicopter manufacturer, a second line is needed in the private sector that can become part of the global supply chain and offer viable products for the export market as well. The responses also pointed out that HAL already has an order book of ₹60,000 crore and is set to get another nominated order

worth ₹39,000 crore for light combat aircraft (LCA), besides Kamov KA 226T choppers for the army, asserting that it's already running at full capacity.

The Federation of Indian Chambers of Commerce & Industry (Ficci) earlier wrote to the defence ministry against a "dilution of the strategic partnership model." The letter said that the private sector has been struggling for orders despite building capacities in line with the Make in India plan and HAL as a competitor will make it a "non level playing field."

https://economictimes.indiatimes.com/news/defence/keep-hal-out-of-naval-copter-plan-private-cos-to-govt/articleshow/76949585.cms

BHARAT SHAKTI
Self-Reliance in Defence

Wed, 15 July 2020

India-China Ladakh standoff – Role and capability of helicopters

By Lt Gen BS Pawar (Retd)

The unprecedented standoff between Indian and Chinese army troops in Ladakh–now in stage I of the agreed disengagement process–has once again highlighted the restrictions that the high altitude terrain can impose on the functioning of both man and machine.

Image Courtesy: Boeing

Harsh terrain and climatic conditions in this area impose substantial constraints on both the PLA and Indian Army in its operations. While the summer season is comparatively better except for the extremely high wind speeds, the winter adds to the adverse conditions with temperatures in the region of minus 30 to minus 40-degree centigrade, further degrading the capability of men and material and thus requiring specialised equipment and clothing to keep the force operational – Siachen is an apt example of the same. The constraints of altitude, terrain and climate are most severe in the Ladakh/Aksai Chin region than any other area along the LAC.

Helicopter Operations in Eastern Ladakh

The helicopters' capability gets degraded, more so in summer season due to hot and high wind conditions. However, notwithstanding the punishing and extremely harsh environmental conditions, the helicopter, despite its limitations, remains the best bet for rapid deployment and transportation of troops, equipment, weapon systems, warlike stores including ammunition and fuel.

Redeployment of troops, the direction of artillery fire, forward air controller (FAC), search and rescue and casualty evacuation are some additional essential and critical tasks that the helicopters can carry out, especially during a conflict. It must be noted that a majority of these tasks would require to be carried out during the night and in the mountainous terrain; both being major challenges even though all modern state of art helicopters have night-fighting capabilities. It was demonstrated amply during the Kargil conflict in 1999 wherein similar terrain configurations, the Cheetah and the Mi-17 helicopters diligently carried out all tasks, both by day and night, despite the danger from the SAMs and small arms fire. One Mi-17 was lost to a SAM hit during the conflict.

With tanks and light armoured carriers also inducted into eastern Ladakh region by the PLA, the attack and armed helicopters role becomes very significant, provided they can operate at these altitudes. During the Kargil conflict, the Mi 25/Mi 35 held with the air force were not capable of operating at these altitudes and hence were not used.

Another important facet of helicopter operations in high altitudes is the training of pilots who would require specialised training to operate in these areas. The skills required to fly these helicopters at these altitudes are in complete contrast to those required while flying at sea level irrespective of the pilot's experience. The main factors which require the pilots' attention are the drastic reduction in a margin of power available and the sluggish response of the flying controls – helicopter operations in Siachen the highest battlefield in the world is a vivid example where helicopters are operating at their extreme ceiling and landing at helipads as high as 19800 feet, a feat unparalleled anywhere in history.

Helicopter Capabilities – China and India

In the numbers game, China far outweighs India with regards to holdings of all categories of military helicopters and the stark difference comes in the attack category where India is totally outnumbered. India presently holds a mere 70-80 attack helicopters (AH) which includes the armed Advanced Light Helicopter (ALH) – Rudra. The Chinese, as per data available, have approximately 280 AH in their inventory but a large number of these are in the category of Light Reconnaissance and Attack and Armed versions – the Indian holding includes the 28 Apaches being inducted; most of these have been received.

In the light observation category the Cheetah helicopter, though of old vintage and awaiting a replacement for over a decade, continues to be the lifeline of troops deployed in Siachen and other high altitude areas of Ladakh, Sikkim and Arunachal Pradesh. The Cheetal helicopter, a modified Cheetah with a much more powerful engine will greatly boost up its high altitude capability, but these are limited in numbers. However, a major concern is that the replacement of these critical assets is nowhere in sight and keeping this fleet operational itself is becoming a nightmare – a serious security issue in the current scenario.

Cheetah's main role hinges around reconnaissance and surveillance, the direction of artillery fire, FAC, resupply of critical warlike stores and casualty evacuation. The best feature about these helicopters is that they can land anywhere and do not need a helipad; amply demonstrated during the Kargil conflict. The Chinese, on the other hand, have the Harbin WZ-19 light reconnaissance helicopter which can also be armed, and the Changhe Z-11 light utility helicopter. Both should be able to operate at these altitudes but the capability of the armed WZ-19 is suspect.

The biggest trump card India holds is the ALH in the utility class, capable of operating at altitudes similar to the Cheetah and with greater capacity of troop and load carriage. Being a state of art modern-day helicopter it is equipped with a 'Self Protection Suite' with a missile warning and chaff dispensing system, which can give it adequate protection against SAMs. The ALHs in sufficient numbers are already operating in Siachen and Ladakh areas and will be a force multiplier in case of a conflict.

In the Medium Lift Category, both India and China are operating the Russian origin Mi-17 helicopters. It is assumed that like India, China would also be operating the latest upgraded version, the Mi-17 V5 helicopters which have more powerful engines, modern-day avionics, glass cockpit and can be armed with rockets and machine guns. Besides, the Chinese also have the homemade Z-20 helicopter in this category, which has been seen flying in the area of the current standoff. It resembles the American UH-60 Black Hawk. India, on the other hand, has a very large fleet of Mi-17 V5s which have an excellent capability for high altitude operations and are also armed with rockets and machine guns.

In the Heavy Lift category the Chinese boast of the Z-8G large transport helicopter which, as per the Global Times, is capable of operating at high altitudes and is part of the activity in Eastern Ladakh. However, the Z-8G and its predecessor the Z-8 are a copy of French SA 321 Super Frelon which France had sold to China in the late 1970s – the SA 321 Super Frelon is no more in service and the so-called capability of the Z-8G needs to be taken with a pinch of salt. India, on the other hand, has recently acquired the Chinook heavy-lift helicopter which is a time tested warhorse and is in operation with 19 countries. It is a multirole platform used for transportation of troops, artillery guns and tanks, equipment and fuel. The Chinook is already being used by the Indian

military for ferrying heavy equipment and artillery guns along the borders with China and Pakistan. It certainly is a game-changer in India's favour.

With the Chinese having inducted light tanks in the area of the standoff, Armed/ Attack Helicopters (AH) are expected to play a significant role in case of a conflict. In the AH category, the much-touted state of art Chinese Z-10 AH's capability to operate at these altitudes is suspect due to its underpowered engines. It's due to this basic reason that the Pak army selected the Turkish T-129 ATAK attack helicopter over the Chinese Z-10. As per reports, the Chinese are working on a new engine which is yet to go into production.

On the other hand, the HAL developed Light Combat Helicopter (LCH) is basically designed for high altitude operations and has completed all requisite trials and is ready for induction into the army and air force. Unfortunately, the LCH is not yet in service, but keeping in mind the current situation its induction needs to be fast-tracked.

The recent induction of the Apache AH 64E Guardian AH, the most lethal and modern AH in the world has greatly enhanced the war fighting capability of the Indian military, but being a heavy-duty AH its capability to operate in the current environment is not likely, even though as per reports some Apache AH has been moved to forward airbases in Ladakh. What is of significance is that the Rudra – the armed ALH – can operate in this environment, but, sadly, is not yet fitted with an anti-tank missile. This is due to the DRDO's failure to produce the air-launched version of the NAG anti-tank missile called 'HELINA' over the last decade-plus.

All attempts to procure a suitable anti-tank missile ex import have been stonewalled at the behest of the DRDO by the government of the day with consequences detrimental to operational preparedness. Imagine having a state of art attack/armed helicopter, but without the most essential armament, the anti-tank missile. Hopefully, some action will now be taken by the government to speed up this process or the LCH will also meet the same fate.

Conclusion

While China may have the quantitative edge in different types of helicopters held, most of them do not have the capability to effectively operate at such altitudes because of underpowered engines. India, on the other hand, may lack numbers but certainly has a qualitative edge with helicopters like the ALH, Mi-17V5 and Chinook already operating extensively in such environments.

