

Aug
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: 192 18 August 2020



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Mon, 17 Aug 2020

LRDE pushing for Uttam AESA for last batch of Tejas Mk-1A

The home-grown Uttam Active Electronically Scanned Array (AESA) radar developed by Electronics & Radar Development Establishment (LRDE) seems to be making the right moves to get the attention of the Indian Air Force (IAF).

With the addition of AESA radar being one of the key features of Tejas MK1A, LRDE hopes that Uttam can even meet the schedules of the upgraded programme.

It has already completed more than 100 hours of flying on a hired aircraft and nearly 25 hours on Tejas test platforms. It is now confirmed that Uttam's air-to-air mode and its sub-mode functionalities have been already tested.



Uttam is in competition with the Israeli Elta radar and the official word is not yet out on the question of how many Tejas MK1As (total 83) will be fitted with the desi technology.

LRDE scientists are pinning their hopes on the Aatmanirbhar Bharat mandate.

Uttam Radar

The Uttam is an advanced active phased array radar (APAR) system being developed by Electronics and Radar Development Establishment (LRDE) for the HAL Tejas and other combat aircraft of Indian Air Force. Development of Uttam started in 2008 and it was first unveiled at Aero India 2009. Uttam is slated to be a successor to hybrid passive electronically scanned array radar EL/M-2032 currently equipping LCA Tejas. Radar is currently being integrated with an LCA.

UTTAM has capabilities like, Identification friend or foe (IFF), electronic and communication support measures, C-band line-of-sight and Ku-band SATCOM datalinks, etc., similar to those on the AWACS and Conformal Airborne Early Warning & Control Systems (CAEW) systems.

The important modes of operation of the UTTAM radar system are the surface surveillance and the air surveillance. The sensor has the abilities to search, track-while-scan, priority tracking, high performance tracking, etc. In priority tracking, the targets will be placed in full track mode even if these cross the primary surveillance area. In high performance tracking, additional measurements are made to improve the tracking accuracy. Utilizing active aperture technology, the radar provides a fast-beam agile system that can operate in several modes concurrently.

Uttam features an active phased array (APAR) which gives it superior scanning performance over legacy passive phased array radar. Unlike most contemporary radars, Uttam features Quad TRM i.e. a single plank consists of 4 TRMs.

<https://www.defenceaviationpost.com/2020/08/lrde-pushing-for-uttam-aesa-for-last-batch-of-tejas-mk-1a/>



Tue, 18 Aug 2020

TAPAS BH-201 tested with SATCOM

Rustom-II (Tapas), the medium-altitude long-endurance (MALE) unmanned aerial vehicle (UAV) from Aeronautical Development Establishment flew in the Satellite Communication (SATCOM) mode for the first time.

Sources at DRDO headquarters confirm that the UAV also flew with the long range electro optical payload. They claim that these two capabilities are not available on the Heron and Searcher UAVs being operated by the tri-Services now.

The future of this UAV programme is still unclear, with the Services yet to give any firm commitment. Sources say the Tapas team is determined to prove several new capabilities during the next set of trials.



Rustom 2/Tapas

“TAPAS 201, a multi-mission UAV is being developed to carry out the Intelligence, Surveillance and Reconnaissance (ISR) roles for the three Armed Forces with an endurance of 24 hours. It is capable to carry different combinations of payloads like Medium Range Electro Optic (MREO), Long Range Electro Optic (LREO), Synthetic Aperture Radar (SAR), Electronic Intelligence (ELINT), Communication Intelligence (COMINT) and Situational Awareness Payloads (SAP) to perform missions during day and night.”

<https://www.defenceaviationpost.com/2020/08/tapas-bh-201-tested-with-satcom/>



Tue, 18 Aug 2020

Made in India Tejas fighter planes: IAF to place an order for 83 LCA Mk1A year-end

The carriage of Beyond Visual Range (BVR) missiles and ASRAAM missiles for long range as well as short range operations is planned in LCA Mk1A in addition to prevailing store configurations to increase offensive capability

By Huma Siddiqui

The Indian Air Force (IAF) is getting ready to finalise a deal with the state-owned Hindustan Aeronautics Limited (HAL) for procuring 83 the Mk1A version of the Light Combat Aircraft 'Tejas'. “Most likely the deal which will be around Rs 38,000 crore, is expected to be inked in December. Though there is no confirmed date yet,” company sources told Financial Express Online.

Once the deal is done, it will be a major boost not only to the order book of the HAL, but will give a huge boost to 'Make in India' initiative in the defence sector.

Earlier this year, the Defence Acquisition Council (DAC) had given its approval for the procurement of 83 LCA 'Tejas' and the next step is getting approval by the Cabinet Committee on Security (CCS). “This is a critical step, as the deal has been getting delayed over price issues, as it was on the higher side. In the deal when it is firmed up there will be 10 twin seater which according to sources “is going to be used as the trainers by the IAF.”

Why does IAF need these aircraft?

As has been reported by Financial Express Online, this single engine, four and a half generation indigenous fighter will be replacing the MiG-21 Bison.

Game Changer?

These indigenous fighters have been designed and developed by Aircraft Development Agency (ADA), DRDO, will be manufactured by HAL. These aircraft are expected to be the backbone of the IAF.

The all weather aircraft has as its primary role air superiority and ground attack. In its secondary role it has reconnaissance and anti-shipping strikes capability.

The Mk1A, according to sources in the HAL is an advanced version of LCA Mk1 (FOC) having four major capabilities over the current variant of LCA.

These indigenous fighters will come with the mid-air refuelling, with electronic warfare suites, active electronically scanned array (AESA) radar capabilities.

This is Tail-less compound delta built with Advanced Composite Materials with reduced Weight, increased Life and reduced Signature. Equipped with Quadruplex Digital Fly by Wire, it is a Supersonic fighter at all altitudes for air combat. Best suited for offensive air support, it has the capability to carry a Payload of 3500 Kg and comes with a ceiling of 15 Km.

Also, LCA Mk1A will have inbuilt capability to fire BVR missiles such as Derby missile and is already integrated on current Tejas itself. Indigenously developed BVR missile (ASTRA Mk1) has been identified to be integrated on Mk1A, which will be a weapon of choice of IAF. This versatile weapon will give an edge to LCA Tejas over its contemporaries in BVR warfare.

The carriage of Beyond Visual Range (BVR) missiles and ASRAAM missiles for long range as well as short range operations is planned in LCA Mk1A in addition to prevailing store configurations to increase offensive capability.

Addition of Digital Moving Map with 2D maps & 3D perspective view, provision for GLONASS (Global Navigation Satellite System), Indian Regional Navigation Satellite System (IRNSS) based positioning system and GAGAN (GPS Aided Geo Augmented Navigation) SBAS (Satellite based augmentation system) features will enhance the operational capabilities and take India towards its home grown GPS system. These additional features shall provide more precision war fighting capabilities to LCA Tejas.

LCA Mk1A will have excellent manoeuvrability, unhindered by control and stability considerations, over the widest possible speed and CG range from + 8 to - 3 'g'

Indigenous Element

More than 60 per cent content on board this aircraft is indigenous and has a totally insulated supply chain.

Over 140 organizations are involved in design of LCA, and employed around 10,000 personnel.

As far as production is concerned - 100 per cent outsourcing, 70 Indian suppliers involved in outsourcing of the detail parts.

The Indian LRU suppliers contribute more than 100 systems, and employing close to around five thousand personnel.

Several improvements are planned for LCA Mk1A

AESA radar: This shall be electronically scanned agile beam radar which will be based on Transmit/Receive modules (TRM) and support multimode operation in X-band with a bandwidth of 600MHz or more. It will be having a capability to track 16 targets at a time in Air to Air, Air to ground and Air to sea modes.

Electronic warfare (EW) suite: With electronic counter measures (ECM) and ECCM with extended band of operation for threat detection and jamming capability, it will increase



survivability in a networked environment. With the integration of an external jamming pod, it can perform as offensive air combat platform.

BVR Missile: Indigenously developed BVR missile ASTRA Mk1 will be integrated on Mk1A.

And is perhaps the only platform in the IAF wherein armaments from Russian or European origin can be integrated since the required software capabilities lies with India for this platform.

<https://www.financialexpress.com/defence/made-in-india-tejas-fighter-planes-iaf-to-place-an-order-for-83-lca-mk1a-year-end/2057708/>

Defence News

Defence Strategic: National/International

THE TIMES OF INDIA

Tue, 18 Aug 2020

India prepares roadmap to promote defence exports using diplomatic channels

New Delhi: The government has prepared a roadmap to promote the indigenously developed military platforms and weapons to boost their exports and will use diplomatic channels to promote them in overseas markets, a senior defence ministry official said on Monday.

Defence minister Rajnath Singh earlier this month had unveiled a major policy decision, announcing imposition of a phase-wise ban on import of 101 military platforms and weapons systems with an aim to promote the domestic defence industry.

Raj Kumar, Secretary, Department of Defence Production, said at a webinar that the domestic defence industry will hold web interactions with the representatives of friendly countries to figure out what kind of products and platforms they require.

"We are preparing country-wise profiles of products, weapons and platforms which are probably needed by our friendly countries. So we are now planning to start web interaction led by the industry," Kumar said.

"That country's defence attache, our DPSUs (defence public sector undertakings), industry, will then figure out what is in the store for us to promote there for exports," he said.

Kumar said the government will be standing side by side with the domestic industry through its defence attaches, embassies and diplomatic channels to promote exports.

To promote indigenous production, the Defence Ministry on August 9 announced restrictions on import of 101 weapons and military platforms including light combat helicopters, conventional submarines and cruise missiles under a staggered timeline till 2024.

Kumar said a second list of import-restricted defence items will be notified soon.

"This is the first list we are examining and then a second list will also come. We expect you (industry) to come forward and start investing to meet our requirements," he said at the webinar -- "Army Make Projects 2020" -- organised by FICCI.



India prepares roadmap to promote defence exports using diplomatic channels

The senior official said as successful domestic bidders move to the defence equipment production stage, his department will share their details with the UP and Tamil Nadu defence corridor authorities, who "will compete in attracting your units to their respective states".

He said since the three services are making efforts to push the "Make II" category of defence production projects, he will interact with project participants to understand their concerns and share best practices among the services.

As secretary of the Department of Defence Production, Kumar heads the collegiate committee that approves the "Make II" category of projects.

Under the Make II category, no government funding is given to the Indian company for the prototype development process. If a prototype developed by the company meets the standards set by the armed forces, an order is placed for such equipment or platforms.

"Everything, whether it is defence industrial corridor, or whether it is defence production and export promotion policy, or whether it is a negative list - everything works in the same direction that we have to be among the top producers of defence items," he said.

India is one of the most lucrative markets for global defence giants. The country has figured among the top three global importers of military hardware for the last eight years.

The Indian armed forces are projected to spend around USD 130 billion in capital procurement in the next five years.

On August 9, Defence Minister Singh said the ministry was now ready for a "big push" to indigenous defence manufacturing in tune with Prime Minister Narendra Modi's call for an "Atmanirbhar Bharat" (Self-Reliant India).

The negative list of 101 items includes towed artillery guns, short range surface to air missiles, cruise missiles, offshore patrol vessels, electronic warfare systems, next generation missile vessels, floating dock, anti-submarine rocket launchers and short range maritime reconnaissance aircraft.

The list also includes basic trainer aircraft, lightweight rocket launchers, multi-barrel rocket launchers, missile destroyers, sonar systems for ships, rockets, ASTRA-MK I beyond visual range air-to-air missiles, light machine guns and artillery ammunition (155 mm) and ship-borne medium range guns.

<https://timesofindia.indiatimes.com/india/india-prepares-roadmap-to-promote-defence-exports-using-diplomatic-channels/articleshow/77589806.cms>

THE HINDU BusinessLine

Tue, 18 Aug 2020

Indigenisation of defence equipment is a priority, says Army

*S K Saini, Vice Chief of the Army Staff urges industry
ensuring supply of top-notch quality products*

New Delhi: The indigenisation of defence equipment is on the priority of the Indian Army, but the domestic industry needs to ensure quality products.

