Aug
2020

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Volume: 45 Issue: 201 28 August 2020

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Fri, 28 Aug 2020

Patna AIIMS to be referral hospital for DRDO Covid care centres

Patna AIIMS will also train hospital staff at two facilities in Patna and Muzaffarpur

By Ruchir Kumar

New Delhi: Patna's All India Institute of Medical Sciences (AIIMS) will be the referral facility for the makeshift Covid-19 care hospital set up by the Defence Research and Development Organisation (DRDO) at the ESIC Hospital at Bihta here.

It will also train hospital staff at two facilities in Patna and Muzaffarpur, said Dr Sanjeev Kumar, nodal officer for Covid-19 at AIIMS (Patna).

The 500-bed makeshift Covid-19 hospital in Bihta was inaugurated on August 24. The Patahi airfield would be utilised for another 500-bed makeshift field hospital at Muzaffarpur that is expected to be functional by August 31, said a letter from Sunil Sharma, joint secretary, Union health ministry.

A medic collects a sample for Covid-19 testing at a hospital in Patna. (Santosh Kumar/ HT photo)

"We received a letter to this effect from the ministry of health....," said Dr Kumar. The Bihar government will also provide staff while doctors at these facilities would be from Army hospitals, he added.

Dr Veena Singh, head of the department of burns and plastic surgery and sub-dean, faculty affairs, AIIMS (Patna), has been nominated as the nodal officer for these facilities.

A team of three Army doctors visited AIIMS (Patna) to discuss with senior faculty members the training of healthcare workers, including nursing staff, technicians, and cleaning staff.

"Dr Singh has prepared a detailed training schedule regarding donning and doffing of PPE kits, infection prevention, biomedical waste management, patient transportation, dead body packaging...," said Dr Kumar.

"The training will start at Bihta from Thursday and will be done in small batches of 30 personnel each."

Dr PK Singh, Director AIIMS (Patna), said the setting up of Covid-19 care facilities is a welcome step. "As a premier institute, AIIMS (Patna) is ready to lead the responsibility to make them fully functional."

The 500-bed makeshift hospitals have been funded under the PM CARES (Prime Minister's Citizen Assistance and Relief in Emergency Situations) Fund.

The DRDO has provided hospital infrastructure, which includes 125 intensive care unit beds with ventilators.

https://www.hindustantimes.com/india-news/patna-aiims-to-be-referral-hospital-for-drdo-covid-care-centres/story-FRi8KPqKXfhKf0NTUTz6cP.html

THE HINDU BusinessLine

Fri, 28 Aug 2020

DRDO offers free access to patents to start-ups, SMEs

Hyderabad: The Defence Research and Development Organization (DRDO) has opened up its huge pool of intellectual property by offering 1,500 patents to entrepreneurs free of cost.

"To give a big boost for defence manufacturing in the country, the DRDO is offering 1,500 of its patents, including critical missile technology, life sciences, and naval technology for free to entrepreneurs that might want to build products," said G Satheesh Reddy, Chairman of DRDO.

He was delivering the special address at the inaugural of the two-day webinar on 'Invest in Telangana: Opportunities in Post Covid World' on Thursday. The webinar is being organised by the Confederation of Indian Industry and the Telangana Government.

He said that the patents can be accessed free of cost even by start-ups and medium and small manufacturing enterprises. "The DRDO won't be just offering the technology but will also be handholding the industry and help them to produce the product," he said.

"The DRDO has also tweaked its policy for Transfer of Technology (ToT) to the industry. No ToT fee will be charged from the industry, DRDO Development Partners developing systems or sub-systems for military applications," he added.

Inaugurating the conference, Telangana IT and Industries Minister, KT Rama Rao said that the State's economy was growing at an average annual growth rate of 9 per cent. "The State achieved a double-digit growth in last two years," he said.

The State stood sixth in Niti Aayog's Export Preparedness Index 2020. Among the land locked States, Telangana stood second after Rajasthan," he said. In Agriculture, the kharif acreage went up by 36 per cent this year, the highest for any State in the country.

He released the Nizamabad District Development Plan and a handbook on 'Make on Telangana'.

https://www.thehindubusinessline.com/news/science/drdo-offers-free-access-to-patents-to-start-ups-smes/article32457950.ece#

THE HINDU

Fri, 28 Aug 2020

Armed forces committed to hand-hold domestic defence industry: Gen. Bipin Rawat

Delving into complex security scenario, Chief of Defence Staff Gen. Bipin Rawat said as India grows in stature, the security challenges are bound to increase "exponentially"

New Delhi: Nothing will give the armed forces greater satisfaction than fighting and coming out victorious in war with indigenous technology and equipment, Chief of Defence Staff Gen. Bipin Rawat said on August 27.

Chief of Defence Staff (CDS) Gen Bipin Rawat during a press conference in New Delhi. File | Photo Credit: PTI

In an address at a seminar on promoting self-reliance in defence, Gen. Rawat also said India's armed forces are committed to hand-hold the domestic industry in developing next generation military platforms and equipment.

Delving into complex security scenario, he said as India grows in stature, the security challenges are bound to increase "exponentially".

"Nothing will give us greater satisfaction than fighting and coming out victorious in wars with indigenous technology and equipment," said the Chief of Defence Staff, adding the armed forces do not have any bias towards imported equipment.

He also said industry leaders that ensuring a time-bound defence procurement process is a key focus of the newly-created Department of Military Affairs.

The seminar was attended by Defence Minister Rajnath Singh and chiefs of the Army, Navy and the Indian Air Force (IAF).

"India today is transiting through a period which is chequered with numerous challenges and threats. Our collective response to COVID-19 has firmly established our ability to overcome any such unforeseeable eventuality," he said.

The Chief of Defence Staff also debunked the perception that the armed forces prefer imported equipment.

"I would like to reiterate our unequivocal assurance of our commitment to procuring indigenous equipment and weapon systems. This reiteration is necessary because at times we are incorrectly perceived to have an import bias. In reality, nothing could be further from reality," he said.

"The combined size of armed forces, huge inventory, the technology spread of the equipment and need for its constant upkeep and maintenance provides a viable market to Indian industry," he added.