The Rudra with its armament package of rockets, guns and air to air missiles could be a very effective weapon system in this area despite not have the critical anti-tank missile. The biggest advantage that the Indian military has is its experience of flying these machines in far worse terrain and climatic conditions existing in the Siachen Glacier – in fact, army and air force helicopters regularly operate all along the LAC in Ladakh, Sikkim and Arunachal Pradesh, with the man and machine conditioned for such operations.

Helicopter operations will be the key to supporting and sustaining the troops deployed in the area and this requirement will become more pronounced in winter months when temperatures plummet, and icy winds and heavy snowfall adds to the existing woes.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of BharatShakti.in)

https://bharatshakti.in/india-china-ladakh-standoff-role-and-capability-of-helicopters/

THE TIMES OF INDIA

Wed, 15 July 2020

Indian and Chinese military commanders hold marathon talks on further disengagement in eastern Ladakh

New Delhi: Indian and Chinese military commanders on Tuesday held over 10-hour-long intense negotiations on finalising a framework for a "time-bound and verifiable" disengagement process from all the friction points in eastern Ladakh including Pangong Tso and Depsang, people familiar with the developments said.

The marathon fourth round of Lt General-level talks also focused on steps for pulling back large number of troops and weapons from rear bases along the Line of Actual Control (LAC) in eastern Ladakh, they said.

The Indian side insisted on "total restoration" of status quo ante in all areas of eastern Ladakh prior to May 5 when the standoff began following a clash between Indian and Chinese troops in Pangong Tso, sources said.

It also conveyed concerns over China's "new claim lines" in the region and demanded immediate withdrawal of Chinese troops from a number of areas including Pangong Tso, they said. There was no official word on details of the meeting.

The talks began at around 11am at a designated meeting point in Chushul on the Indian side of the de-facto border between the two countries and continued beyond 9pm.

The Indian delegation was led by Lt Gen Harinder Singh, the commander of the Leh-based 14 Corps, while the Chinese side was headed by the commander of the South Xinjiang military region.

The key focus of the talks was learnt to be on rolling out the phase two of the disengagement process besides firming up modalities for withdrawal of forces and weapons from the rear bases in a time-bound and verifiable manner, the sources said, adding they were aimed at further de-escalation of the situation at various friction points.

The third round of military talks on June 30 lasted for 12 hours.

The talks are taking place days after implementation of the first phase of the disengagement process from the friction points.

China's People's Liberation Army (PLA) has already completed pulling back troops from Gogra, Hot Springs and Galwan Valley and significantly thinned down its presence in the ridgeline of Finger Four in the Pangong Tso area in the last one week as demanded by India.

In line with a mutually agreed decision, the two sides created a minimum buffer zone of three kilometres in most of the friction points where they were locked in a standoff.

The formal process of disengagement of troops began on June 6, a day after a nearly two-hour long telephonic conversation between National Security Advisor Ajit Doval and Chinese Foreign Minister Wang Yi on ways to bring down tension in the area.

The two countries have already held three rounds of Lt General-level talks and the last one took place on June 30 during which both sides agreed on an "expeditious, phased and step wise" de-escalation as a "priority" to end the standoff.

At Tuesday's meeting, the sources said the two sides are also expected to finalise a roadmap for overall restoration of peace and tranquility in the high-altitude region that witnessed an eight-week bitter standoff between the troops of the two countries.

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

However, the situation deteriorated following the Galwan Valley clashes on June 15 as the two sides significantly bolstered their deployments in most areas along the LAC. The second round of talks took place on June 22.

The Indian and Chinese armies were locked in a bitter standoff in multiple locations in eastern Ladakh for over eight weeks since May 5.

The tension escalated after the violent clashes in Galwan Valley in which 20 Indian Army personnel were killed. The Chinese side also suffered casualties but it is yet to give out the details. According to an American intelligence report, the number of casualties on the Chinese side was 35.

Following the Galwan Valley incident, the government has given the armed forces "full freedom" to give a "befitting" response to any Chinese misadventure along the LAC.

The Army has rushed additional troops to forward locations along the border following the deadly clashes. The IAF has also moved air defence systems as well as a sizeable number of its frontline combat jets and attack helicopters to several key air bases.

https://timesofindia.indiatimes.com/india/indian-and-chinese-military-commanders-hold-marathon-talks-on-further-disengagement-in-eastern-ladakh/articleshow/76966131.cms

BHARAT SHAKTI
Self-Reliance in Defence

Wed, 15 July 2020

Indian Army alive to Chinese plans; Taking counter measures

By Nitin A. Gokhale

The Indian Army top brass is revisiting a tabletop exercise it carried out sometime in 2018, war-gaming possible Chinese moves all along the Himalayan frontier. This exercise, done in the wake of the 2017 Dolam (Doklam) crisis, had examined possible Chinese strategies and had come up with India's counter-response. Done across the Northern and Eastern Command geographies, the exercise was conceived by the Shimla-based Army Training Command (ARTRAC).

It had concluded that China would indulge in 'hit and run' tactics against India to test its own forces and also map India's response to small-, medium- and large-scale exercises-cum-mobilisations and that the PLA would apply pressure at multiple points to try and push the envelope. And repeat the sequence in a year or two.

Image Courtesy: ADG PI - Indian Army

Events since early May have panned out exactly as the 2018 exercise had predicted. As we now know, the conclusions reached at the end of that exercise were mirrored almost exactly this year. PLA ground forces mobilised in larger numbers in Aksai Chin than ever before, deployed armoured and artillery elements at several points close to the Line of Actual Control (LAC) and created multiple friction points. The PLA's military aim was two-fold: assess its own drills as well as the readiness of its troops and record India's response.

Incidentally, the current Chief of Defence Staff (CDS), General Bipin Rawat, was the Indian Army Chief and current Army Chief General MM Naravane was heading the Army Training Command (ARTRAC) when the exercise was undertaken.

India's rapid 'mirror' deployment in Ladakh and the robust response all along the eastern Ladakh frontier may have surprised many, including Chinese commanders but it now emerges that the Indian Army had anticipated such a contingency and the moment the Chinese mobilisation close to the LAC was noticed in early May, India deployed reserve troops of 14 Corps quickly and

followed it up with the induction of additional brigades from a Mountain Division earmarked for Ladakh but based outside the Northern Command's Area of Operations (AOR).

In any case, one of the three brigades of this division always exercises in Ladakh's high-altitude areas during the Spring-Summer months. So additional, well-acclimatised troops were already available in sufficient numbers when the Chinese started testing India's preparedness in early May. Subsequently, the entire Division was deployed in eastern Ladakh.

Another important finding of the 2018 exercise (and a couple of similar ones in earlier years), was that the Chinese would employ these tactics—deploy, raise the temperature and then withdraw after prolonged talks—at least twice in different locations (Ladakh this year, maybe opposite Arunachal Pradesh the next), spread over a period of three-four years and eventually launch a massive attack across the entire Himalayan frontier to settle the border once and for all.

Indian military planners have also anticipated the Chinese strategy of 'mobilise-deploy-withdraw' as a ruse to force India to commit forces permanently in operational locations close to the LAC and raise the cost. "Today it is Ladakh, next year it could be Barahoti area (in Uttarakhand), and Arunachal Pradesh thereafter. After every mobilisation, if we permanently locate additional forces in forward areas, the PLA would be most happy. That is the mistake we will not commit," a senior military planner revealed.

Forearmed with this assessment, India is watching the current three Ds process—disengagement, de-escalation and de-induction—with extreme caution. The Indian military is not letting its guard down, especially in the context of the betrayal on June 15 when Chinese troops attacked the Commanding Officer of 16 Bihar Col Santosh Babu breaking a long-standing protocol at the LAC. India lost 20 brave soldiers in the subsequent clash but retaliated in equal measure, inflicting heavy losses on the PLA too. The bloodshed and loss of lives was certainly a new experience for the PLA which has not seen any real battlefield action after 1979.

The 15 June clash at Galwan is likely to have created far-reaching ripples, effects of which will not be apparent immediately but the fact is the trust, for whatever it was worth, on the border is now replaced with tension and weariness, demolishing a long-held belief that the India-China border is peaceful.

As for the future, Indian planners are working on various plans to meet another likely Chinese attempt at intimidation and probing advances in coming years even as diplomacy tries to find lasting solutions to the contentious boundary issue. The plans include improving ISR (Intelligence, Surveillance and Reconnaissance) capability along the LAC, utilising additional heavy lift capability provided by the Indian Air Force (IAF) and speeding up all-weather surface connectivity to Ladakh and other vulnerable areas in Arunachal Pradesh and Sikkim. Raising the strength of various Scout battalions (Ladakh Scouts, Arunachal Scouts, Sikkim Scouts, Garhwal and Kumaon Scouts) is also on the anvil.