"The introduction of Make-II category has given significant momentum and fresh direction to the indigenisation programme," said S K Saini, Vice Chief of the Army Staff, Indian Army.

Speaking at the FICCI – Indian Army Webinar on Army Make Projects 2020, Saini said, "It is wrong to say that there is a bias towards imports, but the domestic industry must realise the crucial nature of technologies and equipment being supplied and ensure that they supply top-notch quality products."

"The Indian Army is committed to buying and using indigenous weapons and equipment and, therefore, supports their conception design, development and manufacture within the country," he

said. There are today 28 major projects worth ₹30,000 crore in progress. This includes 13 'Approval In Principle' of projects which are suo moto projects from the industry. Of these 28 projects, 13 Make-II Projects have already been granted 'Acceptance of Necessity', he added.

These Make-II projects are aimed to foster indigenous Research and Development and boost indigenous defence manufacturing, Saini said.

<https://www.thehindubusinessline.com/economy/policy/indigenisation-of-defence-equipment-is-a-priority-saysarmy/article32374837.ece#>



Tue, 18 Aug 2020

Making indigenous equipment needed to maintain our strategic autonomy: Vice CoAS Lt Gen SK Saini

Lt Gen SK Saini said that the Indian army is the lead agent of change for this initiative and can redefine India as a global hub for manufacture of defence equipment

New Delhi: Vice Chief of the Army Staff (VCOAS) Lt Gen SK Saini termed the need for developing indigenous capabilities an imperative need for keeping the country's strategic autonomy.

Saini said, "Developing indigenous and local capabilities to confront emerging security challenges is an imperative need. It is no secret that during crunch situations, technologies developed by other countries would either not be available or if shared, will be at the cost of our strategic autonomy."

Saini was delivering the inaugural address at a webinar organised by FICCI on the subject "Ushering Indigenisation through Make in India". The Webinar was aimed to strengthen the Indian Army – Industry interface by engaging in direct dialogue and stocktaking of last year.

"The previous year was game-changer with respect to indigenous arms and equipment manufacturing," said the VCOAS adding that the Indian army is the lead agent of change for this initiative and can redefine India as a global hub for manufacture of defence equipment.



Vice Chief of the Army Staff Lt Gen SK Saini (photo Special Arrangement)

"The only caveat was that the quality of the equipment had to pass stringent tests of quality, had to be developed innovatively and must adhere to the delivery timelines. This was to ensure that the Indian army was equipped with the best of equipment to fight its adversaries as heavy costs were imposed on the side coming second," Saini said.

The army is pursuing to make projects in diverse fields of technology including 3rd generation ATGMs BMP upgrades, aerial targets, precision ammunition, tank ammunition, auxiliary power units, drone kill systems, mountain radars, to name a few.

Nine new projects were introduced in 2019 and in 2020 four more will be unveiled. Out of the 28 projects in progress, almost 50 per cent (13 of them) valued at Rs 21,264 crore are suo-moto proposals received from the Indian defence industry.

The first RFP under Make II route has been issued recently on 13 Jul 20 for our first Make II project of Manuverable Expendable Aerial Targets (MEAT). One more RFP for Upgraded Assault

Track Way and three Project Sanction Orders (PSOs) valued at Rs 4919 Cr are going to be issued very soon.

To provide a major boost to indigenization, the Army has launched several initiatives in the recent past. These include establishment of Army Design Bureau to facilitate direct interaction with defence industries, Army's problem definition statements released annually to provide a clear direction to the industry and release of the Olive Pages, which list the army's annual requirements of spares, sustenance and upgrades.

<https://www.newindianexpress.com/nation/2020/aug/18/making-indigenous-equipment-needed-to-maintain-our-strategic-autonomy-vice-coas-lt-gen-sk-saini-2184749.html>

DECCAN Chronicle

Tue, 18 Aug 2020

MoD embargoes: Private sector has to play a key role

With this announcement closing the tap on imports, India's ranking as the second largest defence importer in the world

Gautam Moorthy

August 9, 2020, will go down as a red-letter day in India's history. While the world and India, too, remained largely immobilised owing to the ubiquitous Chinese virus, the defence minister, Rajnath Singh, announced what is arguably the most historic reform ever undertaken by India's ministry of defence (MoD).

It put out a list of 101 major war fighting equipment, platforms and systems whose imports are to be progressively terminated from December 2020 to December 2025. There is supposedly yet another "negative import" list due. This left observers hard put to count the systems/platforms left out for future import.

A quick glance at the list indicates that 69 systems/platforms have the cut-off date of December 2020, 11 with December 2021, four with December 2022, eight with December 2023, eight with December 2024 and one with December 2025.

A cursory look at the timelines would indicate to the astute observer that these have been drawn up keeping in mind the indigenised content already incorporated into the system.

With this announcement closing the tap on imports, India's ranking as the second largest defence importer in the world next only to Saudi Arabia will certainly drop much to the relief of its government and citizens.

Besides saving precious foreign exchange, it will also indicate to the world that India is no longer punching below its weight.

While all this is music to the ears of most Indians as it would boost manufacturing, employment and trade, thereby giving a fillip to the economy, how this would be operationalised is the question that needs to be addressed.

There is a lot of apprehension that has been expressed in the media. Some commentators have stated that this is nothing but new wine in old bottles being as it is a reiteration of the Defence Procurement Procedure 2016 (DPP-2016).

However, if one examines that document in some detail, it is seen that this is simply not the case, but a logical conclusion of that policy four years down the line.



Going forward, how this embargo would be operationalised is the question rightly asked.
PTI Photo

In the foreword prefacing that document, the then defence minister, late Manohar Parrikar, very presciently forecasted this conclusion.

He had written, “Hence, the Ministry of Defence (MoD) is determined to treat DPP 2016 as a dynamic and an evolving document and is committed to making improvements based on emerging data and anecdotal evidence, to realise the vision of ‘Make in India’ in the defence sector.” It is evident that this import embargo list is neither a reiteration of that policy nor something completely new, but simply a consequence consistent with that policy.

The other apprehension is that India’s military-industrial complex has not matured enough to be standing on its own feet and delivering the goods. This too is fallacious as a number of platforms/systems that are now being manufactured in India is a testimony to the level of expertise achieved.

This has taken place either through tie-ups with firms abroad (the strategic partnership model) or through the Defence Research and Development Organisation (DRDO) route.

Going forward, how this embargo would be operationalised is the question rightly asked. First, India’s defence industry complex, tightly controlled by the government, represented by 41 ordnance factories and nine defence PSUs have now to compete with the private sector and can no longer bank on the Armed Forces to bail them out with orders whose pricing in many cases is exorbitant.

Second, within the private sector, there is a humongous scope for medium and small scale industries to rise to the occasion by ramping up capacities and building up a huge defence industry base to cater for ancillaries, sub-systems and components that would be required if India is going solo and not relying on government imports.

This leads us to the third important factor, which is that the private sector and the corporatised Ordnance Factory Board along with the defence PSUs are free to sign MoUs with original equipment manufacturers abroad to also import critical ancillaries, sub-systems and components for manufacture within India with transfer of technology and with proportionate offsets.

This single significant step frees the government from getting involved in complex negotiations with foreign firms and being compelled to adhering to stringent policies and rules laid down in the government financial regulations and the DPP (Defence Procurement Procedure 2020).

All such manufacturers will also be free to export their products making India a net exporter of defence products.

The requirement to drastically reduce imports has long been felt but it needed a strong political dispensation and the will to carry it out.

The road ahead is not going to be smooth but this single significant step taken by the government to wean itself away from imports in this crucial domain needs to be applauded.

That it was in the making since 2016 is known. However, it appears to have been pushed through now because of the combination of a slackening economy, the deleterious effect of Covid-19 and, above all, by China’s transgressions in Eastern Ladakh. How this will play out remains to be seen.

<https://www.deccanchronicle.com/opinion/op-ed/170820/gautam-moorthy-mod-embargoes-private-sector-has-to-play-a-key-role.html>

Indian Navy Commanders to hold 3-day conclave to review maritime security

Top commanders of the Indian Navy will hold a three-day conclave beginning Wednesday to review the country's maritime security scenario

New Delhi: Top commanders of the Indian Navy will hold a three-day conclave beginning Wednesday to review the country's maritime security scenario including deployment of a significant number of naval assets in the Indian Ocean region in view of the border row with China in eastern Ladakh, official sources said.

The Indian Navy has already deployed a range of its frontline warships and submarines in the Indian Ocean region to send a clear message to China, following escalation of the border dispute with the neighbouring country in the wake of the Galwan Valley clashes on June 15.

Defence Minister Rajnath Singh and Chief of Defence Staff Gen Bipin Rawat are expected to address the inaugural day of the conclave, the sources said.

All possible security challenges that the country may face including from China and Pakistan in the Indian Ocean Region will be deliberated upon at length at the conclave, they added.

The Indian Ocean, considered the backyard of the Indian Navy, is critical to India's strategic interests. Over the years, the region has witnessed increasing Chinese presence.

China increased its presence in the Indian Ocean Region by constructing the deep-sea Gwadar Port in southern Pakistan and a naval base in Djibouti in the Horn of Africa.

In the last few weeks, the Navy has significantly expanded its deployment in the Indian Ocean Region, positioning a plethora of warships and submarines following the Galwan Valley clash with Chinese troops in eastern Ladakh 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.

Over the years, the Indian Navy's focus has been on enhancing combat efficiency and improving operational readiness and these issues will be discussed in detail, the sources said.

Measures to ensure safety, continued training, and checks and balances on crew proficiency aboard the front-line warships will also be reviewed, they said.

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

https://www.business-standard.com/article/current-affairs/indian-navy-commanders-to-hold-3-day-conclave-to-review-maritime-security-120081701722_1.html



समुद्र में भी मिलेगा चीन को माकूल जवाब, नौसेना की बड़ी तैयारी, कल शीर्ष नेवी कमांडरों की अहम बैठक

पूर्वी लद्दाख में चीन से जारी तनाव के मद्देनजर नौसेना के शीर्ष कमांडरों (Navy commanders) की बुधवार को एक बड़ी बैठक होगी। इसमें चीन के खिलाफ रणनीति पर मंथन होगा..

नई दिल्ली: पूर्वी लद्दाख में चीन से जारी तनाव के मद्देनजर नौसेना के शीर्ष कमांडरों (Navy commanders) की बुधवार को एक बड़ी बैठक होगी। बैठक में पीपुल्स लिबरेशन आर्मी नेवी (People Liberation Army Navy, PLAN) की गतिविधियों से निपटने की तैयारियों पर चर्चा होगी। यह बैठक ऐसे वक्त में हो रही है जब चीन सीमा पर तैनाती बढ़ा रहा है और पूर्वी लद्दाख क्षेत्र (Eastern Ladakh sector) में फिंगर इलाके (Finger area), डेपसांग (Depsang) और गोगरा (Gogra) से पीछे हटने में आनाकानी कर रहा है। यही नहीं नौसेना ने चीनी नौसेना की हरकतों पर नजर रखने के लिए युद्धपोतों की तैनाती भी बढ़ा दी है।

नौसेना के सूत्रों ने बताया कि नौसेना के शीर्ष अधिकारी इस बैठक में शिरकत करेंगे। भारतीय नौसेना के अधिकारी इस बैठक में चीनी आक्रामकता और हिंद महासागर क्षेत्र में भारतीय नौसेना द्वारा उठाए जाने वाले जरूरी कदमों पर विस्तार से चर्चा करेंगे। इस बैठक में नौसेना प्रमुख भी शामिल होंगे। इसमें पश्चिमी नौसेना कमांडर (Western Navy Commander) वाइस एडमिरल अजीत कुमार (Vice Admiral Ajit Kumar) और पूर्वी नौसेना कमांडर (Eastern Naval commander) वाइस एडमिरल अतुल जैन (Vice Admiral Atul Jain) सहित महत्वपूर्ण कमांडर भाग लेंगे।