Gen. Rawat also elaborated on various policy initiatives by the government to promote the domestic defence industry and said the strength of the Defence Research and Development Organisation (DRDO) should be be utilised in bringing out new equipment and technologies.

"We have a very strong private sector and we can leverage our market access to make India a global hub for design and manufacture of defence equipment & further integrate into global supply chain," he said.

He also urged the defence industry to invest in research and development in the field of diverse technologies, particularly in the area of niche and disruptive technologies.

"The armed forces are committed to supporting 'Atmanirbhar Bharat' We assure you of adopting a more transparent and open approach with industry to acquaint them with services requirements and understanding industry capability and limitations," he said.

The government has already outlined its broad roadmap to make India a hub of defence manufacturing and has been taking policy initiatives to promote the domestic defence industry.

On August 9, the Defence Minister announced that India will stop import of 101 weapons and military platforms like transport aircraft, light combat helicopters, conventional submarines, cruise missiles and sonar systems by 2024.

In a related development, the DRDO on August 24 identified 108 military systems and subsystems like navigation radars, tank transporters and missile canisters for the domestic industry to design, develop and manufacture.

The premier organisation said it will also provide support to industries for design, development and testing of these systems on a requirement basis.

It has set a target of next year in developing the 108 systems and subsystems.

India is one the largest importers of arms globally. According to estimates, the Indian armed forces are projected to spend around $130 billion in capital procurement in the next five years. The government now wants to reduce dependence on imported military platforms and decided to support the domestic defence manufacturing.

The Defence Ministry has set a goal of a turnover of $25 billion (₹1.75 lakh crore) in defence manufacturing in the next five years that included an export target of $5 billion (₹35,000 crore) worth of military hardware.

https://www.thehindu.com/news/national/armed-forces-committed-to-hand-hold-domestic-defence-industry-gen-bipin-rawat/article32458192.ece

Defence News

Defence Strategic: National/International

NDTV

Fri, 28 Aug 2020

Army Chief MM Naravane Releases Book on National Security

The book published by the Army think-tank Centre for Land Warfare Studies (CLAWS) was released on August 17

New Delhi: Army Chief General MM Naravane released a book titled "National Security Challenges: Young Scholars' Perspective" penned by university students.

The book published by the Army think-tank Centre for Land Warfare Studies (CLAWS) was released on August 17.

Army Chief General MM Naravane released a book on national security challenges (File)

The authors all university students ranging from the undergraduate level to doctoral candidates have written on varied themes concerning national security.

The book is a tribute to Field Marshal Manekshaw, the great grand strategist of 1971 Indo-Pakistan War that resulted in the liberation of Bangladesh.

The book is a compilation 2018-2019 FMMEC award-

winning and few select essays which are divided into three themes, namely, conceptual understanding and facets of India's national security; technological evolution, cyber threats and security and national, regional and global experiences.

The Indian Army and CLAWS has decided that a complimentary copy of the book be sent to all the universities (central, state, private, deemed-to be) along with all the IITs, IIMs, NLUs and Business Schools.

To boost the morale of the students and the young authors, the book carries messages from Defence Minister Rajnath Singh, National Security Advisor, Ajit Doval, KC and COAS General MM Naravane.

(Except for the headline, this story has not been edited by NDTV staff and is published from a syndicated feed.)

https://www.ndtv.com/india-news/army-chief-mm-naravane-releases-book-on-national-security-2286269

Business Standard

Fri, 28 Aug 2020

Govt working on setting up a new air defence command by October: Report

The new air defence command will handle certain air assets like missiles of the Indian Army

New Delhi: The defence ministry is likely to make an announcement in October on setting up of a new air defence command under the broad principle of convergence among the three services, people familiar with the development said on Thursday.

The new air defence command will handle certain air assets like missiles of the Indian Army, they said.

A high-level committee was appointed earlier this year to frame contours of the new air defence command with a focus on ensuring jointness among the three services.

The initiative was part of Chief of Defence Staff Gen Bipin Rawat's mandate to redesign all existing military commands to help them effectively deal with all future security challenges.

It is learnt that the air defence command is likely to based in an area under the IAF's Delhi-headquartered Western Command or its Central Command headquartered in Prayagraj in Uttar Pradesh.

The Air Defence Command will bring all the air assets of the IAF, the Indian Navy and the Indian Army.

In one of his first decisions, Chief of Defence Staff Gen Rawat in January issued directions to prepare a roadmap by June 30 to create the Air Defence Command to further enhance security of India's skies.

The move was part of efforts to bringing in tri-services jointness and synergy include setting up of common "logistics support pools" in stations where two or more services have their presence.

In the last few months, Gen Rawat has held a series of meetings with the IAF brass in giving shape to the air defence command.

Gen Rawat took charge as the country's first Chief of Defence Staff on January 1 which was seen as a watershed moment for India's military planning to bring in convergence among the three services. The newly created department of military affairs (DMA) under Gen Rawat is coordinating implementation of all the futuristic projects including redesigning of existing commands.

The DMA is also working on a proposal to have a peninsula command which is likely to be formed by merging the Indian Navy's eastern and western commands.As per plan, the tri-services

command under a naval commander will have air assets as well as support of the Army, and it will take care of entire responsibility of maritime security challenge in the Indian Ocean Region.
https://www.business-standard.com/article/defence/govt-working-on-setting-up-a-new-air-defence-command-by-october-report-120082800008_1.html

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Fri, 28 Aug 2020

India's self-reliance in defence sector to boost its global standing: PM Narendra Modi

By Manu Pubby

Synopsis

The PM said this would reinforce India's strategic partnerships as he laid out a roadmap for greater participation of the private sector in weapon manufacturing and invited foreign players to set up shops given the reforms being unrolled in FDI and labour rules

New Delhi: Prime Minister Narendra Modi on Thursday said India would shape its position as a net security provider in the Indian Ocean Region by emerging as a reliable weapon supplier to friendly nations, a resolve that he linked with the goal of self-reliance in defence manufacturing.

The PM said this would reinforce India's strategic partnerships as he laid out a roadmap for greater participation of the private sector in weapon manufacturing and invited foreign players to set up shops given the reforms being unrolled in FDI and labour rules.