The Scout battalions, as the name suggests, function as the eyes and ears of the Army in the forward areas. The recruits are mostly drawn from amongst the local population and are therefore more familiar with the local topography and better acclimatised to high-altitude areas. Their deployment in forward areas helps the Army to get early warning and advance intelligence. More soldiers are likely to be recruited in these battalions in coming years and deploy them in company strength (100-odd men) instead of battalion.

Meanwhile, a comprehensive assessment of the Ladakh episode is currently underway in different segments on the Indian security establishment as well as in government-linked or government-supported think tanks. The three armed forces are carrying out their own review of the Chinese deployments, particular by the PLA and the PLA Air Force (PLAAF) in Xinjiang, Tibet and in Aksai Chin since early May, while a separate stock-taking of India's intelligence gathering capability, both TECHINT (technical intelligence) and HUMINT (human intelligence) is being done to figure out what could be done to better collect, collate and analyse varied intelligence inputs that are received from time to time. Think-tanks such as the MEA-funded China Centre for

Contemporary Studies (CCCS) are also looking at the possible non-military reasons for the Chinese actions in Ladakh and their long-term consequences for India-China relations.
https://bharatshakti.in/indian-army-alive-to-chinese-plans-taking-counter-measures/

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Wed, 15 July 2020

India proposes to build road in Bhutan's 'Yeti territory' which China claimed recently

By Dipanjan Roy Chaudhury

Synopsis

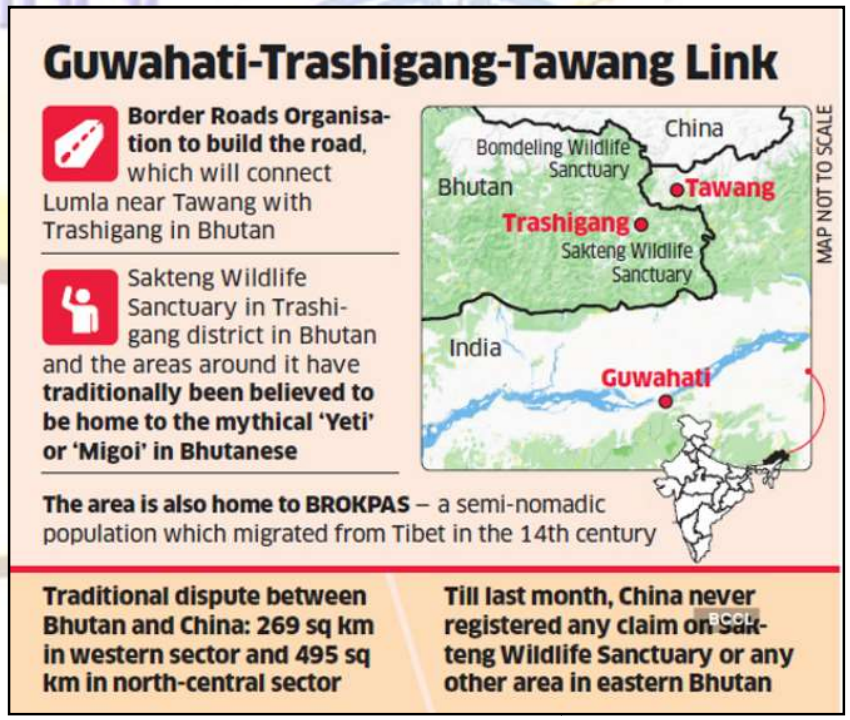
The road, which has strategic significance, will reduce the distance between Guwahati & Tawang by 150 kilometres, ET has learnt. This will enable India to deploy troops faster to respond to any military moves by China, not only across Tawang but also towards the eastern region of Bhutan.

New Delhi: India has proposed to build a road in Bhutan's 'Yeti territory' — which China claimed recently — enabling New Delhi to quickly access Tawang in Arunachal Pradesh, which borders China.

The road, which has strategic significance, will reduce the distance between Guwahati and Tawang by 150 kilometres, ET has learnt.

This will enable India to deploy troops faster to respond to any military moves by China, not only across Tawang, but also towards the eastern region of Bhutan.

China's new claim of territory in far-eastern Bhutan is linked to its claim on 90,000 sq km of territory in Arunachal Pradesh, according to experts familiar with the eastern sector of the India-China boundary.



China claims Tawang as part of its policy to have absolute control over Tibet. The sixth Dalai Lama was born in Tawang and the current Dalai Lama fled to India via Tawang.

India has earmarked Border Roads Organisation to build the road, which is important for Bhutan as well. The road will connect Lumla near Tawang with Trashigang in Bhutan. New Delhi and Thimphu have shared security interests.

In June, China tried to block funding by an international agency for the Sakteng Wildlife Sanctuary in far-eastern Bhutan. It claimed that the sanctuary as well as the areas around it were parts of disputed territory.

On its part, Thimphu served a demarche, stating that the territorial dispute between Bhutan and China were limited only to 269 sq km in the western sector and 495 sq km in the north-central sector of the boundary between them. It asserted that no part of its territory in the eastern sector was ever on the agenda of its boundary negotiation.

The Sakteng Wildlife Sanctuary in Trashigang district in far-eastern Bhutan and the areas around it have traditionally been believed to be home to the mythical 'Yeti' or 'Migoi' in Bhutanese. The area is also home to Brokpas — a semi-nomadic population which migrated from Tibet in the 14th century.

Bhutan and China have been negotiating to settle the boundary dispute since 1984. Till last month, China never registered any claim on Sakteng Wildlife Sanctuary or any other area in eastern Bhutan during the 24 rounds of boundary negotiations between 1984 and 2016. The boundary negotiations have remained in cold storage since the Dokalam crisis of 2017.

https://economictimes.indiatimes.com/news/defence/india-proposes-to-build-road-via-bhutans-wildlife-park/articleshow/76950740.cms

Wed, 15 July 2020

'Andaman & Nicobar Islands can be centre point of connecting strategic line of maritime hubs to tackle China'

Fully equipping ports and islands in a way to make them strategic outposts which would help monitor the naval activities could be a way to tackle Chinese maritime aggression, suggests an article in Modern Diplomacy.

The article, suggests a strategic line of maritime hubs "which can be called a chain of maritime hubs to tackle China". The article authored by Gitanjali Sinha Roy, while highlighting several incidents of Chinese aggression over sea and land, said: "One way to tackle China would be to full equip ports and islands in a way to make them strategic outposts which would help monitor the naval activities combining it with an integrated surveillance network which would give all the countries tactical leverage in the various regional seas."

The author mentioned several incidents of Chinese aggression — this year in April, a Vietnamese fishing vessel in the South China Sea was sunk by a Chinese ship, a stand-off between a Chinese survey ship and Malaysian oil exploration ship in Malaysia's exclusive economic zone (EEZ) took place. In July, Chinese coast guard ships had twice intruded into the Japanese territorial waters and these Chinese ships were once approaching the Japanese fishing boats which were blocked by the Japanese coast guard.

"China has also expanded an artificial island in the Maldives and this has led to China encroaching upon India's realm of influence. China has also deployed submarines and intelligence ships in the Indian Ocean. This could be China's game of power projection in the Indian Ocean region and yet again, one can say it is the revival of the strategic encirclement earlier done through 'the string of pearls strategy' against India. Therefore, Chinese maritime aggression is a rather major cause of concern," the article said.

The author stated that India's Andaman and Nicobar Islands can be the central point of connecting, monitoring and surveillance for Vietnam's Cam Ranh Bay and Djibouti.

The article noted that Viet Nam's Cam Ranh Bay is one of the most equipped ports of all time and it is geostrategically the closest to the South China Sea and has always been the hub of refuelling, repairing vessels and aircraft carriers.

"The Cam Ranh Bay is also a vital port in the sea lines of communication and is critical in the maritime passageways and so, it can be used to monitor the Chinese moments. If the U.S. gets the Cam Ranh Bay, then it can upgrade and modernise the Cam Ranh Bay making it the starting point of the maritime chain hub to tackle China," the author said.

Vietnam has been one of the most vocal countries in the region against continued Chinese belligerence in South China Sea.

The article stated that India's strategically located Andaman and Nicobar Islands can be a centre point of this maritime hub to tackle China.

China's expanding footprints in the Indian Ocean region has been a cause of concern for India.

"In 2019, India set up an Indian Naval Air Station-INS Kohassa and has been developing the island to its full strength. Also, Japan has also been actively participating as Japan's NEC Corporation has been installing an undersea cable from Chennai to the Andaman and Nicobar Islands," the author said.