समाचार एजेंसी एएनआइ के मुताबिक, नौसेना चीन की चुनौती से निपटने के लिए मिशन आधारित तैनाती समेत पीएलएएन की गतिविधियों पर नजर रखने के लिए विशेष उपाय कर रही है। सूत्रों ने बताया कि नौसेना हिंद महासागर क्षेत्र में मलक्का जलडमरूमध्य से पीएलएएन की आवाजाही पर कड़ी नजर रखने के लिए ड्रोंओं और पनडुब्बियों की तैनाती की योजना पर काम कर रही है। इसके लिए जरूरी सैन्य हथियारों को हासिल करने की भी योजना है। नौसेना जिबूती क्षेत्र के आसपास मौजूद चीनी जहाजों की लगातार निगरानी कर रही है।

सूत्रों ने बताया कि नौसेना ने वायुसेना के एक महत्वपूर्ण अड्डे पर अपने मिग-29 K लड़ाकू विमानों (MiG-29K fighter aircraft) को भी तैनात किया है। इस बेस से लड़ाकू विमान जमीन और पहाड़ी इलाकों में ऑपरेशनों का अभ्यास कर रहे हैं। यही नहीं नौसेना ने 1,245 करोड़ रुपये से अधिक के सौदे के तहत 10 नौसैनिक ड्रोंओं (Naval Shipborne Unmanned Aerial Vehicles) की खरीद पर भी तेजी से काम शुरू किया है। भारतीय नौसेना ने हिंद महासागर क्षेत्र में अपने युद्धपोतों की संख्या भी बढ़ा दी है। नौसेना उत्तर में लद्दाख से लेकर दक्षिण में मॉरीशस तक करीब 7,000 किलोमीटर और पश्चिम में लाल सागर से पूर्व में मलक्का जलडमरूमध्य तक करीब 8,000 किलोमीटर की दूरी तक निगरानी रख रही है।

<https://www.jagran.com/news/national-amid-border-tensions-indian-navy-commanders-to-discuss-security-situation-with-china-20636196.html>

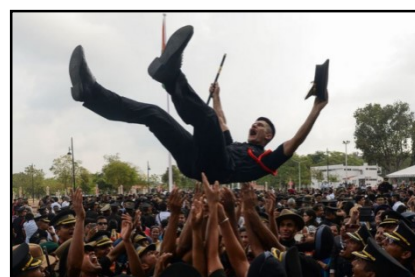
Do we need Conscription in Indian Armed Forces?

The compulsory or mandatory military service could be one of the ways to reduce the shortage of personnel in the armed forces

By Sujay Dhawan

Indian Armed Forces have been phenomenal and instrumental in defending its borders from countries like Pakistan and China. Wars in years 1965, 1971 and 1999 could not have been won if our Armed forces were weak and frail. India has time and again invested huge amount in procuring latest warfare technology to counter any external threat. Most recently, we have purchased Rafale Fighter Planes from France and Apache from the US. But an important factor in any armed force is number of men recruited from time to time.

The Indian Air Force and the Indian Navy are well equipped to rise up to any instance of terrorist attack or war. On the other hand, the Indian Army, though equipped with latest technology, still lacks numbers. Last year in January 2019, Indian Defence Minister Rajnath Singh officially replied in Rajya Sabha, the Upper House of the Parliament, that there are more than 45000 vacancies in the Indian Army. With approx. 1.4 million personnel, the Indian Army is one of the largest in the world. Even countries like the US and Russia have applauded Indian ground forces courage and valour in the past.



The question which still lingers on is that we still require a huge number of personnel in the Indian Army. What purpose it could have with such highly modern, world class arms & ammunition, if there isn't enough manpower to operate them. When it comes to recruitment, the Indian Army has set standards which not every individual cannot withstand. Although, shortage of staff in the Indian Army has been there for very long. More than a decade back, General Deepak Kapoor also mentioned that problem of shortage of staff do persists.

Majorly the recruitment in the Indian Army is done through the National Defence Academy (NDA) & Combined Defence Services (CDS exams). In past couple of years, the applications for the Indian Army had tended to fall as youth want cushy, high paying corporate jobs. The desire of serving in the Indian Army has been consistently low among the youth, though the current government has tried to boost the morale of the youth to join in handsome numbers in the Defence forces but still the numbers are way behind the requisite.

There are many countries in the world with Military Conscription. The compulsory or mandatory military service could be one of the ways to reduce the shortage of personnel in the armed forces. The 24 months to 36 months of compulsion of serving in the Armed Forces might solve the shortage problem to some extent.

It might also drag us to a very pertinent question that if conscription is there, then every citizen will be equipped with knowledge of operating guns and this might increase instances of public shooting or increase in crime rates for that matter.

With neighbours like China and Pakistan, we remain in constant fear of war. As now India enters 74th year of Independence, still we face the same situation as we faced several decades back but this time we need to introspect, learn from the past and act accordingly.

<https://www.newdelhitimes.com/do-we-need-conscription-in-indian-armed-forces/>

5 Rounds of military talks later, army prepares for long winter deployment at Ladakh

CDS General Bipin Rawat, along with his top commanders, told an all-party parliamentary Public Accounts Committee that the military de-escalation process with China would be a 'long drawn out matter.'

By Rahul Bedi

Chandigarh: Military pressure on China's People's Liberation Army (PLA) to vacate the large tracts of Indian territory it has been occupying along the line of actual control (LAC) in eastern Ladakh since early May, appears not to have worked.

Despite five rounds of Indian and Chinese corps' commanders' talks between mid-June and early August, the onus, it now seems, is on Indian diplomats, security officials, politicians and economists to manage the PLA's eviction and to restore the military status quo ante which prevailed along the LAC in April, before hostilities began.

This outcome became decidedly apparent after India's newly appointed Chief of Defence Staff (CDS) General Bipin Rawat, along with his top commanders, told an all-party parliamentary Public Accounts Committee (PAC) last week that the military de-escalation process with China would be a long drawn out matter.



Sub-Sector North: Map of the road from Durbuk to Daulat Beg Oldie. The place where Indian and Chinese soldiers clashed on June 15, 2020 is around 5 kilometres east of the road. Image: The Wire/Google Earth

In their collective depositions, the CDS and his senior colleagues reportedly informed the PAC that as the process of the PLA's de-escalation and pullback was likely to be an 'extended one,' the

Indian Army was preparing to deploy personnel along the LAC during the upcoming harsh winter months, October onwards.

In military and security circles, General Rawat's statement has been considered as sign of the Indian military's inability to effectively 'coerce' nuclear-rival China into vacating occupied territory along the LAC which India perceives as its own – a line which, ironically, China too has endorsed for decades.

This outcome has been despite the Indian Army's 'mirror deployments' to the PLAs along the LAC, backed by howitzers, main battle tanks, assorted missile batteries, and frequent sorties over the contentious region by the Indian Air Force's (IAF) varied combat aircraft and attack helicopters, to match those of the PLA Air Force (PLAAF) operating on the Tibetan plateau.

In addition, in an extended bid to exert pressure on China, the Indian Navy (IN) has been aggressively patrolling the Indian Ocean, where it believes it has the operational edge over the PLA Navy (PLAN), a relatively new entrant to the region.

And, to add to the Indian military's chagrin, even the July 29 arrival in Ambala of five 4.5 generation Dassault Rafale fighters failed to frighten the PLA into behaving, thus leaving the field open to the country's three other principal instruments of national power to confront China's formidable strategic and military challenge. Other than the executive headed by Prime Minister Narendra Modi, these broadly include diplomats, economists and those manning the informational domain, that comprises public diplomacy and assorted communication campaigns.

Over the past few weeks, official sources said, India's military is believed to have subtly conveyed to the federal government that it was now up to these instrumentalities to 'address the immediate point of pain' along the LAC and to work towards restoring the status quo along it.

Senior officers and defence analysts, however, conceded that even these channels had little or no leverage to ensure Chinese compliance, forcing perhaps the inevitability of India having to reconcile itself to yet another 'new normal' in territorial title in the disputed Himalayan region, much like it had 58 years earlier, following the border war with China in 1962.

Official sources told *The Wire* that the PLA has refused to pull back from slivers of territory it occupies along the Pangon Tso (Lake) and the strategically located Depsang Plains to its north to a depth of some 25-30 km in keeping with its 1959 claim line that led to the border war three years later.

And though the PLA has pulled back from the Galwan River area, it has created a 4 km buffer zone, of which 3 km is on the Indian side of the LAC and where patrolling for now is circumscribed. Similarly, the PLA's disengagement in the Hot Springs-Gogra Sector is restricted to merely 1 km, and in no way in consonance with what was reportedly mutually determined during the third round of the respective corps' commanders meet at Chushul on June 30.

The most recent August 8 meeting between Indian and Chinese Major General-rank officers, commanding divisions along the LAC, at a meeting point on China's side of border at Daulat Beg Oldie also proved futile. Neither side, it seemed, was willing to either disengage or pull back to end the stalemate, official sources said.

Meanwhile, the 'long haul' that General Rawat referred to in his PAC deposition was the impending deployment in eastern Ladakh of an additional 25,000-30,000 troops across a 300-350 km frontage in mountainous terrain over 13,000 feet and above in altitude.

With no infrastructure whatsoever to sustain these troops in murderously freezing temperatures, the army and Ministry of Defence (MoD) are at present involved in feverishly creating habitats and acquiring high altitude gear at great expense, to sustain the six-month long deployment expected to last till April 2021.

Under its significantly augmented ongoing Advanced Winter Stocking (AWS), the army is also piling up food, fuel, ammunition, missiles and assorted ordnance to sustain the additional placements. The Army Chief, General M.M. Naravane, too, recently told his frontline LAC formation commanders to maintain a high state of alertness to deal with any Chinese

‘misadventure’, but provided little optimism regarding any PLA pullback and status quo restoration.

And though this troop deployment along the LAC in Ladakh is inevitable during the upcoming winter, its tactical and strategic intent in military terms remains somewhat unclear.

Is it to prevent China from transgressing the LAC further? Or is it aimed at pressurising the PLA into eventually restoring the status quo along it as prevailed in April, and foregoing its 1962 territorial objectives in the Ladakh region? Or is it a misguided combination of both with no end factored into the eventual outcome?

It also needs stressing that the PLA is comparatively better housed and accoutred than the Indian Army on its Tibetan side of the LAC, further rendering an unequal contest even more asymmetrical between the two forces at the basic environmental level.

Many senior retired and serving army officers, believe that this upcoming deployment is merely a forerunner to debilitatingly rendering the LAC into another ‘hot’ disputed border, akin to the Line of Control or LoC in Kashmir, that India can ill afford.

Can India’s concomitant instrumentalities of governance and state power, other than the military, obviate such an outcome?

<https://thewire.in/security/ladakh-indian-army-pla-winter-general-rawat>

ThePrint

Tue, 18 Aug 2020

HAL helicopter not for us — Indian Navy doesn’t want PSU to be part of \$3 bn chopper deal

Indian private firms have also written to the defence ministry against HAL's inclusion in the Naval Utility Helicopter initiative

By Sneesh Alex Philip

New Delhi: The Indian Navy remains adamant against the inclusion of government-owned Hindustan Aeronautics Limited (HAL) in the \$3 billion (Rs 22,500 crore approximately) deal for Naval Utility Helicopters (NUH), asserting that the company’s product do not meet the force’s requirements.

This had been conveyed to the defence ministry by the Navy time and again, sources in the defence and security establishment told ThePrint.

“HAL’s NUH is not for us. The blade folding takes excessive time and the size of the folded blades is bigger than what is required. In times of rescue missions or quick surveillance, the time taken on the blades is a disability,” a Navy source said.

ThePrint had on 30 May reported that the project could become the first challenge for the Narendra Modi-led government under its new ‘atma nirbhar Bharat (self-reliant India)’ initiative in the defence sector.

The NUH is being pursued under a strategic partnership model focused on the Indian private industry meeting manufacturing needs through tie-ups with foreign vendors.

“The entire aim of the strategic partnership is to help the creation of a defence hub in the country from the private sector. NUH programme is like the Maruti car programme which will lead to creation of a private helicopter manufacturing and servicing ecosystem,” the Navy source quoted above said.