In a surprise address at a FICCI webinar on Atmanirbhar Bharat — he was not scheduled to speak at the event — PM Modi said the Atmanirbhar initiative wasn't inward-looking but was aimed at making the global economy more resilient and stable and was directed at the goal of world peace.

"India has the capability to become a reliable weapons supplier for several of our friendly nations, this will give India's strategic partnerships more heft. It will also shape India's position as a net security provider in the Indian Ocean Region," the PM said at the webinar organised by FICCI.

The comments gain significance given the current border conflict with China and troop build-up that continues in eastern Ladakh since May this year. According to global arms transfer data, a bulk of Chinese arms exports are made to India's neighbourhood — Pakistan, Bangladesh, Myanmar and Sri Lanka.

The PM said that the private sector will receive more orders in the coming days and urged the industry to focus on research and development of future technologies, saying that this should not be left only to the Defence Research and Development Organisation. He assured that the negative list for imports — announced earlier this month — would be expanded in the future and was aimed at boosting the domestic industry.

GOI to permit up to 74% FDI in defence manufacturing through automatic route: PM Modi

Defence minister Rajnath Singh said the ministry was earmarking a significant portion of its annual budget to procurement from the domestic industry, with this year's outplay pegged at 52,000 crore.

"In the present day, technology will drive capability and countries with cutting-edge technologies will lead the world. It is vital that India's military power is based on indigenous technology which will enable us to exercise strategic autonomy," he said.

The minister assured the private industry a level-playing field with the public sector and said the aim was not just self-reliance but to 'Make for the world', emphasising that exports would be a priority area in the coming years. Singh assured the corporatisation of the Ordnance Factory Board was a work in progress and said that process should be completed within a year, in what would be one of the biggest reforms in defence manufacturing in decades.

https://economictimes.indiatimes.com/news/defence/indias-self-reliance-in-defence-sector-to-boost-its-global-standing-pm-narendra-modi/articleshow/77786330.cms

INDIA TODAY

Fri, 28 Aug 2020

Rs 350 crore: Cost of winter gear for sustaining Army in Ladakh this year amid border clash

The Indian Army is likely to incur a cost of Rs 350 to Rs 400 crore for providing special winter clothing to over 30,000 troops deployed in eastern Ladakh

By Abhishek Bhalla

New Delhi: The Indian Army will incur an estimated expenditure of Rs 350 to Rs 400 crore for providing basic logistics like special winter clothing to cater to the enhanced deployment of over 30,000 troops in eastern Ladakh as the military tussle with China is likely to continue.

The cost per soldier for special equipment to brave the harsh winter is about Rs 1 lakh.

The cost per soldier for special equipment to brave the harsh winter is about Rs 1 lakh.

With no breakthrough in site, additional deployment at heights of over 12,000 feet where temperatures can dip to minus 50 degrees is a big challenge in terms of providing logistics to troops. The army is already making arrangements to ensure necessary material is provided in advance to meet the requirements of snow clothing, shelters and food.

Sustaining a big deployment in these tough conditions is a task that requires advance planning, officials say.

"Making arrangements for deploying troops at more than 12,000 feet in normal times is a challenge, and in these circumstances, when the numbers are much more the task will be cut out. Arrangements are already in place for sustaining the enhanced deployment for winter," said an official.

The winter clothing and gear includes special three-layered jackets and trousers, boots, snow goggles, facemask, rucksacks, among others.

Temperature-controlled special tents and pre-fabricated huts that can maintain the optimum temperature are essential for providing shelter at the freezing heights where oxygen levels are low, are also in Ladakh.

Most of the friction points between India and China in Ladakh, like Pangong Tso Lake and Galwan Valley, where the face-offs have happened, are above 14,000 feet.

Special Ration

In the cold desert, a scientifically formulated special diet has to be provided with high nutrient value to balance for the loss of appetite and reduced intake of food, sources said.

Rations are accordingly authorised at different scales for all ranks serving at altitude below 9000 feet, between 9000 feet and 12000 feet and above 12000 ft with progressive increments for

challenges at higher altitudes. Ration at these heights also takes into account countering heat and dehydration in the cold desert.

The nutrient requirement in a region like Ladakh is influenced by altitude due to hypoxic environment or low oxygen availability due to reduced barometric pressure, extreme cold, low humidity and intense solar radiation.

The energy requirement is more in such high-altitude areas due to 7 to 21% increase in Basal Metabolic Rate (BMR) during acclimatisation and stay at extreme altitude.

While physical activities in inhospitable environment and the weight of cold protective clothing of the individual increase the energy expenditure, loss of appetite leads to weight loss and decreased performance.

Winter war reserves also being built up

Sources say reserves for winter gear are also being built up. Responding to the findings of the Comptroller and Auditor General (CAG) pointing out deficiencies of winter clothing and equipment for high altitude areas, the Army recently informed the Public Accounts Committee saying the shortage in reserves at the Army headquarters does not impact availability of equipment to troops.

The Indian Army stated that the shortages in the stocks that existed for special clothing and mountaineering meant for areas where temperatures dip below minus 20 degrees is now being built up.

The army's assertion that there is no shortage of equipment and clothing for troops on the ground is significant as it comes amid the India-China standoff in Ladakh. With the deadlock continuing, the Indian Army is stocking and preparing for a long winter deployment when the temperatures in some of these areas can dip -30 degrees Celsius to -45 degrees Celsius.

In its clarification to a parliamentary panel about the shortage flagged in the CAG report that was tabled in Parliament earlier this year, the army said the report talked only about shortage in reserves at the headquarters and had no bearing on troops deployed in areas at more than 10,000 feet. It informed the Public Accounts Committee that local purchases are available to meet any eventuality if required.

"Discounting reserves, availability of stocks with troops was adequate. Local purchases for urgent requirements are undertaken," the Army stated to the PAC on August 10.

Due to the shortage, troops ended up "recycling" snow boots, the CAG had observed in its report for the period between 2015-16 to 2017-18.

The panel was informed that high altitude areas are divided in two categories. Up to 12,000 feet is in the category of extreme cold clothing and for heights beyond that, special clothing and mountaineering equipment are required.