"Therefore, some believe that as the Indian Navy is developing these islands, it becomes a vital strategic outpost for India to monitor rival naval activities and has invested to develop an integrated surveillance network and so, the Andaman and Nicobar can be the centre point of connect, monitoring and surveillance for Cam Ranh Bay and Djibouti," the article added. Finally, the author mentions of Djibouti as a third and last point of the maritime chain hub to tackle China. It is important to note that China already has a support base in Djibouti which is also a military base operated by the Chinese PLAN.

The author stressed that the interesting part is that the south part of the Djibouti city are the military bases which are Camp Lemonnier run by the United States Navy, Base Aerienne run by the French Air Force and the Japan Self-Defence Force Base Djibouti and all these three countries bases can be the "third and most crucial point of the maritime chain hub to tackle China."

The article underlines that the future of global order lies in who controls the world waterways and so China is watching and expanding in the regional seas. It stated that the foreign countries will have to go beyond normal and they must work in unison to tackle Chinese aggressiveness in all parts of regional seas.

"It would be rather sensible for all the other countries like the U.S, France, Japan, India and Viet Nam to cooperate and coordinate and try to develop and work towards this concept of a strategic Maritime chain hub to tackle China and this could also be discussed as part of the Quad meetings and also invite more countries to join in," it said.

https://idrw.org/andaman-nicobar-islands-can-be-centre-point-of-connecting-strategic-line-of-maritime-hubs-to-tackle-china/#more-230941

Wed, 15 July 2020

Kargil Vijay Diwas 2020: Tribute to the heroes of 'Operation Vijay'

Kargil Vijay Diwas 2020: Named after the successful 'Operation Vijay', Kargil Vijay Diwas is a day when the country pays homage to the Kargil War heroes and celebrates victory over Pakistan in the Kargil War

Edited By Debjani Chaterjee

New Delhi: India will observe the 21st anniversary of Kargil Vijay Diwas on July 26. Named after the successful 'Operation Vijay', Kargil Vijay Diwas is a day when the country pays homage to the Kargil War heroes and celebrates victory over Pakistan in the Kargil War. 'Operation Vijay' was the name given to India's limited war against Pakistan after the neighbouring country occupied the high outposts in Jammu and Kashmir's Kargil in 1999.

On July 26, 1999, India successfully regained command over all the high outposts. The Kargil War was fought for more than 60 days.

Kargil Vij:ay Diwas 2020: Every year on July 26, India remembers the Kargil War heroes

On Saturday, Prime Minister Narendra Modi tweeted that he will speak to the people of the country in his 'Mann Ki Baat' on July 26. Last year, PM Modi had said that the day should be remembered for the "courage, bravery and dedication" shown by the soldiers who took part in Operation Vijay.

Under 'Operation Vijay', the Indian government had mobilized two lakh troops. In the Kargil War, 527 soldiers from the Indian Armed Forces sacrificed their lives. The Kargil War Memorial, built by the Indian Army, is located in Dras, about five kilometre from the Tiger Hill.

India, on July 7, remembered Captain Vikram Batra, the Kargil War hero, on his 21st death anniversary. Captain Vikram Batra sacrificed his life fighting Pakistani forces during the Kargil War. At the age of 24, Captain Batra became the face of the Indian soldier at Kargil, whose words reverberate even today - 'Yeh Dil Maange More..' The soldier took the advertising slogan and elevated it to a motto for life.

Another Kargil War hero, Captain K Nachiketa, was captured by the soldiers of the Pakistani Northern Light Infantry during the Kargil War. He was brutally beaten and tortured. The fighter pilot had been assigned the task of hitting Pakistani posts in Kargil at altitudes in excess of 17,000 feet.

Eight days after he was captured and after intense efforts made by the government of India to secure his release, Captain Nachiketa was handed over to the Red Cross, which brought him back to India. He was greeted by the then President KR Narayanan and former Prime Minister Vajpayee.

For most, this would have been enough to call it a day. But Captain Nachiketa is clearly made of sterner stuff. He could not return to fighter flying because of an injury to his back when he ejected over Kargil but he was able to enter the Indian Air Force's transport fleet and continues to fly giant Il-76 transports.

https://www.ndtv.com/india-news/kargil-vijay-diwas-2020-date-operation-vijay-and-tribute-to-the-kargil-war-heroes-2262655

DefenceNews

Wed, 15 July 2020

Beijing unilaterally trying to change status quo from India to Bhutan to South China Sea: Japan

Accusing China of pushing its territorial claims amid the coronavirus pandemic, Japan has come out with its defence white paper on the security in the region. It highlighted the growing Chinese aggressiveness and its naval acitivities in the region and its plans to alert status quo unilaterally in several areas in Asia including India, Bhutan and South China.

News agency Associated Press (AP) quoted Japanese Defence Minister Tarō Kōno speaking on Chinese aggressiveness India and Japan as he stated, "Bejing has been unilaterally enforcing its power on the border between China and India, the Bhutan border, in the South China Sea, the East China Sea and multiple places. We wrote specifically about its behaviour (in the white paper)."

As per WION, the white paper by the Japanese Defence Ministry stated, "China has relentlessly continued unilateral attempts to change the status quo by coercion in the sea area around the Senkaku Islands, leading to a grave matter of concern."

In its white paper, Prime Minister Shinzo Abe's government criticised Beijing for relentlessly attempting to undermine Tokyo's administration of the Senkaku Islanad in the East China Sea . Explaining how the Chinese Navy and Air Force have in recent years expanded and intensified their activities in the surrounding sea areas and the airspace of Japan, and there are cases involving the one-sided escalation of activities.

Senkaku Islands in the East China Sea are administered by Japan but China claims them as their own and call it Diaoyu.

On the South China Sea issue, the Japanese defence white papers said,"China is moving forward with militarization, as well as expanding and intensifying its activities in the maritime and aerial domains, thereby continuing unilateral attempts to change the status quo by coercion to create a fait accompli."

On the increased capabilities by Chinese forces in more distant seas such as the Indian Ocean in recent years, the defence white papers said, "China"s support for the construction of port infrastructure in Indian Ocean countries as well as Pacific island countries could lead China to secure bases available for its military purpose".

This is something that has been a worry for India, given China's first overseas base in Djibouti and presence in Pakistan's Gwadar port.

Both India and Japan have been increasing defence partnership. In September 2019, a Japan-India defense ministerial meeting was held followed by the first Japan-India 2+2 foreign and defense ministerial meeting in November of the same year.

On COVID-19, the white paper said, "The pandemic may expose and intensify strategic competition among countries intending to create international and regional orders more preferable to themselves and to expand their influence."

https://www.defencenews.in/article/Beijing-unilaterally-trying-to-change-status-quo-from-India-to-Bhutan-to-South-China-Sea-Japan-871621

The Indian EXPRESS

Wed, 15 July 2020

Explained: India's military ties with Nepal

Soldiers from Nepal form a significant part of the Indian Army's legendary Gurkha regiment. Here is a brief explainer on the origin and evolution of these ties

By Manraj Grewal Sharma

Chandigarh: On July 10, Havildar Sambur Gurung (36), a soldier from Nepal serving in the Gurkha regiment, was killed in cross-border firing along the Line of Control in Nowshera sector of Jammu. Coming amidst the chill in the Indo-Nepal ties, Gurung's supreme sacrifice is a reminder about the strong ties between the Indian and Nepalese armed forces. Soldiers from Nepal form a significant part of the Indian Army's legendary Gurkha regiment. Here is a brief explainer on the origin and evolution of these ties:

The origin of India's military ties with Nepal

Former Army Chief Gen VP Malik (retd), who has dedicated a chapter to Nepal in his book 'India's Military Conflicts & Diplomacy', says India's military connection with the Himalayan country goes back to the reign of Maharaja Ranjit Singh whose army in Lahore enlisted Nepalese soldiers called Lahure or soldiers of fortune.

At the 13th Edition of the bilateral biannual military exercise, between India and Nepal Army, Pithoragarh, May 30, 2018. (Source: Twitter/@SpokespersonMoD/ Representational Image)

British India raised the first battalion of the Gurkha Regiment as the Nasiri regiment on April 24, 1815. By the time the First World War started, there were 10 Gurkha regiments in the British Indian Army.

When India got freedom, these regiments were divided between the British and Indian armies as per the Britain–India–Nepal Tripartite Agreement signed in November 1947. Six Gurkha regiments with a lakh-odd soldier came to India, which went on to raise another regiment called 11 Gurkha Rifles to accommodate soldiers of 7th Gurkha Rifles and the 10th Gurkha Rifles, who chose not to transfer to the British Army.