An India Navy Chetak Helicopter (representational image) | indiannavy.nic.in

Another source said that an assessment carried out by the Navy has found that ALHs does not meet the force's requirements.

Private players also objected to HAL's possible inclusion

The Navy has been desperate to replace its Chetak of 1960s vintage with NUH. The NUHs are to be utilised for multiple roles, including search and rescue, casualty evacuation and low-intensity maritime operations, besides torpedo drops.

The Navy had received eight responses to the expression of interest (EOI) issued in February last year, as part of its plan to purchase 111 helicopters for Rs 21,738 crore.

HAL had submitted two bids — one by itself and another through a joint venture with Russian Helicopters to produce the Kamov chopper.

It is to note that private players have also objected to the possible inclusion of HAL in the NUH programme in May last year.

Private firms that have responded to the request for information (RFI) are Mahindra Defence Systems, Tata Aerospace, Reliance, Adani, Bharat Forge and Coimbatore-based Lakshmi Machine Works.

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

The private sector players had then written back to the ministry saying HAL should be kept out.

Speaking to ThePrint in May, Wing Commander (retd) Unni Pillai, who is the executive director (CTP-RW) at HAL, had said, "There are two bolts there. You remove one and it can be folded. It takes about six minutes to fold on the LUH (Light Utility Helicopter). On the ALH, we are planning to incorporate the same which we would be able to do at the same time."

However, Navy officials have said the time taken is too long and such bolts are risky.

<https://theprint.in/defence/hal-helicopter-not-for-us-indian-navy-doesnt-want-psu-to-be-part-of-3-bn-chopper-deal/482990/>

hindustantimes

Tue, 18 Aug 2020

'Important to respect, support each other': China reacts to PM Modi's Independence Day speech, remarks on ties with India

*The foreign ministry was reacting to Prime Minister Narendra Modi's
Independence Day speech where he talked about strengthening the
Indian armed forces and said the country's territorial integrity is supreme*

By Sutirtho Patranobis

Beijing: China is ready to work with India to enhance mutual trust and properly manage differences, the Chinese foreign ministry said on Monday, adding that the "right path" ahead for the two countries is to respect each other.

The foreign ministry was reacting to Prime Minister Narendra Modi's Independence Day speech where he talked about strengthening the Indian armed forces and said the country's territorial integrity is supreme.

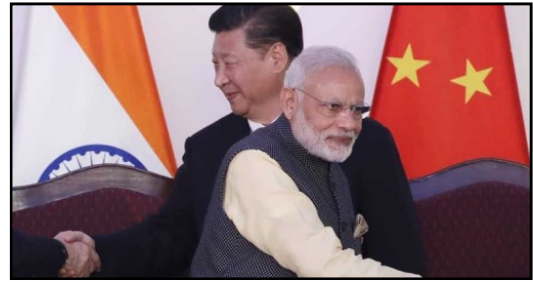
"From LoC (Line of Control) to LAC (Line of Actual Control), anyone who casts an eye on the sovereignty of the country, the armed forces have responded in the language they understand," Modi had said in his address to the nation from the ramparts of Red Fort.

Modi also referred to the border clash in eastern Ladakh without naming China.

“India’s integrity is supreme for us. What we can do, what our soldiers can do — everyone saw that in Ladakh,” Modi said, referring to the June 15 border clash in the Galwan Valley.

At least 20 Indian soldiers were killed in the clash and China has also acknowledged that it suffered casualties but without citing an accurate death toll.

Asked to comment on Modi’s speech, Chinese foreign ministry spokesperson Zhao Lijian said: “We have noted Prime Minister Modi’s speech. We are close neighbours, we are all emerging countries with over one billion people”.



“So the sound development of bilateral ties not only serves the interest of the two peoples but also stability, peace, prosperity of the region and the whole world. The right path for the two sides is to respect and support each other as this serves our long-term interests,” Zhao said at the regular ministry briefing on Monday.

“So, China stands ready to work with India to enhance our political mutual trust, properly manage our differences, step-up practical cooperation and safeguard the long-term development of bilateral ties,” he said.

Prime Minister Modi’s speech was also analysed by the Chinese state media, which said it was important, in China’s context, to follow what he does next.

“After the latest round of senior military-level talks between Beijing and New Delhi on August 8, India hasn’t shown any sign of changing its stance. At the same time, China has also held its ground. As the two countries are still at a stalemate over key issues, Modi’s real intentions will likely be revealed in his next moves,” Zhao Gancheng, a research fellow at the Shanghai Institute for International Studies told the tabloid, Global Times.

Referring to Modi’s speech, Zhao said that it could be explained from two perspectives.

“One is that Modi has become tougher and put on a combative look. The other explanation is that the Indian government thought it had done enough by demonstrating its attitude toward China. Therefore, what Modi said in his Independence Day speech is not very important - but what he will do next is.”

<https://www.hindustantimes.com/india-news/important-to-respect-support-each-other-china-reacts-to-pm-modi-s-independence-day-speech-remarks-on-ties-with-india/story-rPnBLJoHqq6gGP6d9k1U9N.html>

Ready to work with India to manage our differences: China

A western media journalist had asked China's reaction to Prime Minister Narendra Modi's remarks that the Indian armed forces have given a befitting reply to those challenging the country's sovereignty

By Anubha Rohatgi

Beijing: China on Monday said it is ready to work with India to enhance political mutual trust, properly manage their differences and safeguard the long-term development of bilateral ties.

Chinese Foreign Ministry spokesman Zhao Lijian said this at a regular briefing when a Western media journalist sought China's reaction to Prime Minister Narendra Modi's remarks that the Indian armed forces have given a befitting reply to those challenging the country's sovereignty.

Modi, in his 74th Independence Day address to the nation from the ramparts of Red Fort, said the armed forces have given a befitting reply to those challenging the country's sovereignty "from LoC to LAC", in a veiled reference to Pakistan and China.

"From LoC (Line of Control) to LAC (Line of Actual Control), anyone who casts an eye on the sovereignty of the country, the armed forces have responded in the language they understand," Modi said.

Modi's comments came amid India's bitter border row with China along the LAC in eastern Ladakh and rise in incidents of ceasefire violations along the LoC with Pakistan in the last few months.

Responding to the question, Chinese foreign ministry spokesman Zhao said that "we have noted Prime Minister Modi's speech." "We are close neighbours, we are emerging countries with over one billion people. So, the sound development of bilateral ties not only serves the interest of the two peoples but also stability, peace, prosperity of the region and the whole world," he said.

"The right path for the two sides is to respect and support each other as this serves our long-term interests," Zhao said.

"So, China stands ready to work with India to enhance our political mutual trust, properly manage our differences, step-up practical cooperation and safeguard the long-term development of bilateral ties," the spokesman added.

In his speech, Prime Minister Modi also said that "whether it is terrorism or expansionism, India is fighting both with determination." Referring to the Galwan Valley clashes in eastern Ladakh in June, the prime minister said respect for India's sovereignty is supreme and the world has seen in Ladakh what its brave jawans can do to maintain this resolve.

"I salute all those brave soldiers from the Red Fort," Modi said, adding the whole country is united in protecting the sovereignty of the country.

Twenty Indian army personnel were killed during the clashes on June 15. The Chinese side also suffered casualties but it is yet to give out the details.

<https://www.hindustantimes.com/world-news/ready-to-work-with-india-to-manage-our-differences-china/story-7Pb9Bgy9WFp4ZayPygE5LL.html>



Modi, in his 74th Independence Day address to the nation from the ramparts of Red Fort, said the armed forces have given a befitting reply to those challenging the country's sovereignty "from LoC to LAC", in a veiled reference to Pakistan and China.(HT F

With China reluctant to disengage, top Indian political, military leaders to discuss way forward in Ladakh

New Delhi: With China not disengaging in Finger area, Depsang plains and Gogra after multiple rounds of military talks, top Indian political and military leaders are scheduled to meet on Monday to discuss the way forward there.

Chinese troops have been camping in the Finger area for over three months now and have even started fortifying their bases there with construction of bunkers and sangars.

"Top political leadership along with the military leaders are scheduled to discuss the strategy to deal with the ongoing situation in Eastern Ladakh sector where the Chinese had transgressed into multiple locations," government sources told ANI.

The leaders are expected to discuss how to deal with the situation where the Chinese have adopted a rigid approach and engaged in a standoff with Indian forces in Depsang plains, Finger area and Gogra for almost three months now, they said.

The meeting of senior leadership is happening almost a week after the last meeting between the Major Generals of India and China at Daulat Beg Oldi. During the talks, the Indian side asked the Chinese to stop efforts to create obstacles for the Indian patrols going to Patrolling Point 10, 11, 12 and 13.

The Chinese have been demanding that India should deescalate from the DBO and Eastern Ladakh sector but India is clear that the Indian build-up has been in response to the Chinese actions and build-up along with the Indian territory.

The Chinese have maintained heavy troops along with long-range artillery and armoured vehicles opposite DBO sector and India has also built up accordingly to prevent any misadventure by the Chinese.

The Defence Ministry recently stated that the Chinese have been showing aggression along the LAC since April-May timeframe and has transgressed into the Indian areas from Kungrang nala, Galwan valley and other areas.

On June 15, the Indian Army was engaged in a faceoff with the Chinese troops near PP-14 in Galwan valley in which 20 Indian soldiers were killed.

On July 17, Defence Minister Rajnath Singh had said, "Talks are underway (with China) to resolve the border dispute...it should be resolved. But to what extent it can be resolved, I cannot guarantee it. But let me assure you that no power in the world can either touch or capture even one inch of Indian territory."

The Chinese have refused to vacate Finger area and are saying that they would maintain an observation post with over 30 soldiers around Finger 5. India has made it clear that the Chinese should completely disengage from all friction points.

<https://timesofindia.indiatimes.com/india/with-china-reluctant-to-disengage-top-indian-political-military-leaders-to-discuss-way-forward-in-ladakh/articleshow/77588758.cms>

Chinese stealth fighters head west to confront India

By David Axe

Two Chinese air force J-20 stealth fighters have appeared at an air base in China's far west as the mountain stand-off between India and China enters its fourth month.



J-20s at Hotan. Chinese social media

The twin-engine J-20s are visible in commercial satellite imagery of Hotan air base, in the Uighur autonomous region of Xinjiang. Chinese social-media users first spotted the planes.

The J-20 deployment, however temporary, signals Beijing's resolve as China wrestles with India for influence over a disputed region of the Himalayas. But a pair of warplanes, no matter how sophisticated, don't represent much actual combat power.

It's not clear whether there are more J-20s out west than just two that are visible in the satellite photo. The Chinese air force possesses only around 40 J-20s.

Hotan lies some 200 miles from Ladakh, the region of northern India along which runs the Line of Actual Control, the demarcation between Indian and Chinese forces in the Himalayas. Diplomats drew that line as part of truce talks following a bitter, bloody border war in 1962.

After weeks of posturing, in early June Chinese forces killed 20 Indian soldiers in a skirmish along the LOAC. Forty-three Chinese soldiers also were injured or died, according to press reports.

Indian and Chinese warplanes and helicopters are patrolling the border zone as the stand-off continues. India has deployed Su-30, MiG-29 and MiG-29K fighters.

The People's Liberation Army Air Force previously deployed at least six H-6 bombers with KD-63 cruise missiles to Kashgar airport, also in Xinjiang, placing the bombers within striking distance of Indian forces.

The tiny contingent of J-20s arguably is less potent than the H-6 force is. Two J-20s flying together probably could mount no more than a single patrol every couple of days. Double the J-20 detachment to four planes, and you might get a daily two-jet mission.

Triple it, and you might be able to sustain slightly more than a mission per day, on average. But at that size, the J-20 contingent at Hotan could require the support of the PLAAF's entire stealth-fighter fleet.

That's because, owing to training and maintenance requirements, a force of 40 fighters can sustain just a handful of planes on front-line operations over a prolonged period of time.

It's a problem that smaller European air force are struggling with as they acquire tiny fleets of F-35 stealth fighters to replace their larger fleets of old F-16s. Denmark is buying 27 F-35s to replace 41 F-16s and expects to deploy four F-35s at a time. Belgium is acquiring 34 F-35s to replace 56 F-16s and could deploy around five F-35s.