Over 3,54,000 troops are deployed up to 12,000 feet and 38,000 at heights above that.

https://www.indiatoday.in/india/story/rs-350-rs400-crore-cost-of-winter-gear-for-sustaining-army-in-ladakh-this-year-amid-border-clash-1715850-2020-08-27

FINANCIAL EXPRESS
Read to Lead

Fri, 28 Aug 2020

LAC standoff with China: Indigenous Light Utility Helicopters land in Ladakh for final winter trials

Developed by Rotary Wing Research and Design Center (RWR&DC) of HAL, these helicopters will be produced at the green field helicopter manufacturing facility located at Tumakuru

By Huma Siddiqui

Amidst the ongoing tensions between India and China along the Line of Actual Control (LAC), the indigenous Light Utility Helicopter (LUH) has landed in Ladakh for final trials.

Confirming this to Financial Express Online, sources said "these helicopters will be flying with the Indian Army from helipads located in forward areas."

The helicopter Glass Cockpit and is expected to be used for various roles including Reconnaissance, Surveillance and also as a light transport helicopter.

These helicopters will be replacing the Cheetah and Chetak helicopters which are currently being used by the Indian Army in the high altitude areas. As has been reported by Financial Express Online, earlier this year, the Initial Operational Clearance (IOC) certificate for the LUH has been issued to state-owned Hindustan Aeronautics Limited (HAL).

More about LUH

According to HAL this is a new generation helicopter with state of the art technologies onboard. With a weight of 3-Ton, these machines are expected to meet the emerging needs in this class of helicopters in the future both in the military and civil world.

Developed by Rotary Wing Research and Design Center (RWR&DC) of HAL, these helicopters will be produced at the green field helicopter manufacturing facility located at Tumakuru.

It comes with a Glass Cockpit and is expected to be used for various roles including Reconnaissance, Surveillance and also as a light transport helicopter.

It has the capability to fly at a speed of 235 Kmph with a 400 kg payload.

It is powered by TM/HAL Ardiden 1U/Shakti 1U single turboshaft engine which has enough power margins which will allow it to cater to the demands of the high altitude missions.

In February 2009, the design and development was launched and on Dec 6, 2014, the initial Ground Test Vehicle (GTV) run was carried out.

The technical flight trial of the first prototype Light Utility Helicopter (LUH) was carried out successfully in September 2016. The flight testing is going of two prototypes.

In principle, HAL has an order from both the Indian Army (126) and the Indian Air Force (61).

Who is flight testing?

It is being done by the test pilots from both the Indian Army and the Indian Air Force in hot and high altitude.

Evaluation of all systems, specific flight testing such as Night flying, Slope landing, Single Hydraulic Performance, run-on landing with the engine off etc., have been completed satisfactorily.

Operational Clearance is expected in the near future having successfully completed all major developmental trials.

In 2019, the helicopter has undergone comprehensive tests at Leh (3300m) which was under extreme temperatures going up to the International Standard Atmosphere (ISA) +32 degree C. The tests also included not only envelope expansion but performance and flying qualities. From Leh,

there was a hover performance at Daulat Beg Oldie (DBO) Advanced Landing Ground (ALG) which is at a height of 5000m and then it had gone to another forward helipad at a height of 5500m at ISA +27degree C.

This helicopter has already successfully completed its hot trials in Nagpur, sea trials at Chennai and Puducherry.

https://www.financialexpress.com/defence/lac-standoff-with-china-indigenous-light-utility-helicopters-land-in-ladakh-for-final-winter-trials/2067498/

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Fri, 28 Aug 2020

Indo-japan mutual logistics pact can enable Navies access to Djibouti & Andamans

By Dipanjan Roy Chaudhury

Synopsis

Indo-Japanese defence ties have been growing over the past few years. At the end of the bilateral 2018 summit meeting in Tokyo attended by the two leaders, both countries had agreed to begin formal negotiations on ACSA.

New Delhi: The Acquisition and Cross-Servicing Agreement (ACSA) expected to be concluded at next month's annual summit between PM Narendra Modi and his Japanese counterpart Shinzo Abe would give the Indian Navy access to the Japanese military base in Djibouti and the Japanese Navy access to Andaman and Nicobar Islands.

The ACSA (commonly referred to as Mutual Logistics Services Pact) would permit the Indian Navy access to a Japanese base in Djibouti. The Japan Maritime Self Defence Force (JSDF) would be permitted to use India's military installations in the Andaman and Nicobar Islands, ET has reliably gathered. India currently has such pacts with the US, Australia, France and is likely to sign one with Russia later this year.

Delhi has since long been keen to get a presence in Djibouti as part of its Indian Ocean outreach.

Djibouti, wedged between the Gulf of Aden and the Red Sea, is a natural gatekeeper to a vital and extremely bustling sea-lane. The base in Djibouti is the JSDF's first full-scale, long term overseas base.

Similarly, Andaman and Nicobar is critical for the Japanese Navy in the Bay of Bengal region. The ACSA aims to expand Indo-Japanese strategic partnership amid an ambitious China whose aggression has unnerved many countries in Asia.

Indo-Japanese defence ties have been growing over the past few years. At the end of the bilateral 2018 summit meeting in Tokyo attended by the two leaders, both countries had agreed to begin formal negotiations on ACSA.

"The two leaders welcomed the joint exercise between each of the three services and the commencement of negotiations on the ACSA, which will enhance the strategic depth of bilateral security and defence cooperation," according to the joint statement issued after the 2018 summit.

The joint statement said, "recognising that enhanced exchanges in expanding maritime domain awareness (MDA) in the Indo-Pacific region contributes to regional peace and stability, they welcomed the signing of the Implementing Arrangement for deeper cooperation between the Indian Navy and the Japan Maritime Self-Defence Force."

ACSA will require the armed forces of India and Japan to help each other with logistic support, including food, water, billet, transport, petroleum, oils, lubricants, clothing, communications, medical services, base support, storage, use of facilities, training services, spare parts, repair and maintenance and airport and seaport services.

The Summit is being planned in the backdrop of the Japanese Defence White Paper 2020 (JDWP) released on July 14, which had more criticism of China, than before. It is the first time that a JDWP has characterised China's actions around the Senkaku Islands as "relentlessly seeking to affect Japan's control over them at the time of the Covid crisis".