Can Nepali citizens join the Indian Army?

Yes, any Nepali can join the Indian Army, both as a jawan and as an officer. A citizen of Nepal can take the National Defence Academy or Combined Defence Services exams and join the Indian Army as an officer. Col Lalit Rai, who received a Vir Chakra for the bravery of his battalion, the 1/11 Gurkha Rifles, during the Kargil war, is one such officer of Nepalese descent.

The Nepalese army also sends its officers for training to India's military academies and combat colleges.

The Gurkha regiments, which have 35 battalions, recruit a large number of troops from Nepal.

Lt Gen DS Hooda (retd), the Northern Army commander during the surgical strikes of 2016, who was commissioned into 4th Gurkhas, vouches for the strong inter-personal ties between the soldiers and officers of the two countries due to the Gurkha regiments. "Every year, our battalions commission a tour of Nepal. Young officers from India trek to traditional recruiting areas in the rugged Himalayas, meet the locals, and often live in villages with ex-servicemen."

Both the officers and the troops are fiercely proud of their war cry 'Jai Maha Kali, Ayo Gorkhali', the khukri, and their command over Gurkhali language. Lt Gen Depinder Singh (retd), former chief of the Indian Peace Keeping Force (IPKF), and an officer of the Gurkha regiment, recalls how in the initial years after Independence, any officer who could not master Gurkhali in three months was shifted to another regiment.

Do the soldiers from Nepal enjoy the same rights as the Indian troops?

Yes, they enjoy the same benefits as the India troops both during service and after retirement. They get the same medical facilities as the Indian soldiers, and often medical teams from the Indian Army tour Nepal. Unlike the British, who started giving the Nepalese soldiers pension only a few years ago, the Indian Army has never discriminated against the Nepalese soldiers, who can avail of healthcare facilities in India as well. The Indian Army also runs welfare projects in Nepal villages, including small water and power projects.

Is the Indian Chief of Army Staff the honorary chief of the Nepalese army?

Yes, this convention dates back to 1972 when then Field Marshal Sam Manekshaw, a Gurkha regiment officer, fondly called Sam Bahadur by his troops, was made the honorary chief of the Nepalese army. Ever since, the Army chief of India is the honorary chief of the Nepalese army and vice-versa.

https://indianexpress.com/article/explained/india-nepal-military-relations-6505544/

Science & Technology News

EurekAlert!

Tue, 14 July 2020

New solar material could clean drinking water

Research Triangle Park, N.C. (July 13, 2020) - Providing clean water to Soldiers in the field and citizens around the world is essential, and yet one of the world's greatest challenges. Now a new super-wicking and super-light-absorbing aluminum material developed with Army funding could change that.

IMAGE: With Army funding researchers at the University of Rochester have developed an aluminum panel that angled at the sun purifies water. view more

With funding from the Army Research Office, an element of the U.S. Army Combat Capabilities Development Command's Army Research Laboratory, researchers at the University of Rochester have developed a new aluminum panel that more efficiently concentrates solar energy to evaporate and purify contaminated water.

"The Army and its warfighters run on water, so there is particular interest in basic materials research that could lead to advanced technologies for generating drinking water," said Dr. Evan Runnerstrom, program manager at ARO. "The combined super-wicking and light-absorbing properties of these aluminum surfaces may enable passive or low-power water purification to better sustain the warfighter in the field."

The researchers developed a laser processing technology that turns regular aluminum pitch black, making it highly absorptive, as well as super-wicking (it wicks water uphill against gravity). They then applied this super absorptive and super-wicking aluminum for this solar water purification.

The technology featured in *Nature Sustainability*, uses a burst of femtosecond (ultrashort) laser pulses to etch the surface of a normal sheet of aluminum. When the aluminum panel is dipped in water at an angle facing the sun, it draws a thin film of water upwards over the metal's surface. At the same time, the blackened surface retains nearly 100-percent of the energy it absorbs from the

sun to quickly heat the water. Finally, the wicking surface structures change the inter-molecular bonds of the water, increasing the efficiency of the evaporation process even further.

"These three things together enable the technology to operate better than an ideal device at 100 percent efficiency," said Professor Chunlei Guo, professor of optics at University of Rochester. "This is a simple, durable, inexpensive way to address the global water crisis, especially in developing nations."

Experiments by the lab show that the method reduces the presence of all common contaminants, such as detergent, dyes, urine, heavy metals and glycerin, to safe levels for drinking.

The technology could also be useful in developed countries for relieving water shortages in drought-stricken areas, and for water desalinization projects, Guo said.

Using sunlight to boil has long been recognized as a way to eliminate microbial pathogens and reduce deaths from diarrheal infections, but boiling water does not eliminate heavy metals and other contaminants.

Solar-based water purification; however, can greatly reduce these contaminants because nearly all the impurities are left behind when the evaporating water becomes gaseous and then condenses and gets collected.

The most common method of solar-based water evaporation is volume heating, in which a large volume of water is heated but only the top layer can evaporate. This is obviously inefficient, Guo said, because only a small fraction of the heating energy gets used.

A more efficient approach, called interfacial heating, places floating, multi-layered absorbing and wicking materials on top of the water, so that only water near the surface needs to be heated. But the available materials all have to float horizontally on top of the water and cannot face the sun directly. Furthermore, the available wicking materials become quickly clogged with contaminants left behind after evaporation, requiring frequent replacement of the materials.

The aluminum panel the researchers developed avoids these difficulties by pulling a thin layer of water out of the reservoir and directly onto the solar absorber surface for heating and evaporation.

"Moreover, because we use an open-grooved surface, it is very easy to clean by simply spraying it," Guo said. "The biggest advantage is that the angle of the panels can be continuously adjusted to directly face the sun as it rises and then moves across the sky before setting - maximizing energy absorption."

The Army and Guo are exploring transition opportunities to further develop this technology within DOD laboratories and private industry.

https://www.eurekalert.org/pub_releases/2020-07/uarl-nsm071320.php

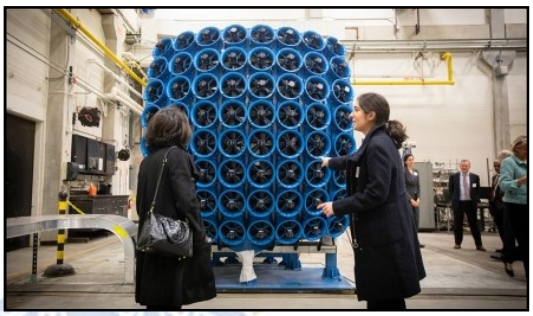
Wed, 15 July 2020

UB engineer to track how wildfires spread, help save lives

By Peter Murphy

Buffalo, N.Y. – University at Buffalo engineer Negar Elhami-Khorasani is part of a multi-institutional group of researchers who are using science and technology to better understand and help prevent deadly wildfires.

"Wildfires have always been part of the natural landscape for a healthy ecosystem, yet these fires are projected to become more frequent and intense," says Elhami-Khorasani, PhD, assistant professor in civil engineering in the School of Engineering and Applied Sciences. "The economic and social impacts of wildfires have risen in recent years, and now represent a global concern."



Engineer Negar Elhami-Khorasani, right, stands in front of a wind tunnel at UB that's used for wildfire research.

The research group, led by the University of Nevada, Reno (UNR), recently received a five-year, $2 million grant from the National Science Foundation's Leading Engineering for America's Prosperity, Health and Infrastructure program.

Elhami-Khorasani will develop a data-driven urban fire spread model to evaluate wildfire risk in wildland urban interface (WUI) communities, which are areas where natural environments meet human-developed land. She will study temporal and spatial spread of fire, considering uncertainties in urban fuel, landscape, vegetation, and environmental factors.

Along with the rest of the team, Elhami-Khorasani will establish a continuous fire risk assessment framework moving from the wildland to urban and suburban areas. She will also collaborate with the UNR to translate total burned area in a community to economic losses and its effects on community residents' perception of life.

The group was assembled Hamed Ebrahimian, an assistant professor at UNR, who began pursuing a better way to understand fire risk after the 2018 Camp Fire, which was the deadliest and most destructive wildfire in California history.

"Some of the most tragic fatalities in the Camp Fire were due to unpredicted fire behavior, which surprised the victims and eliminated the proper reaction time," Ebrahimian says.

University of California, Los Angeles, the National Center for Atmospheric Research in Boulder, the Desert Research Institute and other University of Nevada units will collaborate with researchers at UNR and UB.