The J-20s however do underscore Chinese resolve—and could hint at larger, future deployments of a wider variety of fighter types. The Chinese air force at present is thin on the ground in China's west. The PLAAF concentrates its forces in the east for operations over the disputed China Seas and for a possible invasion of Taiwan.

Besides, the austere conditions and performance-draining high elevations of western airfields complicate fighter operations. Chinese J-16s that routinely fly from western bases reportedly carry just a few small air-to-air missiles and must get new brake discs after every mission.

At 4,600 feet above sea level, Hotan is higher than are most of the bases the PLAAF operates from—with the obvious impact on the performance of aircraft flying from the base. Hotan's proximity to the LOAC at least mitigates the performance impact of the high, thin air.

To be clear, Indian forces in the region suffer the same constraints, although it's worth pointing out that India has more experience with air operations in the mountains.

During a clash with Pakistani forces in Kashmir back in 1999, a single coordinated strike by Indian air force Mirage 2000s hauling Litening camera pods and laser-guided bombs succeeded in knocking out a key Pakistani headquarters.

<https://www.forbes.com/sites/davidaxe/2020/08/17/chinese-stealth-fighters-head-west-to-confront-india/#394ed80b1b85>



Tue, 18 Aug 2020

HAL-developed Dhruv helicopter being used to clean Mauritius oil spill

HAL Dhruv is a utility helicopter designed and developed by Hindustan Aeronautics Limited (HAL). A total of 228 Dhruv Helicopters have been produced by March 2017 including 216 for the Indian Armed Forces
Edited By Subhangi Kumari Singh

New Delhi: Indian built helicopter Dhruv is being used in cleaning the Mauritius oil spill. HAL's Dhruv along with 3 Chetak helicopters are helping extricate skimmed oil from the vessel MV Wakashio. India had gifted One Dhruv and 2 Chetak Helicopters in December 2016 to Government of Mauritius.

HAL Dhruv is a utility helicopter designed and developed by Hindustan Aeronautics Limited (HAL). A total of 228 Dhruv Helicopters have been produced by March 2017 including 216 for the Indian Armed Forces. It has been supplied to Nepal Army & Mauritius Police, Maldives.

India has been increasingly focusing on Atmanirbhar Bharat in defence and just a few weeks ago defence ministry had come out with 101 "negative list" of items that can't be imported.

When it comes to Chetak Helicopters, HAL started manufacturing of helicopters in 1962 by entering in an agreement with Sud Aviation (Presently M/S Airbus). The first Chetak in 'Fly Away' condition delivered in 1965. One of the Chetaks used to clean the Mauritius oil spill was given in 1987.

India yesterday sent equipment and a 10 member team to Mauritius to help the country deal with the crisis which it as declared as an "environmental emergency".

<https://zeenews.india.com/india/hal-developed-dhruv-helicopter-being-used-to-clean-mauritius-oil-spill-2303301.html>



Tue, 18 Aug 2020

Pakistan may deploy Chinese UAVs at LoC to create unrest in Jammu and Kashmir

Pakistan is planning to deploy medium-altitude long-endurance unmanned aerial vehicles (UAV) at Line of Control (LoC) to create in Jammu and Kashmir, according to reports. Security agencies sources said that Pakistan has procured Cai Hong-4 (CH-4) UAV from China in big numbers in order to unleash mayhem in Kashmir valley
By Manish Shukla

Highlights

- ***Pakistan is planning to deploy medium-altitude long-endurance unmanned aerial vehicles (UAV) at Line of Control (LoC) to create in Jammu and Kashmir, according to reports.***
- ***Security agencies sources said that Pakistan has procured Cai Hong-4 (CH-4) UAV from China in big numbers in order to unleash mayhem in Kashmir valley.***
- ***It is learnt that a 10 member-team of Pakistan Army led by Brigadier Mohammad Zafar Iqbal has visited China to review the procurement process.***

Pakistan is planning to deploy medium-altitude long-endurance unmanned aerial vehicles (UAV) at Line of Control (LoC) to create further unrest in Jammu and Kashmir, according to reports. Security agencies sources said that Pakistan is procuring Cai Hong-4 (CH-4) UAV from China in big numbers in order to unleash mayhem in Kashmir valley.

It is learnt that a 10 member-team of Pakistan Army led by Brigadier Mohammad Zafar Iqbal has visited China to review the procurement process. The Pakistan Army team recently visited China for factory acceptance test for items procured from Aerospace Long-March International Trade Company (ALIT) in China.

Iqbal had earlier visited China in December 2019 for factory acceptance test of first tranche of Cai Hong-4 for which delivery was to commence in 2020.

The CH-4 has a take-off mass between 1,200-1,300kg depending on the variant. It can also carry a wide range of payloads. The UAV is already in service with military forces including the Iraqi Army and the Royal Jordanian Air Force.

Few days ago, intel reports had revealed that Pakistani Army Special Service Group (SSG) commandos are giving arms training to Talibani and Afghani terrorists in secret places of Afghanistan. The report added that these terrorists are planning to launch attacks on security establishment and patrolling party in Jammu and Kashmir.

The report also claimed that different terrorist outfits in Kashmir were working in tandem with each other to launch terror attacks in the valley and facilitate infiltration of terrorists from Pakistan.

<https://zeenews.india.com/india/pakistan-planning-to-deploy-chinese-uavs-at-loc-to-create-unrest-in-jammu-and-kashmir-2303309.html>

Training of Indian astronauts in Russia for mission Gaganyaan on schedule despite Covid

By Dipanjan Roy Chaudhury

Synopsis

The Indian Embassy in Moscow is closely monitoring progress of astronaut training with the Indian envoy meeting the four astronauts recently. The Russian side has taken special care for healthcare of trainees.

New Delhi: The training of Indian astronauts in Russia for Gaganyaan mission is being held as per schedule notwithstanding the pandemic and the process will be completed as per schedule by March 2021. The bilateral summit expected to be held in October could see a signing of a pact for new areas of cooperation in space sector.

The Indian Embassy in Moscow is closely monitoring progress of astronaut training with the Indian envoy meeting the four astronauts recently. The Russian side has taken special care for healthcare of trainees.

“Space cooperation is a very old area of cooperation between India and Russia. We are very grateful to the support given by the Soviet Union. The first Indian cosmonaut in the Space was with the help that Soviet Union provided, was Rakesh Sharma. He is still looked upon by the young and old people in India as a great hero,” Indian Ambassador to Russia D Bala Venkatesh Varma said.

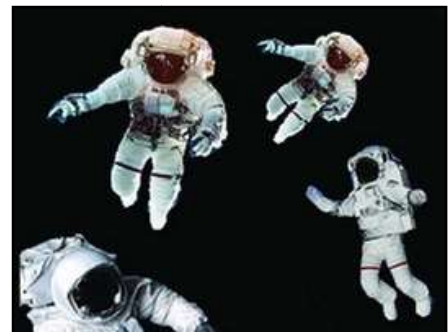
“Today, there are four astronauts called Gagan-nauts who are being trained in Russia, who will be travelling into space in the coming two years and that too, on an Indian spacecraft. So, this is yet another area of cooperation.”

The envoy said, “I had the opportunity to meet them recently and they are full of praise and admiration for the support, professionalism and the friendship that they received at the Roscosmos and from their Russian friends. And we are indeed very grateful for that. You see, the Space industry is changing. In the past, it used to be only the Government sector, the Space sector, which used to do Space research but, now, private industry is increasingly playing a role.”

“India too is allowing the Government sector to partner with the private sector. So, we would very much welcome Russian companies to participate in the opportunities in the Space sector in India, including, private sector companies to form joint ventures with the Indian partners and take this cooperation forward.”

India’s engagement with Russia in space relationships goes back to 1975, when the erstwhile Soviet Union helped in the launch of Aryabhata (India’s first satellite), from the Soyuz Launch Vehicle. Even the second satellite Bhaskara was launched from Soviet Union in 1979.

Two other areas where Russia is a critical partner are in the fields of satellite navigation through the Russian Satellite Navigation System ‘GLONASS’ for help in India’s own system called NavIC. The second is in the development of GSLV (Geosynchronous Satellite Launch Vehicle) Launch



“Today, there are four astronauts called Gagan-nauts who are being trained in Russia, who will be travelling into space in the coming two years and that too, on an Indian spacecraft,” Indian Ambassador to Russia D Bala Venkatesh Varma said.

Vehicle, which powers the Chandrayaan-2 and many upcoming missions of ISRO by providing the Cryogenic rocket technology.

<https://economictimes.indiatimes.com/news/science/training-of-indian-astronauts-in-russia-for-mission-gaganyaan-on-schedule-despite-covid/articleshow/77591804.cms>



Tue, 18 Aug 2020

Ripple effects after slow-motion bubble collapse

By Thamarasee Jeewandara

A recent feature cover photo on *Science* portrayed a bubble in mid-collapse, based on a study conducted by Alexandros T. Oratis et al. The research team in mechanical engineering, mathematics and aerospace engineering at Boston University, MIT and Princeton University demonstrated the formation of intriguing wave-like patterns when bubbles underwent collapse. Using a complex lighting setup and fast shutter speed in the lab, perfectly aligned to capture a fleeting moment, within one second, they photographed the tiny bubble emerging from the surrounding media of dense silicone oil.

The rupture and collapse of viscous bubbles are widespread in nature and in industrial applications. The phenomenon is accompanied by elastic sheets that develop radial wrinkles. While the weight of the film appeared to play a dominant role during film collapse and wrinkling instability, in this work, gravity appeared to play a surprisingly negligible role. Based on fluid mechanics of the phenomena, Oratis et al. showed surface tension to be the driving factor during collapse to initiate dynamic buckling instability and wrinkling behavior, accompanied with the breakdown of curved viscous and viscoelastic films. The research work is relevant to understand industrial and chemical applications, including aerosol production from exhalation events in the respiratory tract.

Wrinkling of thin sheets

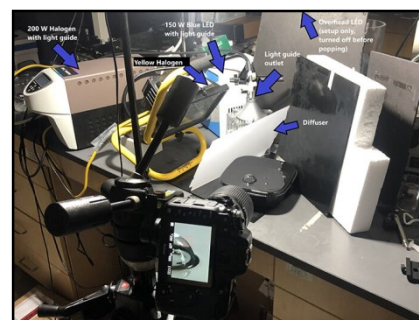
Understanding the formation of bubbles is important due to their ubiquity in nature and industrial applications including bubble collection during glass manufacture, spray painting, disposal of radioactive waste and in volcanic eruptions. Elastic sheets can wrinkle under compressive stress since they require less energy to buckle than compress. In recent studies researchers have focused on understanding the bending deformations that occur when a thin elastic sheet is stretched, poked, or wrapped around a curved object. Similarly, viscous liquids too can buckle in a process observed as 'parachute instability' when a rising bubble reaches the surface to rupture. After surfacing, a bubble consists of a thin liquid film in the form of a spherical cap supported by the gas trapped inside it. The wrinkles that develop during bubble rupture do so due to the weight of the collapsing thin film to allow trapped gas to escape. Oratis et al. showed that the wrinkling instability did not specifically depend on gravity or the presence of a hole experimentally formed to allow trapped gas to escape from the bubble.

Proof-of-concept

The team conducted experiments and observed the development of wrinkles in a collapsing bubble on a silicon oil bath to show how it was driven by surface tension instead of gravity. To test



Ripple effects forming on sheets of a bubble film photographed mid-collapse. Image credit: Oliver McRae/Boston University, Credit: Science Advances, doi: 10.1126/science.aba0593



McRae's complex lighting setup to photograph the tiny bubble as it emerged from the dense silicone oil. Credit: Science Advances, doi: 10.1126/science.aba0593

the hypothesis, they conducted an experiment with bubbles turned upside down, an approach facilitated due to the liquid viscosity. They accomplished this by preparing the bubble right-side up and rapidly rotating the sample to rupture it in a few seconds. When inverted, the bubble film continued to maintain its shape and thickness at the apex. If gravity and viscosity had been dominant contributors to the process, the inverted bubbles would have elongated downward as seen in simulations. Instead, the team noted the inverted bubble reverting back up against the force of gravity, while wrinkles formed during the final stages of bubble collapse, providing them a clear view of the process.