Widening the scope of Indo-Pacific partnership, including third country projects, are also on the cards, ET has learnt. Japan has decided to increase its investments in two of India's key neighbours — Bangladesh and Myanmar.

Increase in Japanese FDI into India, including Japanese companies planning to shift to India from China, and incentives for these business enterprises will be discussed by the two leaders at the Summit, sources informed.

Simultaneously, India and Japan will work to have technology companies build platforms that help emerging nations put government services online, taking ideas from Delhi's all-in-one digital infrastructure which allows access to various public services.

Abe was scheduled to travel last December for the annual summit but had to postpone it due to protests in Guwahati. He had planned to visit Delhi in April which was postponed due to Covid.

https://economictimes.indiatimes.com/news/defence/indo-japan-mutual-logistics-pact-can-enable-navies-access-to-djibouti-andamans/articleshow/77787795.cms

hindustantimes

Fri, 28 Aug 2020

Govt to clear $2 billion deal for Israeli-made AWACS amid stand-off with China

Work has begun to build a road over the glaciated Saser La to link up Daulat Beg Oldie with Sansoma and acquire 200 tactical drones for the army's battalion commanders

By Shishir Gupta

New Delhi: Spurred by the stand-off with People's Liberation Army in Ladakh, the Narendra Modi government is all set to clear acquisition of two PHALCON airborne warning and control systems (AWACS) as early as next week. India has three PHALCON AWACS with a 360 degree rotodome mounted on top of the aircraft and two DRDO-built AWACS with 240 degree rotodome. China has 28 AWACS and Pakistan has seven for directing the air battle in the worst case scenario.

While the government is tight-lipped about the entire process, the acquisition was given a final official go last week and has been put up before the Cabinet Committee on Security (CCS). This is the second time it has reached the CCS. The last time, the CCS sent the proposal back to National Security Adviser Ajit Doval and sought some clarifications.

The PHALCON radar is going to cost about $1 billion with another $1 billion going towards the purchase of the platform, in this case Russian A-50 aircraft. The radar and the platform will be integrated in Israel. It will take about two to three years for the delivery of the complete system.

The Cabinet Committee on Security is expected to clear a US 2 billion acquisition of 2 PHALCON AWACS.

The need for more AWACS was first felt during the Pakistani aerial dogfight after the February 26 Balakot strike by the Indian Air Force. While Pakistan was flying two Swedish made AWACS round the clock to detect and repel any intrusion into its air space, the IAF was, at times vulnerable due to the limitation of its resources. The requirement for more AWACS or eyes in the sky were felt after the PLA unilateral aggression in East Ladakh and their reluctance to restore status quo ante even after the Special Representatives on both sides agreed to both dis-engagement and de-escalation.

Apart from this the Modi government has decided to push road connectivity towards the Daulat Beg Oldie sector with the Border Roads Organization asking permission of the Ministry of Home Affairs to cut a road over the glaciated Saser La to link up DBO with Sansoma via Murgo as an alternative to the Darbuk-Shyok-DBO road.

The BRO has already built the road from Murgo to Saser Brangsa, which sits on the mouth of the Saser La. Even though Saser La is a glaciated moraine, the BRO has the ability to build a road over it for the present and a tunnel under the permafrost in the future. Once the road is built, it will allow Indian Army to rapidly move troops from the Siachen sector into Sub-Sector North depending on the requirement. Sansoma, on the banks of Nubra River is an important logistics base for the Siachen Glacier troop deployments.

Apart from the high-value AWACS, the Indian Army is also acquiring 200 tactical drones for its battalion commanders so that the immediate battle theatre is transparent. This drones has been developed locally in collaboration with the DRDO and has undergone trials.

https://www.hindustantimes.com/india-news/govt-to-clear-2-billion-deal-for-israeli-made-awacs-amid-stand-off-with-china/story-1JtIBkloVbKLRIO7rPG16K.html

अमर उजाला

Fri, 28 Aug 2020

इस्राइल से दो फाल्कॉन अवॉक्स खरीदेगा भारत, इन खूबियों से है लैस

नई दिल्ली: चीन और पाकिस्तान के साथ बढ़ रहे तनाव के बीच केंद्र सरकार ने भारतीय वायुसेना के लिए इस्राइल से दो फाल्कॉन अवॉक्स खरीदने की तैयारी कर ली है। अधिकृत सूत्रों ने गुरुवार को कहा कि करीब एक अरब डॉलर में हवाई हमला चेतावनी व नियंत्रण तंत्र (अवॉक्स) की इस सरकारी खरीद को मंजूरी देने की प्रक्रिया निर्णायक स्तर पर पहुंच चुकी है।

Phalcon Awacs - फोटो: pixabay

सूत्रों के मुताबिक, वायुसेना के पास पहले से ही तीन फाल्कॉन अवॉक्स मौजूद हैं। दो अवॉक्स और मिल जाने से देश के हवाई सुरक्षा मैकेनिज्म को महत्वपूर्ण सहारा मिलेगा। सूत्रों ने कहा, खरीद को मंजूरी देने के प्रस्ताव पर सुरक्षा मामलों की कैबिनेट (सीसीएस) की अगली बैठक में निर्णायक चर्चा होगी।

अवॉक्स को रूसी मूल के इल्यूशिन-76 मालवाहक विमान के ऊपर लगाया जाता है और इसकी बेहतरीन सर्विलांस क्षमता के चलते इसे 'आसमान में आंख' कहकर पुकारा जाता है। इस्राइल के फाल्कॉन अवॉक्स को क्षेत्रीय दायरा पार करे बिना ही दुश्मन के विमानों, मिसाइलों और उसके जवानों की गतिविधियों की हलचल को पकड़ने की क्षमता में बेहतरीन माना जाता है। इस्राइली अवॉक्स के अलावा भारतीय वायुसेना के पास रक्षा अनुसंधान व विकास संगठन (डीआरडीओ) के द्वारा बनाए गए दो स्वदेशी एईडब्ल्यूएंडसी सिस्टम भी मौजूद हैं।