Elhami-Khorasani's research investigates performance of the built environment under extreme loading and multi-hazard scenarios, especially fire and fire following earthquakes.

She is a member of several professional associations, including the American Society of Civil Engineers (ASCE) Fire Protection Committee, the International Association for Fire Safety Science (IAFSS) Large Outdoor Fires and the Built Environment working group, the ASCE Task Group 2 on Reliability based Performance for Structural Systems, and the fib Task Group on Performance-Based Design.

For more information on the project, visit UNR's website.

http://www.buffalo.edu/news/releases/2020/07/009.html

EurekAlert!

Wed, 15 July 2020

NREL research points to strategies for recycling of solar panels

Researchers at the National Renewable Energy Laboratory (NREL) have conducted the first global assessment into the most promising approaches to end-of-life management for solar photovoltaic (PV) modules.

PV modules have a 30-year lifespan. There is currently no plan for how to manage this at end of their lifespan. The volume of modules no longer needed could total 80 million metric tons by 2050. In addition to quantity, the nature of the waste also poses challenges. PV modules are made of valuable, precious, critical, and toxic materials. There is currently no standard for how to recycle the valuable ones and mitigate the toxic ones.

Numerous articles review individual options for PV recycling but, until now, no one has done a global assessment of all PV recycling efforts to identify the most promising approaches.

"PV is a major part of the energy transition," said Garvin Heath, a senior scientist at NREL who specializes in sustainability science. "We must be good stewards of these materials and develop a circular economy for PV modules."

Heath is lead author of "Research and development priorities for silicon photovoltaic module recycling supporting a circular economy," which appears in the journal *Nature Energy*. His co-authors from NREL are Timothy Silverman, Michael Kempe, Michael Deceglie, and Teresa Barnes; and former NREL colleagues Tim Remo and Hao Cui. The team also collaborated with outside experts, particularly in solar manufacturing.

"It provides a succinct, in-depth synthesis of where we should and should not steer our focus as researchers, investors, and policymakers," Heath said.

The authors focused on the recycling of crystalline silicon, a material used in more than 90% of installed PV systems in a very pure form. It accounts for about half of the energy, carbon footprint, and cost to produce PV modules, but only a small portion of their mass. Silicon's value is determined by its purity.

"It takes a lot of investment to make silicon pure," said Silverman, PV hardware expert. "For a PV module, you take these silicon cells, seal them up in a weatherproof package where they're touching other materials, and wait 20 to 30 years--all the while, PV technology is improving. How can we get back that energy and material investment in the best way for the environment?"

The authors found some countries have PV recycling regulations in place, while others are just beginning to consider solutions. Currently, only one crystalline silicon PV-dedicated recycling facility exists in the world due to the limited amount of waste being produced today.

Based on their findings, the authors recommend research and development to reduce recycling costs and environmental impacts, while maximizing material recovery. They suggest focusing on high-value silicon versus intact silicon wafers. The latter has been touted as achievable, but silicon wafers often crack and would not likely meet today's exacting standards to enable direct reuse. To recover high-value silicon, the authors highlight the need for research and development of silicon purification processes.

The authors also emphasize that the environmental and economic impacts of recycling practices should be explored using techno-economic analyses and life-cycle assessments.

Finally, the authors note that finding ways to avoid waste to begin with is an important part of the equation, including how to make solar panels last longer, use materials more effectively, and produce electricity more efficiently.

"We need research and development because the accumulation of waste will sneak up on us," Silverman said. "Much like the exponential growth of PV installations, it will seem to move slowly and then rapidly accelerate. By the time there's enough waste to open a PV-dedicated facility, we need to have already studied the proper process."

If successful, these findings could contribute one piece of a PV circular economy.

https://www.eurekalert.org/pub_releases/2020-07/drel-nrp071420.php

EurekAlert!

Wed, 15 July 2020

Underused part of the electromagnetic spectrum gets optics boost from metamaterial

Terahertz radiation, or T-rays, has barely been exploited compared to most of the rest of the electromagnetic spectrum. Yet T-rays potentially have applications in next-generation wireless communications (6G/7G), security systems, biomedicine, and even art history. A new device for controlling T-rays using a specially designed 'metasurface' with properties not found in nature could begin to realize this potential.

The findings are published in the peer-reviewed journal *Optics Express* on July 13th, 2020.

The 'terahertz gap' is a term used by engineers to describe how very little technology exists that makes use of the frequency band in the electromagnetic spectrum that lies between microwaves and infrared radiation: terahertz radiation (also called T-rays).

While it is straightforward to generate and manipulate microwaves and infrared radiation, practical technologies that operate at room temperature and that are able to do the same with T-rays are inefficient and impractical.

This is a great shame, as the properties of T-rays would make them extremely useful if we could indeed harness them.

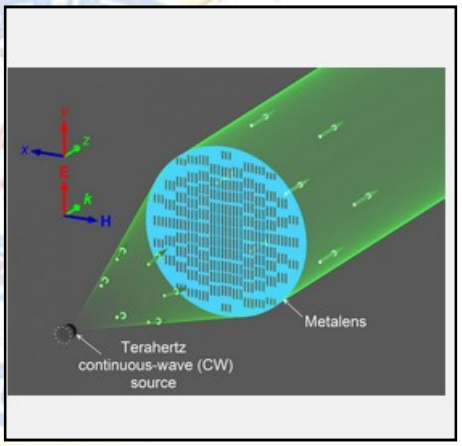


IMAGE: Terahertz metasurface ultra-thin collimator for power enhancement view more

T-rays can penetrate opaque objects like X-rays, but they are non-ionizing, so much safer. They can also go through clothing, wood, plastics, and ceramics, so are of interest for the security and surveillance sector for real-time imaging to identify concealed guns or explosives. For this same reason, terahertz radiation applications are also promising for cultural heritage science, offering art historians and museums a no-radiation risk option for investigation of artifacts ranging from paintings to mummies.

Terahertz technology that allows generation, detection, and application of terahertz waves has taken off in the last decade or so, closing the terahertz gap somewhat. But the performance and dimensions of conventional optical components able to manipulate terahertz waves have not kept up with this rapid development. One reason is the lack of naturally occurring materials suitable for the terahertz waveband.

However, researchers at Tokyo University of Agriculture and Technology (TUAT) led by Associate Professor and terahertz wave engineer Takehito Suzuki have recently developed an optical component that can more easily manipulate T-rays and in a practical fashion--by using a material that doesn't occur in nature.

Conventionally, a collimator--a device that narrows beams or waves, typically consisting of a curved lens or mirror--that can manipulate T-rays is a bulky three-dimensional structure made of naturally occurring materials.

But the TUAT researchers, Takehito Suzuki, Kota Endo, and Satoshi Kondoh, have devised a collimator as an ultra-thin (2.22 micrometers) plane made from a 'metasurface'--a material that is engineered to have properties that are impossible or difficult to find in nature. These properties come not from whatever metal or plastic base substance they are composed of, but instead from the geometry and arrangement of the material in tiny repeating patterns that can bend electromagnetic waves in a way that natural substances cannot.

In this case, the material has an extremely high refractive index (how slow light travels through it) and low reflectance (proportion of light reflected after striking a surface). The collimator consists of 339 pairs of meta-atoms arranged so that the refractive index concentrically increases from the outside to the center of the device.

"The metasurface design is unprecedented," said Suzuki, "delivering a much higher performance that should accelerate the development of a wide range of applications, including next-generation wireless communications (6G/7G) and even thermal radiation control devices."

https://www.eurekalert.org/pub_releases/2020-07/tuoa-upo071420.php

COVID-19 Research News

THE TIMES OF INDIA

Wed, 15 July 2020

IIT Delhi's low-cost Covid-19 test kit to be launched commercially on Wednesday

New Delhi: A low-cost Covid-19 test kit developed by Indian Institute of Technology Delhi that uses an alternative testing method will be launched on Wednesday, according to the IIT director here. IIT Delhi, which became the first academic institute to develop a Covid-19 testing method, gave non-exclusive open licence to companies for commercialising the test, but with a price rider.

While the institute had kept a price rider of Rs 500 per kit, the company Newtech Medical Devices, which is launching the kit named 'corosure' on Wednesday, has not announced the price yet.

Union Human Resource Development (HRD) Minister Ramesh Pokhriyal 'Nishank and Minister of State for HRD Sanjay Dhotre will launch the kit.

"This should change the paradigm of Covid-19 testing in the country, both in terms of scale and cost. The product, approved by ICMR (Indian Council of Medical Research) and DCGI (Drug Controller General of India), is being launched tomorrow.