Surface tension—the driving force

To understand surface tension, the driving force behind the phenomenon, the scientists measured key parameters characteristic of the time-scale of collapse. For this, Oratis et al. used silicon oils with various viscosities and varied film thicknesses during the experiments. Using high-speed images, they calculated representative velocity at the onset of wrinkling and increased the viscosity of the silicone oil, to slow down collapse. As expected, thinner bubbles collapsed faster. The model derived in this work showed how the number of wrinkles strongly depended on the size of the hole created to initiate bubble collapse. During experimental demonstrations, the team eliminated the pressure difference across the bubble surface using a capillary-driven setup that did not breakdown the thin film, as a result, the hole created in the process efficiently induced bubble collapse without rupturing the film.

The experimental results were in fair agreement with the theory. The competition between tensile stress and compressive stress in the system affected the location of wrinkling patterns in the sheets. Oratis et al. performed additional experiments with thicker structures using blown molten glass extracted from the furnace, where they allowed the trapped air to escape through the glass-blowing pipe. During the process, the blown glass collapsed to adopt the shape of a wrinkle. The model derived in this work had limitations for data with the thinnest films where the collapse was so abrupt that the wrinkling pattern lost its symmetry to span the entirety of the bubble. Furthermore, the model predicted that wrinkling would not occur for all conditions.

In this way, Oratis and colleagues showed that surface tension, not gravity, drove the collapse of viscous surface bubbles. They developed a capillary-driven collapse system to initiate dynamic buckling instability via the simultaneous interplay of inertia, compression, and viscous binding of the relapsing film. The work presented viscous sheets with elastic-like instabilities during rapid compression. The results can also explain the fluid mechanics of the exhalation of potential pathogen-bearing aerosols that are linked to the breakdown of thin bubble films in the viscoelastic fluid that lines the respiratory tract. The present work suggests that surface tension alone may prompt buckling instability during viscous film rupture for these films to fold and entrap air, thereby providing deeper insight to the mechanisms of aerosolization.

More information: Oratis A. et al. A new wrinkle on liquid sheets: Turning the mechanism of viscous bubble collapse upside down, *Science*, 10.1126/science.aba0593

F. E. C. Culick. Comments on a Ruptured Soap Film, *Journal of Applied Physics* (2005). [DOI: 10.1063/1.1735765](https://doi.org/10.1063/1.1735765)

B. Davidovitch et al. Prototypical model for tensional wrinkling in thin sheets, *Proceedings of the National Academy of Sciences* (2011). [DOI: 10.1073/pnas.1108553108](https://doi.org/10.1073/pnas.1108553108)

Journal information: [*Science*](#) , [*Journal of Applied Physics*](#) , [*Proceedings of the National Academy of Sciences*](#)
<https://phys.org/news/2020-08-ripple-effects-slow-motion-collapse.html>

Two-dimensional materials for ultrascaled field-effect transistors

By Simone Ulmer

With the increasing miniaturization of electronic components, researchers are struggling with undesirable side effects: In the case of nanometer-scale transistors made of conventional materials such as silicon, quantum effects occur that impair their functionality. One of these quantum effects, for example, is additional leakage currents, i.e. currents that flow "astray" and not via the conductor provided between the source and drain contacts. It is therefore believed that Moore's scaling law, which states that the number of integrated circuits per unit area doubles every 12-18 months, will reach its limits in the near future because of the increasing challenges associated with the miniaturization of their active components. This ultimately means that the currently manufactured silicon-based transistors—called FinFETs and equipping almost every supercomputer—can no longer be made arbitrarily smaller due to quantum effects.

Two-dimensional beacons of hope

However, a new study by researchers at ETH Zurich and EPF Lausanne shows that this problem could be overcome with new two-dimensional (2-D) materials—or at least that is what the simulations they have carried out on the "Piz Daint" supercomputer suggest.

The research group, led by Mathieu Luisier from the Institute for Integrated Systems (IIS) at ETH Zurich and Nicola Marzari from EPF Lausanne, used the research results that Marzari and his team had already achieved as the basis for their new simulations: Back in 2018, 14 years after the discovery of graphene first made it clear that two-dimensional materials could be produced, they used complex simulations on "Piz Daint" to sift through a pool of more than 100,000 materials; they extracted 1,825 promising components from which 2-D layers of material could be obtained.

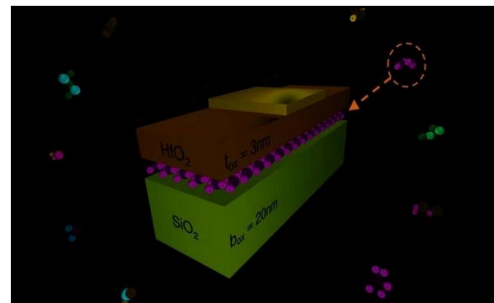
The researchers selected 100 candidates from these more than 1,800 materials, each of which consists of a monolayer of atoms and could be suitable for the construction of ultra-scaled field-effect transistors (FETs). They have now investigated their properties under the "ab initio" microscope. In other words, they used the CSCS supercomputer "Piz Daint" to first determine the atomic structure of these materials using density functional theory (DFT). They then combined these calculations with a so-called Quantum Transport solver to simulate the electron and hole current flows through the virtually generated transistors. The Quantum Transport Simulator used was developed by Luisier together with another ETH research team, and the underlying method was awarded the Gordon Bell Prize in 2019.

Finding the optimal 2-D candidate

The decisive factor for the transistor's viability is whether the current can be optimally controlled by one or several gate contact(s). Thanks to the ultra-thin nature of 2-D materials—usually thinner than a nanometer—a single gate contact can modulate the flow of electrons and hole currents, thus completely switching a transistor on and off.

Structure of a single-gate FET with a channel made of a 2-D material. Arranged around it are a selection of 2-D materials that have been investigated. (Mathieu Luisier/ETH Zürich)

"Although all 2-D materials have this property, not all of them lend themselves to logic applications," Luisier emphasizes, "only those that have a large enough band gap between the



Arranged around it are a selection of 2-D materials that have been investigated. Credit: Mathieu Luisier/ETH Zurich

valence band and conduction band." Materials with a suitable band gap prevent so-called tunnel effects of the electrons and thus the leakage currents caused by them. It is precisely these materials that the researchers were looking for in their simulations.

Their aim was to find 2-D materials that can supply a current greater than 3 milliamperes per micrometer, both as n-type transistors (electron transport) and as p-type transistors (hole transport), and whose channel length can be as small as 5 nanometres without impairing the switching behavior. "Only when these conditions are met can transistors based on two-dimensional materials surpass conventional Si FinFETs," says Luisier.

The ball is now in the experimental researchers' court

Taking these aspects into account, the researchers identified 13 possible 2-D materials with which future transistors could be built and which could also enable the continuation of Moore's scaling law. Some of these materials are already known, for example black phosphorus or HfS₂, but Luisier emphasizes that others are completely new—compounds such as Ag₂N₆ or O₆Sb₄.

"We have created one of the largest databases of transistor materials thanks to our simulations. With these results, we hope to motivate experimentalists working with 2-D materials to exfoliate new crystals and create next-generation logic switches," says the ETH professor. The research groups led by Luisier and Marzari work closely together at the National Centre of Competence in Research (NCCR) MARVEL and have now published their latest joint results in the journal *ACS Nano*. They are confident that transistors based on these new materials could replace those made of silicon or of the currently popular transition metal dichalcogenides.

More information: Cedric Klinkert et al, 2-D Materials for Ultrascaled Field-Effect Transistors: One Hundred Candidates under the Ab Initio Microscope, *ACS Nano* (2020). DOI: [10.1021/acsnano.0c02983](https://doi.org/10.1021/acsnano.0c02983)
<https://phys.org/news/2020-08-two-dimensional-materials-ultrascaled-field-effect-transistors.html>



Tue, 18 Aug 2020

Scientists develop new method to create super stable X-rays

By Ali Sundermier

Modern X-ray laser facilities like the Linac Coherent Light Source (LCLS) at the Department of Energy's SLAC National Accelerator Laboratory allow scientists to study how nature behaves at ultrasmall and ultrafast scales. However, the individual X-ray pulses are unstable, fluctuating from shot to shot, and produce a lot of background noise that can obscure the signal in high-resolution experiments.

Now, SLAC scientists have developed a method to produce brighter X-rays that are more stable and coherent, with wavelengths that are more in sync with one another. This could increase the efficiency of data collection and pave the way for new kinds of experiments. Their results were recently published in *Physical Review Letters*.

Tools for science

For the last several years, the team has been looking for ways to improve the performance of the LCLS by improving the quality of its pulses.

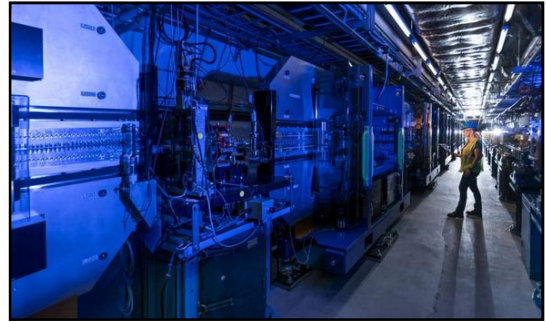
"Producing a perfect X-ray laser is one of the ultimate goals in our community," says co-author and SLAC scientist Zhen Zhang. "We wanted to find a way to make X-ray pulses resemble those from a classical optical laser, which are both stable and coherent."

Bob Schoenlein, LCLS Deputy for Science, says that this research will make XFELs even more important and versatile tools for science.

"This is a very promising approach for controlling the coherence properties of LCLS X-ray pulses," he says. "It will enable studies of complex materials and molecular systems with exquisite resolution in both time and energy."

Best of both worlds

The researchers had been studying existing approaches to generate cleaner X-ray pulses, such as filtering the noisy pulses and re-injecting them into the XFEL using a concept called "self-seeding," but found that there is a fundamental trade-off between highly coherent pulses and highly stable ones. In the traditional self-seeding method, it was not possible to have both at once.



Credit: SLAC National Accelerator Laboratory

They realized that they needed to take an entirely different approach to sidestep this problem. That's when lead author and SLAC scientist Erik Hemsing had the idea to stretch ultrashort X-ray pulses, whose unique properties allow the researchers to stabilize and purify the pulses.

"Instead of filtering the long, noisy pulses as is done in conventional self-seeding, we realized that we should instead first produce ultrashort coherent pulses and then stretch and amplify them," Hemsing says. "This way, according to our studies, we are able to significantly increase the stability and the coherence at the same time."

The concept relies on the fact that the ultrashort pulses can be much less noisy and more coherent than long pulses, particularly if they reach their maximum power. The problem is that the short pulses do not carry much energy and are not ideal for certain high-resolution scientific applications. The researchers found a way to filter these pulses, then amplify them by a factor of 10,000.

"It allows us to get the results we want without major modifications to the existing setup," says co-author and SLAC research associate Alex Halavanau.

Putting it to the test

To follow up on this research, the team hopes to test the idea at LCLS. In the future, Halavanau says, they would like to extend the technique to more energetic "hard" X-rays, and use new, customized soft X-ray pulses enabled by this technique to better understand the physics of atoms, photons and electrons.

Zhirong Huang, director of the SLAC Accelerator Research Division, says: "We look forward to putting this idea to work in the new soft X-ray undulator that will come online soon for LCLS-II."