बालाकोट एयर स्ट्राइक के बाद उठी थी मांग

भारतीय वायुसेना की तरफ से बालाकोट में आतंकी संगठन जैश-ए-मोहम्मद के ठिकाने पर एयर स्ट्राइक करने के अगले दिन पाकिस्तानी वायुसेना की तरफ से की गई हमले की कोशिश ने नए अवॉक्स खरीदने की जरूरत महसूस कराई थी।

वायुसेना ने देश के हवाई सुरक्षा तंत्र में आ रहे अंतराल को भरने के लिए तत्काल दो फाल्कॉन अवॉक्स खरीदने का आग्रह सरकार से किया था। सूत्रों के मुताबिक, फिलहाल पाकिस्तान के पास भारत से ज्यादा अवॉक्स हैं। हालांकि उन्होंने इसकी संख्या नहीं बताई।

https://www.amarujala.com/india-news/indian-air-force-will-have-to-buy-two-sky-eyes-phalcon-awacs-from-israel

FINANCIAL EXPRESS
Read to Lead

Fri, 28 Aug 2020

India to get S-400 Triumf air defence systems in 2021, says Russia

Maria Vorobyova, the official representative of the Federal Service for Military-Technical Cooperation (FSMTC) of Russia, told local media on the sidelines of the ongoing Army-2020 International Military and Technical Forum in that country

By Huma Siddiqui

The first regimental set of S-400 Triumf 'SA-21 Growler' air defence systems will be delivered by Russia to India in 2021, and is ready to consider accelerating the delivery of the following consignments. Maria Vorobyova, the official representative of the Federal Service for Military-Technical Cooperation (FSMTC) of Russia, told local media on the sidelines of the ongoing Army-2020 International Military and Technical Forum in that country.

India and Russia had inked a $ 5.43 billion contract for the S-400 Triumf 'SA-21 Growler' which is long-range surface-to-air missile (SAM) systems for the Indian Air Force (IAF).

In response to a question posed by Interfax, Maria Vorobyova, said "There have been detailed discussions with the Indian partners and the delivery of the first regiment is expected by the end of 2021. The schedule of fulfilling the contract has been discussed in detail with the Indian partners, and the delivery of the first regimental batch is expected by the end of 2021. Further acceleration of the delivery of the first batch from the system is technically impossible, since there are objective, technology-related stages of production, acceptance and transfer of equipment."

India and Russia had inked a $ 5.43 billion contract for the S-400 Triumf 'SA-21 Growler' which is long-range surface-to-air missile (SAM) systems for the Indian Air Force (IAF). As per the contract, IAF is to get five Triumf regimental kits from Russia.

In 2019, the Russian officials had made it clear that the mode of payment for the S-400 has been formalized already, without going into specifics had hinted that it will not be dependent on the USD. Perhaps the payment will be in Rupee-Rouble currency, which will be made by India's main bank to the state-owned Russian Sberbank.

What is India buying?

The delivery of the regimental kits will be staggered and are expected to be completed ahead of 2025. According to the contract between the two countries, the fifth and final kit is slated to be delivered by the first half of 2025.

Besides Mumbai-Baroda Industrial Corridor, it will also be deployed in the National Capital Region.

It will give more power to the Air Defence of the IAF. And all men and women who will be operating this will undergo training in Moscow.

It is referred to as the SA-21 'Growler' by NATO and has four different types of missiles with ranges between 40 km, 100 km, 200-km and 400 km.

According to experts it will help in forming an impenetrable interlocking grid of missiles and can be readied and deployed in a few minutes.

It has the capability to detect and destroy high and low flying targets. It comes with 92N6E electronically-steered phased array radar.

Resistant to electronic jamming the missiles and launchers can be mounted on cross country trucks.

https://www.financialexpress.com/defence/india-to-get-s-400-triumf-air-defence-systems-in-2021-says-russia/2066778/

Science & Technology News

PHYS.ORG

Fri, 28 Aug 2020

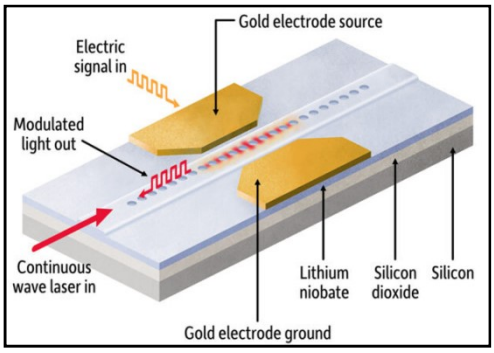
Photonics researchers report breakthrough in miniaturizing light-based chips

By Bob Marcotte

Photonic integrated circuits that use light instead of electricity for computing and signal processing promise greater speed, increased bandwidth, and greater energy efficiency than traditional circuits using electricity.

But they're not yet small enough to compete in computing and other applications where electric circuits continue to reign.

Electrical engineers at the University of Rochester believe they've taken a major step in addressing the problem. Using a material widely adopted by photonics researchers, the Rochester team has created the smallest electro-optical modulator yet. The modulator is a key component of a photonics-based chip, controlling how light moves through its circuits.



A schematic drawing shows an electro-optical modulator developed in the lab of Qiang Lin, professor of electrical and computer engineering. The smallest such component yet developed, it takes advantage of lithium niobate, a "workhorse" material used by researchers to create advanced photonics integrated circuits. Credit: University of Rochester illustration / Michael Osadciw

In *Nature Communications*, the lab of Qiang Lin, professor of electrical and computer engineering, describes using a thin film of lithium niobate (LN) bonded on a silicon dioxide layer to create not only the smallest LN modulator yet, but also one that operates at high speed and is energy efficient.

This "paves a crucial foundation for realizing large-scale LN photonic integrated circuits that are of immense importance for broad applications in data communication, microwave photonics, and quantum photonics," writes lead author Mingxiao Li, a graduate student in Lin's lab.

A workhorse material

Because of its outstanding electro-optic and nonlinear optic properties, lithium niobate has "become a workhorse material system for photonics research and development," Lin says. "However current LN photonic devices, made upon either bulk crystal or thin-film platform require large dimensions and are difficult to scale down in size, which limits the modulation efficiency, energy consumption, and the degree of circuit integration. A major challenge lies in making high-quality nanoscopic photonic structures with high precision."