"The company Newtech Medical Devices, using IIT Delhi technology, can do two million tests per month at an extremely affordable cost. This is a true example of lab to market," said IIT Delhi Director V Ramgopal Rao.

According to the team at IIT Delhi, the current testing methods available are "probe-based", while the one developed by them is a "probe-free" method, which reduces the testing cost without compromising on accuracy.

Using comparative sequence analyses, the IIT Delhi team identified unique regions (short stretches of RNA sequences) in the Covid-19 and SARS COV-2 genome.

"These unique regions are not present in other human coronaviruses providing an opportunity to specifically detect Covid-19," Professor Vivekanandan Perumal, lead member of the team, had told.

"Primer sets, targeting unique regions in the spike protein of Covid-19, were designed and tested using real-time polymerase chain reaction. The primers designed by the group specifically bind to regions conserved in over 200 fully sequenced Covid-19 genomes. The sensitivity of this in-house assay is comparable to that of commercially available kits," Perumal added.

With 28,498 fresh cases recorded in a day, India's Covid-19 tally sprinted past nine lakh on Tuesday, just three days after it crossed the eight-lakh mark, according to the Union health ministry data.

The total coronavirus caseload in the country surged to 9,06,752 and the death toll mounted to 23,727 with 553 people succumbing to the disease in 24 hours, the data updated at 8 am on Tuesday showed.

https://timesofindia.indiatimes.com/city/delhi/iit-delhis-low-cost-covid-19-test-kit-to-be-launched-commercially-on-wednesday/articleshow/76959167.cms

hindustantimes

Wed, 15 July 2020

India on fast-track mode to develop Covid-19 vaccine: ICMR

Highlighting an important fact that is not known about Indian vaccines and drugs, Dr Bhargava said --i.e. 60 per cent of the vaccines (like Rubella, measles, polio) supplied in the world, whether it be Africa, Europe, South East Asia or anywhere are of Indian origin

India is considered as the "pharmacy of the world", about 60 per cent of the drugs uitilised in the United States of America are of Indian origin. So, these are generic drugs produced in India where the country has established itself over the years. This is possibly well known to many people in the world, said (Prof) Dr Balram Bhargava, Director General of Indian Council of Medical Research (ICMR).

Highlighting an important fact that is not known about Indian vaccines and drugs, Dr Bhargava said --i.e. 60 per cent of the vaccines (like Rubella, measles, polio) supplied in the world, whether it be Africa, Europe, South East Asia or anywhere are of Indian origin.

So, India is perceived as an important player in vaccines for supply for the world, he said.

"Any vaccine candidate which is being produced or developed in any part of the world will ultimately have to be scaled up by India or by China. Because these two countries are major producers of vaccines in the world and India supplies 60 per cent of vaccines to the world that all developed nations are aware of it. And therefore, they are in communication with India for the vaccine distribution ultimately, if it is developed to the whole world," Bhargava said.

As far as coronavirus pandemic is concerned, the top scientist of the apex medical research body said that in India's perspective, the country have two indigenous candidate vaccines which scientists are trying their best to fast-track it as their morale duty so that there should not be a delay of a single day for regulatory clearances for these vaccines to break the transmission of the virus as soon as possible.

"There are two indigenous candidate vaccines and they have gone successful toxicity studies in rats, mice and rabbits. These data were submitted to the Drugs Controller General of India (DCGI) following which both these candidate vaccines got clearance to start the early phase of human trials," informed ICMR Director-General.

Recently, ANI reported that DCGI has given its permission to pharma giant Zydus Cadila and Bharat Biotech International Limited (BBIL), who has partnered with ICMR to conduct phase I/II clinical trials on humans for Covid -19 vaccine.

"Now, they have got their sites ready and they are doing the clinical study approximately on 1,000 volunteers each at different sites. They are trying to do early clinical testing for these two candidate vaccines. There are pre-clinical experiments as well for other vaccines being done at National Institute of Virology (NIV) in Pune. Experts are working day and night to do these experiments and it is their moral duty to develop vaccines as fast as possible as more than half a million people have succumbed to Covid-19 across the world. So "fast-tracking" the development of Covid vaccines is more important," said Dr Bhargava.

"Recently, Russia has fast-tracked a vaccine which has been successful and it is in early phases and they have fast-tracked its development. And the world has applauded it and congratulated them. China has fast-tracked its vaccine programme. Meanwhile, the US and UK are looking for ways to fast track its vaccine development for human use," added Bhargava.

https://www.hindustantimes.com/india-news/india-pharmacy-of-the-world-on-fast-track-mode-to-develop-covid-19-vaccine-icmr/story-by8hH2KeA0Qn8bnLcosJUI.html

hindustantimes

Wed, 15 July 2020

TB vaccine averts severe infections, deaths from Covid-19: Study

The BCG vaccine protects against disseminated TB and meningitis in childhood, but doesn't offer protection from adult pulmonary TB, which has led to several countries discontinuing its use

By Sanchita Sharma

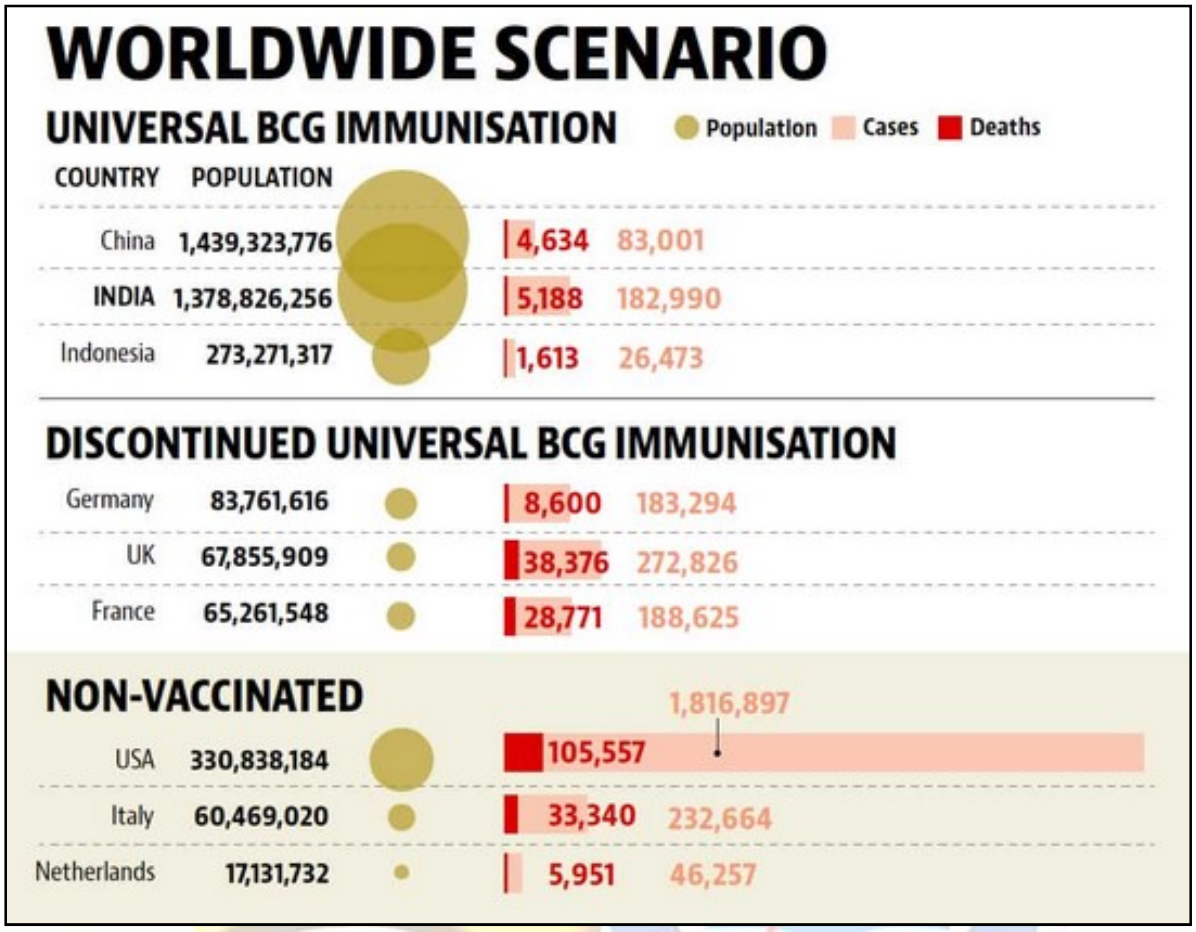
New Delhi: The inexpensive and widely-used Bacillus Calmette–Guerin (BCG) vaccine that protects against childhood tuberculosis also prevents severe infection and death from coronavirus disease (Covid-19), concluded two peer-reviewed studies released last week, including one led by Indian researchers from the Jawaharlal Nehru University (JNU) Delhi.