More information: Erik Hemsing et al. Enhanced Self-Seeding with Ultrashort Electron Beams, *Physical Review Letters* (2020). DOI: [10.1103/PhysRevLett.125.044801](https://doi.org/10.1103/PhysRevLett.125.044801)

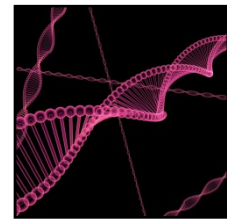
Journal information: *Physical Review Letters*

<https://phys.org/news/2020-08-scientists-method-super-stable-x-rays.html>

Researchers discover how enzyme protects cells from DNA damage

A research team from Mount Sinai has unraveled for the first time the three-dimensional structure and mechanism of a complex enzyme that protects cells from constant DNA damage, opening the door to discovery of new therapeutics for the treatment of chemotherapy-resistant cancers. In a study published in *Nature Structural & Molecular Biology* in August, the researchers described how they used advanced cryo-electron microscopy to gain detailed insights into the enzyme known as DNA polymerase ζ (Pol ζ), whose architecture and mechanism have been a mystery to scientists for years.

"Resolving the structure of the complete Pol ζ enzyme at near-atomic resolution allows us to address long-standing questions of how this unique polymerase replicates through daily DNA-damaging events, while also providing a template for designing drugs against cancers that are refractory to conventional chemotherapeutics," says lead author Aneel Aggarwal, Ph.D., Professor of Pharmacological Sciences at the Icahn School of Medicine at Mount Sinai.



Credit: CC0 Public Domain

DNA polymerase ζ is the crucial enzyme that allows cells to battle the more than 100,000 DNA-damaging events that occur daily from normal metabolic activities and environmental intrusions like ultraviolet light, ionizing radiation, and industrial carcinogens. The Mount Sinai team, which included first author Radhika Malik, Ph.D., Assistant Professor of Pharmacological Sciences, learned how the enzyme protects the cells from natural and manmade environmental as well cellular stresses through an intricate structure of four different proteins that connect to each other in a pentameric, or daisy chain-like, configuration.

This architecture is expected to provide valuable insights to scientists for the future development of drugs designed to inhibit the DNA polymerase when treating cancers like non-small-cell lung, prostate, and ovarian that often become resistant to chemotherapy after early use in patients. The reason for that resistance is that chemotherapies like cisplatin actually depend on their DNA-damaging effects. Thus, blocking or inhibiting the function of Pol ζ makes the cancerous cells more sensitive to the therapeutic impact of chemotherapy.

"The development of effective inhibitors has been hampered in the past by a lack of structural information on Pol ζ ," explains Dr. Aggarwal. "Our work now offers a much clearer picture, and we expect these new insights will spur efforts by scientists around the world to create effective new therapies. For the thousands of patients with tumors that are resistant to chemotherapy, these findings could prove to be particularly valuable by meeting an unfulfilled need in their battle against cancer."

The lack of progress over the years was largely due to the fact that structural studies of DNA polymerase ζ were limited by the low yields and unattainability of well-diffracting crystals. Dr. Aggarwal and his team overcame that problem by employing cryo-electron microscopy. This technology, which allows for the imaging of rapidly frozen molecules in solution, is revolutionizing the entire field of structural biology through its high-resolution pictures of complex molecules.

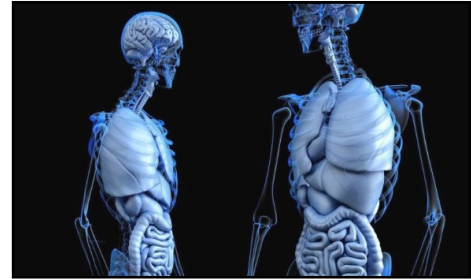
More information: Structure and mechanism of B-family DNA polymerase ζ specialized for translesion DNA synthesis, *Nature Structural & Molecular Biology* (2020). DOI: [10.1038/s41594-020-0476-7](https://doi.org/10.1038/s41594-020-0476-7) , www.nature.com/articles/s41594-020-0476-7

Journal information: [Nature Structural & Molecular Biology](https://phys.org/news/2020-08-enzyme-cells-dna.html)
<https://phys.org/news/2020-08-enzyme-cells-dna.html>

Stomach SIDT1 mediates dietary microRNA absorption

In a new study published in *Cell Research*, Chen-Yu Zhang's group at Nanjing University School of Life Sciences, China, reports that SIDT1 in the mammalian stomach mediates host uptake of dietary and orally administered microRNAs (miRNAs), thus exerting biological functions in the host.

In previous studies, Chen-Yu Zhang's group has demonstrated that intact plant miRNA in foods can be absorbed through the mammalian digestive system and mediate cross-kingdom gene regulation. The discoveries also provide new insight into the oral administration of RNA therapeutic drugs. Although accumulated evidence shows the existence of intact dietary miRNAs within mammalian hosts, the absorption of dietary miRNAs in animal gastrointestinal tract has been frequently questioned, mainly due to the unknown mechanism of absorption.



In the current study, they show that an SID-1 transmembrane family member 1 (SIDT1), a mammalian homolog of SID-1 expressed on gastric pit cells in the stomach is required for the absorption of dietary miRNAs. SIDT1-deficient mice show reduced basal levels and impaired dynamic absorption of dietary miRNAs. Notably, they identified the stomach as the primary site for dietary miRNA absorption, which is dramatically attenuated in the stomachs of SIDT1-deficient mice. Mechanistic analyses revealed that the uptake of exogenous miRNAs by gastric pit cells is SIDT1 and low-pH dependent. Furthermore, oral administration of plant-derived miR2911 retards liver fibrosis, and the protective effect was abolished in SIDT1-deficient mice. This study not only reveals the major mechanism of dietary miRNA absorption, but uncovers a novel physiological function of the mammalian stomach, but also shed light on orally delivered small-RNA therapeutics.

This work is important for the following reasons:

1. In this study, the researchers demonstrated the molecular mechanism of mammalian dietary miRNA absorption, which is one of the most groundbreaking as well as most controversial discoveries in the field of extracellular RNA research in the last decade. Identification of the absorption mechanism provides strong evidence of the physiological existence and functionality of mammalian dietary miRNA absorption, thus ending the 10-year debate on this topic.
2. This work also newly found that the stomach not only absorbs water and alcohol, as is broadly known in classic physiology, but also senses and takes up functional dietary miRNAs. This provides a unique new understanding of digestion physiology.
3. A low-pH condition is required for efficient exogenous miRNA uptake via SIDT1. This finding reveals an evolutionary explanation for functional dietary miRNA absorption, in which the stability of dietary miRNAs is granted in stomach, where RNase activity is largely absent in this low-physiological-pH gastric environment.
4. By oral administration, plant-derived miR2911 can be absorbed via SIDT1 and can subsequently alleviate liver fibrosis in mice, providing a new therapeutic strategy for small-RNA-based treatment. This natural mammalian absorption pathway of dietary miRNA will be easily harnessed for the oral delivery of therapeutic miRNAs, which could be a potential direction in for the development of RNA-based medicine.

More information: Qun Chen et al, SIDT1-dependent absorption in the stomach mediates host uptake of dietary and orally administered microRNAs, *Cell Research* (2020). DOI: [10.1038/s41422-020-0389-3](https://doi.org/10.1038/s41422-020-0389-3)
<https://phys.org/news/2020-08-stomach-sidt1-dietary-microrna-absorption.html>



Tue, 18 Aug 2020

Discovery promising for millions at risk from antibiotic resistance

There is new hope for approximately 700,000 people who die each year from antibiotic resistant infections, with University of Queensland researchers discovering how bacteria share antibiotic-resistance genes.

UQ's Professor Mark Schembri said antibiotic resistant bacteria, in particular emerging 'superbugs', could lead to around 10 million deaths globally by 2050.

"The diminishing pool of effective antibiotics makes these infections a major threat to human health, so it's critical we understand the exact mechanics of how antibiotic resistance spreads between different bacteria," Professor Schembri said.

"In this study, we examined plasmids—self-replicating DNA molecules—which are one of the major drivers for the rapid spread of antibiotic resistance genes between bacteria.

"Many plasmids carry 10 to 15 antibiotic resistance-causing genes, and when they transfer from one bacterial cell to another, two important things happen.

"Firstly, the plasmid is copied so that it is retained by both the donor and recipient cell, and secondly all antibiotic resistance genes are transferred together, meaning that resistance to multiple antibiotics can be transferred and acquired simultaneously."

Lead author Dr. Steven Hancock said the study used a powerful genetic screening system to identify all of the components required for the transfer of an important type of antibiotic resistance plasmid from one bacterial cell to another.

"Our investigation discovered genes encoding the 'syringe' component," Dr. Hancock said.

"That is the mechanism through which plasmid DNA is mobilized, as well as a novel controlling element essential for regulation of the transfer process."

The team also investigated the crystal structure of this controlling element, and revealed how it binds to DNA and activates transcription of other genes involved in the transfer.

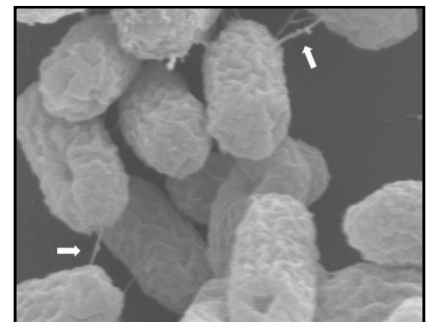
Professor Schembri said this deeper understanding would open the door to solutions for this ever-growing health crisis.

"Preventing the transfer of plasmids between bacteria has been a major challenge in reducing the spread of antibiotic resistance genes," he said.

"By looking at the molecular mechanics, we can start to develop effective solutions for stopping these genes in their tracks.

"Almost everyone has suffered an infection that did not respond to a first round of antibiotic treatment, only to be fortunate enough to be treated with a different antibiotic that worked.

"Now, in extreme cases, we're seeing common infections caused by superbugs that are resistant to all available antibiotics, highlighting the increasing challenge of antibiotic resistance.



Superbugs caught in the act of transferring an antibiotic resistance plasmid through their syringe-like 'pilus', labelled with arrows. Credit: Professor Mark Schembri

"We need to tackle this now, and I'm excited to see how this new knowledge will lead to novel approaches, potentially saving millions of lives globally."

The research has been published in *Nature Microbiology*.

More information: Comprehensive analysis of IncC plasmid conjugation identifies a crucial role for the transcriptional regulator AcaB, *Nature Microbiology* (2020). DOI: [10.1038/s41564-020-0775-0](https://doi.org/10.1038/s41564-020-0775-0) , www.nature.com/articles/s41564-020-0775-0

Journal information: *Nature Microbiology*
<https://phys.org/news/2020-08-discovery-millions-antibiotic-resistance.html>

COVID-19 Research News



Sun, 16 Aug 2020

Researchers identify 73 novel variants of COVID-19 strain in Odisha

The researchers are from CSIR-Institute of Genomics and Integrative Biology (IGIB), New Delhi and Institute of Medical Sciences and SUM Hospital, Bhubaneswar

Bhubaneswar: A team of genomic researchers from two institutes has identified 73 novel variants of the COVID-19 strain in Odisha, its head has said.

The researchers are from CSIR-Institute of Genomics and Integrative Biology (IGIB), New Delhi and Institute of Medical Sciences and SUM Hospital, Bhubaneswar, he said.

"The research team, which carried out sequencing of 1,536 samples including 752 clinical samples, reported two lineages -- B.1.112 and B.1.99 -- for the first time in India," Dr Jayashankar Das, lead investigator and director (research) of the IMS and SUM Hospital, said on Friday.

If one gets to know the detailed character of the novel coronavirus, it will be very easy to treat patients and cure them, he said.

The research team, supported by the Council of Scientific and Industrial Research (CSIR), validated the most-advanced COVID-19 sequencing technology.

This could be a potential high-sensitivity assay for the detection of SARS-CoV-2 with the additional advantage of enabling genetic epidemiology of SARS-CoV-2, Das said.

With this study, India has beaten 12 organisations in 10 countries to complete the first field validation and release the data online, he said, quoting a report by sequencing tech giant Illumina.

The IMS and SUM Hospital researchers are also undertaking the sequencing and analysis of 500 viral genomes to understand the mild, moderate and critical coronavirus infection along with its transmission capabilities, he said.

Besides, the study will help understand the vulnerability of the strains, new therapeutic target and new mutation in eastern India, especially in Odisha, Das said.