The modulator project builds upon the lab's previous use of lithium niobate to create a photonic nanocavity—another key component in photonic chips. At only about a micron in size, the nanocavity can tune wavelengths using only two to three photons at room temperature—"the first time we know of that even two or three photons have been manipulated in this way at room temperatures," Lin says. That device was described in a paper in *Optica*.

The modulator could be used in conjunction with a nanocavity in creating a photonic chip at the nanoscale.

More information: Mingxiao Li et al. Lithium niobate photonic-crystal electro-optic modulator, *Nature Communications* (2020). DOI: 10.1038/s41467-020-17950-7

Mingxiao Li et al. Photon-level tuning of photonic nanocavities, *Optica* (2019). DOI: 10.1364/OPTICA.6.000860

Journal information: *Nature Communications*

https://phys.org/news/2020-08-photonics-breakthrough-miniaturizing-light-based-chips.html

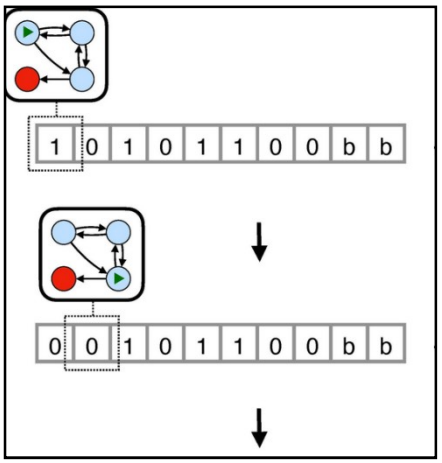
PHYS.ORG

Fri, 28 Aug 2020

Thermodynamics of computation: A quest to find the cost of running a Turing machine

Turing machines were first proposed by British mathematician Alan Turing in 1936, and are a theoretical mathematical model of what it means for a system to "be a computer."

At a high level, these machines are similar to real-world modern computers because they have storage for digital data and programs (somewhat like a hard drive), a little central processing unit (CPU) to perform computations, and can read programs from their storage, run them, and produce outputs. Amazingly, Turing proposed his model before real-world electronic computers existed.



A Turing Machine performing a computation over a sequence of steps. Credit: Kolchinksy and Wolpert,

In a paper published in the American Physical Society's *Physical Review Research*, Santa Fe Institute researchers Artemy Kolchinsky and David Wolpert present their work exploring the thermodynamics of computation within the context of Turing machines.

"Our hunch was that the physics of Turing machines would show a lot of rich and novel structure because they have special properties that simpler models of computation lack, such as universality," says Kolchinsky.

Turing machines are widely believed to be universal, in the sense that any computation done by any system can also be done by a Turing machine.

The quest to find the cost of running a Turing machine began with Wolpert trying to use information theory—the quantification, storage, and communication of information—to formalize how complex a given operation of a computer is. While not restricting his attention to Turing machines per se, it was clear that any results he derived would have to apply to them as well.

During the process, Wolpert stumbled onto the field of stochastic thermodynamics. "I realized, very grudgingly, that I had to throw out the work I had done trying to reformulate nonequilibrium statistical physics, and instead adopt stochastic thermodynamics," he says. "Once I did that, I had the tools to address my original question by rephrasing it as: In terms of stochastic thermodynamics

cost functions, what's the cost of running a Turing machine? In other words, I reformulated my question as a thermodynamics of computation calculation."

Thermodynamics of computation is a subfield of physics that explores what the fundamental laws of physics say about the relationship between energy and computation. It has important implications for the absolute minimum amount of energy required to perform computations.

Wolpert and Kolchinsky's work shows that relationships exist between energy and computation that can be stated in terms of algorithmic information (which defines information as compression length), rather than "Shannon information" (which defines information as reduction of uncertainty about the state of the computer).

Put another way: The energy required by a computation depends on how much more compressible the output of the computation is than the input. "To stretch a Shakespeare analogy, imagine a Turing machine reads-in the entire works of Shakespeare, and then outputs a single sonnet," explains Kolchinsky. "The output has a much shorter compression than the input. Any physical process that carries out that computation would, relatively speaking, require a lot of energy."

While important earlier work also proposed relationships between algorithmic information and energy, Wolpert and Kolchinsky derived these relationships using the formal tools of modern statistical physics. This allows them to analyze a broader range of scenarios and to be more precise about the conditions under which their results hold than was possible by earlier researchers.

"Our results point to new kinds of relationships between energy and computation," says Kolchinsky. "This broadens our understanding of the connection between contemporary physics and information, which is one of the most exciting research areas in physics."

More information: Artemy Kolchinsky et al, Thermodynamic costs of Turing machines, *Physical Review Research* (2020). DOI: 10.1103/PhysRevResearch.2.033312

https://phys.org/news/2020-08-thermodynamics-quest-turing-machine.html

Fri, 28 Aug 2020

On the track of unconventional superconductivity, researchers are charting unknown territory

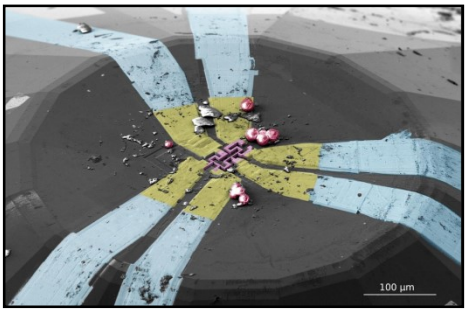
An international team of scientists from the Helmholtz-Zentrum Dresden-Rossendorf (HZDR), the Max Planck Institute for Chemical Physics of Solids, and colleagues from the USA and Switzerland have successfully combined various extreme experimental conditions in a completely unique way, revealing exciting insights into the mysterious conducting properties of the crystalline metal $CeRhIn_5$. In the journal *Nature Communications*, they report on their exploration of previously uncharted regions of the phase diagram of this metal, which is considered a promising model system for understanding unconventional superconductors.

"First, we apply a thin layer of gold to a microscopically small single crystal. Then we use an ion beam to carve out tiny microstructures. At the ends of these structures, we attach ultra-thin platinum tapes to measure resistance along different directions under extremely high pressures, which we generate with a diamond anvil pressure cell. In addition, we apply very powerful magnetic fields to the sample at temperatures near absolute zero."