The JNU study from India found that the quality of protection depends on the BCG strain used to make the vaccine, with Mixed, Pasteur and Japan strains being superior to the three other strains which together account for more than 90% of the BCG vaccines being used in the world. The peer-reviewed study was published in Cell Death and Disease, which part of the Nature group of journals. The second study from the US, published in the Proceedings of the National Academy of Sciences, also linked BCG vaccination with reduced Covid-19 deaths.

"Those who got BCG vaccination, not just in India but in other countries, are more protected than those who were not, shows this analysis of data for countries with over 1,000 reported cases. We think BCG-mediated immune response would help in lowering both incidence and severity of infection," said study author Gobardhan Das, chairperson, Centre for Molecular Medicine, Jawaharlal Nehru University, New Delhi. Around 100 million children around the world get the BCG vaccine every year.

The six major BCG strains that now account for at least 90% of the BCG vaccines employed worldwide are Pasteur, Danish, Glaxo 1077 (derived from the Danish strain), Tokyo, Russia, and Moreau. "The data shows that BCG offers some degree of protection against Covid-19, but all the countries (that give BCG vaccines to their children) do not do equally well, so we looked at which strain offered better protection. We analysed all the strains being used and found that some of the

strains, such as BCG Mix, BCG Pastuer, and BCG Tokyo do better compared to others, such as BCG Russia and BCG Danish. India uses BCG Mix vaccine," said Das.



BCG vaccination of children began in India in 1949; in 2019, at least 97% of the 26 million Indian children born that years received it. The vaccine protects against disseminated TB and meningitis in childhood, but doesn't offer protection from adult pulmonary TB, which has led to several countries discontinuing its use.

"BCG is a potent immune-modulator, especially of the cell-mediated immunity. BCG has protective effects against leprosy, buruli ulcer, bladder cancer, type-1 diabetes and several other diseases, including those not associated with mycobacteria. Macaques immunised with BCG have incidence of pulmonary infections, which led to a proposal for BCG immunisation for the prevention against various respiratory infections. Since Covid-19 is also a respiratory infection, it gives another basis for the study," said Das, who did the study with researchers from the JNU School of Computer and System Sciences, and School of Computational and Integrative Sciences.

Many clinicians and epidemiologists are unconvinced about the findings. "I don't think there's convincing evidence, which we can only get from randomised controlled trials that enroll a large number of people. It is highly unlikely that the protection will last till adulthood, we have convincing evidence from India that it does not protect against adult TB, even in children, it just prevents simple TB from becoming systemic and affecting the brain and other organ," paediatric pulmonologist Dr Krishnan Chhugh, director of paediatrics at Fortis Memorial Research Institute, Gurugram.

Epidemiologists are concerned that most countries with high BCG vaccination rates are not testing enough and those that are registering a sharp increase in numbers. "Several countries now have rapidly escalating Covid-19 outbreaks, including Brazil, India, Russia, Mexico, Peru, Chile. And they all routinely give BCG at birth. So, it is dangerous to make conclusions in such a dynamic situation. We simply cannot act on these correlations and must wait for randomised trials

on BCG and Covid-19," tweeted Prof Madhukar Pai, director, McGill Global Health Programmes, McGill University, Montreal, Canada.

"We can't say `We have been vaccinated, we are safe'. If it works to some extent, it will be great, but even then, it will not be a game changer," said Dr Chugh.

https://www.hindustantimes.com/india-news/tb-vaccine-averts-severe-infections-deaths-study/story-CERDmGhb0rWdjvUfCz8BKL.html

THE HINDU BusinessLine

Wed, 15 July 2020

'Key element of strong antibody response to Covid-19 decoded'

Los Angeles: Scientists have discovered a common feature found in many of the human antibodies that neutralise the novel coronavirus, a finding which they say can aid successful vaccine development against Covid-19.

While multiple vaccine candidates have entered clinical trials, the researchers, including those from the Scripps Research Institute in the US, said the features of human antibodies which contribute to the most effective immune response against the novel coronavirus — SARS-CoV-2 — remain unclear.

In the study, published in the journal *Science*, they assessed nearly 300 recently identified human SARS-CoV-2 antibodies, and uncovered a gene frequently associated with those most effective against the virus.

The researchers explained that SARS-CoV-2 uses the receptor binding domain (RBD) on its spike protein to bind to the host cell-surface receptor, ACE2, and infect human cells.

They said antibodies which could target the RBD and block binding to ACE2 are highly sought, and a number have been discovered.

In the current study, the scientists, including Yuan Meng from The Scripps Research Institute, assessed a list of 294 such RBD-targeting antibodies.

They found that a gene in the IGHV gene family, known as IGHV3-53, is the most frequently used IGHV gene for targeting the RBD of the virus spike protein.

IGHV3-53 antibodies, the researchers said, not only have lower mutation rates but are also more potent in neutralising the virus.

By studying the 3D structures of two IGHV3-53 antibodies bound to the RBD, the researchers identified the features which made them effective and promising for vaccine design.

"Overall, our structural analysis demonstrates that IGHV3-53 provides a versatile framework to target the ACE2 binding site in SARS-CoV-2 RBD," the study noted.

The researchers said the study results can facilitate the design of vaccine agents that can elicit strong neutralising antibody response.

"As IGHV3-53 is found at a reasonable frequency in healthy individuals, this particular antibody response could be commonly elicited during vaccination," they wrote in the study.

https://www.thehindubusinessline.com/news/science/key-element-of-strong-antibody-response-to-covid-19-decoded/article32074819.ece#

Korea Biomedical Review

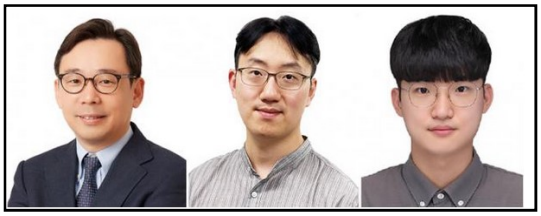
Wed, 15 July 2020

Joint research team finds cause for 'cytokine storm'

By Shim Hyun-tai

The Korea Advanced Institute of Science and Technology said Monday that a joint team of researchers have what causes the hyper-inflammatory response in severe Covid-19 patients.

The hyper-inflammatory response, often called the "cytokine storm," is a symptom, in which the cytokine, an immune substance, is secreted excessively and attacks healthy cells. Cytokine storm is known to cause severe Covid-19. Still, the hyper-inflammatory response's specific cause had been unknown, resulting in difficulties in treating Covid-19 patients.



A joint research team of KAIST and university hospitals has found that interferon triggers severe COVID-19 symptoms. From left are KAIST Professor Shin Eui-cheol and researchers Lee Jeong-seok and Park Seong-wan. (KAIST)

The rapidly spreading Covid-19 virus has infected more than 13 million people worldwide and claimed more than 500,000 lives.

The joint research team, composed of Korea Advanced Institute of Science (KAIST) and Technology, Asan Medical Center, Severance Hospital, and Chungbuk National University Hospital, analyzed severe and mild Covid-19 patients' samples.

The result showed that tumor necrosis factor (TNF) and interleukin-1 (IL-1), which are inflammatory cytokines, were commonly observed in the immune cells of Covid-19 patients regardless of the degree of symptoms.

According to a comparative analysis of severe and mild patients, the cytokine response called interferon was peculiarly strong in severe Covid-19 patients. Interferon is a type of cytokine secreted when its host cell is infected by pathogens such as viruses, bacteria, and parasites, or with the presence of cancer cells.

Generally, interferon type 1 produced by infected cells helps surrounding cells to exhibit antiviral defense against infection.

The research team said that non-specific anti-inflammatory drugs such as steroids could alleviate hyper-inflammatory response in patients with severe Covid-19. However, the study results could provide a new treatment that targets interferon.

"We launched the study urgently to solve the medical problems of Covid-19 patients. Thanks to the support from Asan Medical Center, Severance Hospital, and Chungbuk National University Hospital, we could finish the study in three months," KAIST researcher Lee Jeong-seok said.

KAIST will continue to study new immune mechanisms and personalized anti-inflammatory drugs to increase the survival rate of severe Covid-19 patients, he added.

Their study, "Immunophenotyping of COVID-19 and Influenza Highlights the Role of Type 1 Interferons in Development of Severe COVID-19," was published on the July 10 edition of the journal, Science Immunology.

http://www.koreabiomed.com/news/articleView.html?idxno=8748