The rapid emergence of COVID-19 as a pandemic, which has affected millions of people across the world, has necessitated sensitive and high-throughput approaches for the diagnosis, surveillance and determining the genetic epidemiology of SARS-CoV-2, which will help in tracking strain information as well, he said.

Asked about the difference between RT-PCR test and COVID-19 sequencing tests, Das said, "The COVID-19 sequencing reports give the entire history of the coronavirus, while the RT-PCR tests only determine whether a patient is positive or negative for the infection."

<https://www.newindianexpress.com/states/odisha/2020/aug/15/researchers-identify-73-novel-variants-of-covid-19-strain-in-odisha-2183781.html>



Tue, 18 Aug 2020

COVID-19 vaccine: With three vaccine candidates, India to play major role in fight against coronavirus

By Anulekha Ray

- *Several Indian firms have already joined the race to develop an effective vaccine against COVID-19*
- *At present, two vaccine candidates are at phase I and II clinical human trials in India*

India with its "great track record in low cost drug manufacturing" will play a major role against coronavirus, believes Nobel laureate Peter Charles Doherty. "Given India's great track record in low cost drug and vaccine manufacture, we expect that India will be a major player. This is, after all, the fastest way to return global economic activity," said Doherty.

Peter Charles Doherty won Nobel Prize for Medicine in 1996 for his discovery of how the body's immune system distinguishes virus-infected cells from normal ones.

Doherty remark didn't come as a surprise. India is among the largest manufacturer of generic drugs and vaccines in the world. Vaccine makers in India has made million of doses against polio, meningitis, pneumonia, rotavirus, BCG, measles, mumps and rubella over the years. Now, several Indian firms have already joined the race to develop an effective vaccine against COVID-19.

One of them is Serum Institute of India, the world's largest vaccine maker by number of doses produced and sold globally. British-Swedish pharmaceutical company AstraZeneca Plc has joined SII to manufacture COVID-19 vaccine developed by the University of Oxford. Pune based firm has already received permission to conduct phase II and phase III trial of Oxford's COVID-19 vaccine in India.

The company has already manufactured around 2-3 million doses of the vaccine for getting the process correct and also stabilising its machinery."If you look at the process right now, the risk of the opex (operating expenditure) which we are putting in is more than \$200 million. If this vaccine fails, we will be down (by) \$200 million," Adar Poonawalla, the chief executive officer of Serum Institute of India earlier said.

SII also said Bill & Melinda Gates Foundation will provide at-risk funding of \$150 million to manufacture 100 million doses of COVID-19 vaccines for India and low-and-middle income countries. Under this agreement, Pune-based firm can charge a maximum of \$3 per dose for the two COVID-19 vaccines.

At present, two vaccine candidates are at phase I and II clinical human trials in India. India's first COVID-19 vaccine Covaxin has been developed by Bharat BioTech, Indian Council of Medical Research (ICMR) and National Institute of Virology (NIV). Hyderabad-based vaccine maker has "successfully completed" Phase-I human clinical trials of the vaccine and Phase-II will start soon, Assam health minister Himanta Biswa Sarma said.

Another vaccine was developed by Zydus Cadila. Dubbed as ZyCoV-D, Zydus' COVID-19 vaccine commenced phase II clinical trials from August 6. "ZyCoV-D was found to be safe and well tolerated in the phase I clinical trial," the drug maker said.

"All the subjects in phase I clinical trial were closely monitored in a clinical pharmacological unit for 24 hours post dosing for safety and for 7 days thereafter and the vaccine was found to be very safe," Zydus Cadila Chairman Pankaj R Patel said.

<https://www.livemint.com/news/india/covid-19-vaccine-india-will-play-a-major-role-believes-nobel-laureate-read-why-11597656432842.html>



Tue, 18 Aug 2020

Covid vaccine tracker, August 17: First batch of Russian vaccine ready, roll out from August-end

Coronavirus (COVID-19) vaccine tracker August 17 update: The Reuters report said Russia would roll out the vaccine by the end of this month. That is earlier than its previous announcements of making the vaccine available by September, and starting mass inoculations by October

Pune: Coronavirus Vaccine Tracker, August 17: The first batch of the Russian vaccine for novel Coronavirus has been produced, according to a report in Reuters news agency. Russia had, on August 11, that a vaccine being developed by Moscow's Gamaleya Institute was ready and had been approved. It's the first novel Coronavirus vaccine to be approved for public use.

The Reuters report said Russia would roll out the vaccine by the end of this month. That is earlier than its previous announcements about making the vaccine available by September and starting mass inoculations by October.

The Russian announcement has been received with some amount of scepticism in the global scientific community because of the fact that vaccine has been approved without the mandatory phase-III human trials.

The vaccine went through phase-I and phase-II testing in superfast time, the entire process being completed in less than two months, when usually vaccines take several months, sometimes years, to complete these trials.

Hunt for coronavirus vaccine: The story so far

- More than 160 vaccine candidates in pre-clinical or clinical trials
- 29 of them in clinical trials
- Six in final stages, phase-III of human trials
- At least eight candidate vaccines being developed in India. Two of these have entered phase -II trials after completing phase-I.

(As on August 13; source: WHO Coronavirus vaccine landscape of August 13, 2020)

<https://indianexpress.com/article/explained/covid-vaccine-tracker-update-august-17-6557896/>



An employee shows a new vaccine at the Nikolai Gamaleya National Center of Epidemiology and Microbiology in Moscow, Russia (AP)

People recovered from Covid-19 protected from virus, finds study

The findings are significant since they are the closest confirmation yet that the world's main strategy of using vaccines to trigger immune response could indeed work to stop the coronavirus pandemic

By Binayak Dasgupta

Three people who previously recovered from Covid-19 were protected during a major outbreak of the disease onboard a fishing vessel that left from Seattle, US, according to a new study that offers the first confirmation that having antibodies are enough to prevent a second infection.

The findings were based on antibody (serological) as well as viral detection (reverse transcriptase-polymerase chain reaction, or RT-PCR) tests that were conducted before the vessel departed and upon its return. During its 18 days at sea, 104 of the 122 crew members contracted the virus from a single source.

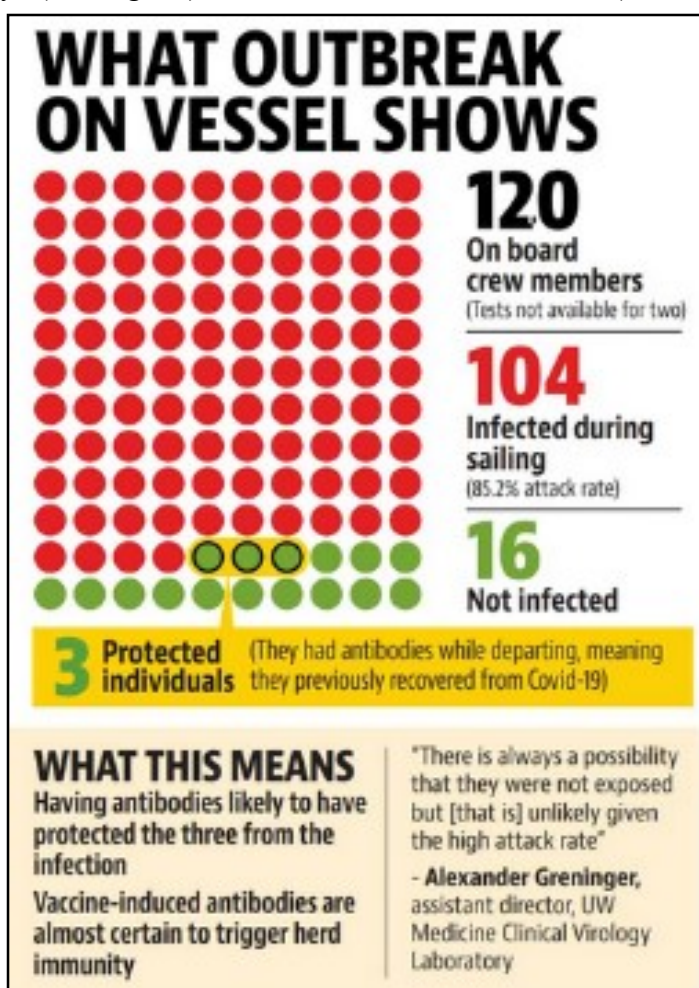
“This suggests that neutralising antibodies are a correlate of protection for Sars-CoV-2, with obvious caveat that more study is needed since the N (number of people with antibodies) was small,” Alexander Greninger, the assistant director of the University of Washington (UW) Medicine Clinical Virology Laboratory and one of the authors of the study, said in an email response to HT.

The study was posted on Friday on the preprint server medRxiv and the researchers were from UW as well as Seattle’s Fred Hutch Cancer Research Center,

The findings are significant since they are the closest confirmation yet that the world’s main strategy of using vaccines to trigger immune response could indeed work to stop the pandemic. This addresses a complicated question of whether antibodies are enough to prevent disease, and ensure symptoms are mild, or have no effect at all.

Deriving such data is normally challenging since scientific ethics prohibit an intentional infection of a person with antibodies to check whether they are safe from the virus.

“A total of 104 individuals had an RT-PCR positive viral test... yielding an attack rate on board of 85.2%. Only three crewmembers tested seropositive prior to departure in initial serological screening and also had neutralizing and spike-reactive antibodies in follow-up assays... None of these crewmembers showed evidence of bona fide viral infection or experienced any symptoms during the outbreak,” the researchers said in their paper.



The analysis involved detailed follow-up tests for 50 days. The researchers also carried out a genomic analysis of 39 genomes from the outbreak and determined that the outbreak was caused by a single source.

Since in all 18 people did not contract the virus, the authors acknowledge a faint chance that the three crew members with antibodies may not have had close contact. “There is always a possibility that they were not exposed but [that is] unlikely given the high attack rate,” said Greninger.

The study also highlights how some antibody tests may be more reliable than others. In the initial serological sampling, six people appeared to have antibodies.

This difference is a result of the human body mounting a varied counterattack against a virus, and detecting these is a complicated process. For instance, in this case, the pre-departure samples were tested using the Abbott Architect kit that looks for antibodies to a specific protein of the virus known as the Nucleocapsid (N).

Once the researchers found out there was an outbreak on the vessel, they took leftover samples from the six people who had N protein antibodies and subjected them to more detailed antibody tests: particularly those that detected antibodies to a more intrinsic parts of the virus -- the spike protein.

In this second round of testing, only three of the six had antibodies. “Therefore, we speculate that the [other] three individuals without neutralizing activity [in later tests] were false positives in the initial serological screening... However, they could have been in the early stages of active infection... Alternatively, they could have experienced a mild or asymptomatic infection,” the authors wrote.

This, the researchers said, makes it crucial to select the right kind of antibody test for serological analysis. “The key is neutralizing antibodies, which anti-RBD binding antibodies are a pretty good surrogate of. We also used blocking of binding assay for ACE2. So, yes, lots of tests here,” Greninger said.

RBD, or receptor binding domain, refers to the ‘spike’ protein the virus uses to infect a cell.

In all, there are close to 200 vaccines under development across the world. Of these, 29 are in clinical trial phases where they are being given to health volunteers to check for any adverse reaction and whether they are unsafe.

“Vaccines currently in development against SARS-CoV-2 have been shown to elicit levels of neutralizing antibodies comparable to those observed in naturally infected persons. However, the protective nature of both vaccine- and infection-elicited neutralizing antibodies in humans remains unproven, with animal models being used to make inferences about protection,” the authors write in the study. “Human challenge trials, which could provide rapid information about the protection conferred by neutralizing antibodies are controversial due to the severity and unknown long-term impacts of Sars-CoV-2 infection and concerns over ethical administration of such trials,” they note.

They add that this can be overcome by retrospective analyses of outbreak events, particularly those on confined shipping vessels. “The high population density and large degree of contact between people on ships contributes to a high attack rate,” they said, adding: “In some cases nearly all passengers will have been exposed”.

<https://www.hindustantimes.com/india-news/antibodies-can-ward-off-second-infection-study/story-asD2et2w9KexkjZxpH1sYM.html>