To the average person, this may sound like an overzealous physicist's whimsical fancy, but in fact, it is an actual description of the experimental work conducted by Dr. Toni Helm from HZDR's High Magnetic Field Laboratory (HLD) and his colleagues from Tallahassee, Los Alamos, Lausanne and Dresden. Well, at least in part, because this description only hints at the many challenges involved in combining such extremes concurrently. This great effort is, of course, not an

end in itself: the researchers are trying to get to the bottom of some fundamental questions of solid state physics.

The sample studied is cer-rhodium-indium-five ($CeRhIn_5$), a metal with surprising properties that are not fully understood yet. Scientists describe it as an unconventional electrical conductor with extremely heavy charge carriers, in which, under certain conditions, electrical current can flow without losses. It is assumed that the key to this superconductivity lies in the metal's magnetic properties.



False-color electron microscopic image of a microstructure (violet) contacted via gold tracks (yellow) after reopening the diamond anvil cell. Ruby spheres (red) are used to sense the pressure in the sample chamber via laser fluorescence spectroscopy. Debris particles are remnants of the pressure medium and pressure device. Credit: Toni Helm/HZDR

The central issues investigated by physicists working with such correlated electron systems include: How do heavy electrons organize collectively? How can this cause magnetism and superconductivity? And what is the relationship between these physical phenomena?

An expedition through the phase diagram

The physicists are particularly interested in the metal's phase diagram, a kind of map whose coordinates are pressure, magnetic field strength, and temperature. If the map is to be meaningful, the scientists have to uncover as many locations as possible in this system of coordinates, just like a cartographer exploring unknown territory. In fact, the emerging diagram is not unlike the terrain of a landscape.

As they reduce temperature to almost four degrees above absolute zero, the physicists observe magnetic order in the metal sample. At this point, they have a number of options: They can cool the sample down even further and expose it to high pressures, forcing a transition into the superconducting state. If, on the other hand, they solely increase the external magnetic field to 600,000 times the strength of the earth's magnetic field, the magnetic order is also suppressed; however, the material enters a state called 'electronically nematic.'

This term is borrowed from the physics of liquid crystals, where it describes a certain spatial orientation of molecules with a long-range order over larger areas. The scientists assume that the electronically nematic state is closely linked to the phenomenon of unconventional superconductivity. The experimental environment at HLD provides optimum conditions for such a complex measurement project. The large magnets generate relatively long-lasting pulses and offer sufficient space for complex measurement methods under extreme conditions.

Experiments at the limit afford a glimpse of the future

The experiments have a few additional special characteristics. For example, working with high-pulsed magnetic fields creates eddy currents in the metallic parts of the experimental setup, which can generate unwanted heat. The scientists have therefore manufactured the central components from a special plastic material that suppresses this effect and functions reliably near absolute zero. Through the microfabrication by focused ion beams, they produce a sample geometry that guarantees a high-quality measurement signal.

"Microstructuring will become much more important in future experiments. That's why we brought this technology into the laboratory right away," says Helm, adding: "So we now have ways to access and gradually penetrate into dimensions where quantum mechanical effects play a major role." He is also certain that the know-how he and his team have acquired will contribute to research on high-temperature superconductors or novel quantum technologies.

More information: Toni Helm et al, Non-monotonic pressure dependence of high-field nematicity and magnetism in CeRhIn5, *Nature Communications* (2020). DOI: 10.1038/s41467-020-17274-6

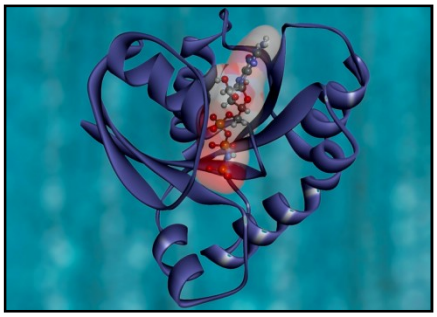
Journal information: *Nature Communications*

https://phys.org/news/2020-08-track-unconventional-superconductivity-unknown-territory.html

Fri, 28 Aug 2020

Decoded: The structure of the barrier between three cells

Organs in animals and in humans have one thing in common: they are bounded by so-called epithelial cells. These, along with the muscle, connective and nervous tissues, belong to the basic types of tissue. Epithelial cells form special connections with one another in order to prevent substances or pathogens from passing between the cells, i.e. they have a protective and sealing function for the body. Researchers at the Institute of Animal Physiology at the University of Munster have now found out how two proteins called Anakonda and M6 interact in epithelial cells in fruit flies in order to produce a functioning barrier at so-called tricellular contacts.



Credit: Unsplash/CC0 Public Domain

These corner points between three cells—so-called tricellular junctions (TCJs)—are a preferred route for migrating cells as well as for bacterial pathogens entering into the body. Although the formation of the barrier function between two epithelial cells has already been well examined, much less is known about the biology of the tricellular contacts. The working group headed by Prof. Dr. Stefan Luschnig is aiming to gain a better understanding of the structure and dynamics of epithelial barriers, hoping that this can contribute in the long term to developing more effective forms of diagnosis and treatment for example of bacterial infections or inflammation reactions. The study has been published in the journal *Current Biology*.

Background and method

TCJs play an essential role in the functioning of the barrier between epithelial cells and in the migration of cells across tissue boundaries. Special protein complexes at the tricellular contacts are responsible for the sealing properties of these structures. Despite the fundamental roles of tricellular contacts in epithelial biology, their molecular structure and the dynamics of their assembly and remodeling have so far been insufficiently understood.

In order to study this process, the researchers visualized the M6 protein in embryos of the fruit fly Drosophila with a fluorescent marker and, using a high-resolution confocal microscope, they observed the processes taking place in the tricellular contacts in the living cells. As a result of their studies, Stefan Luschnig and his team discovered that the M6 protein is responsible for keeping the Anakonda protein stable in its place at the cell membrane of the TCJs.

When the researchers removed the M6 protein, the Anakonda protein—though it still reached its destination at the cell membrane—was not anchored stably there. The consequence is a permeable tricellular junction. These and other findings led the researchers to conclude that the two proteins depend on each other and form a complex, which is of crucial importance for the stabilizing properties of cell contacts and consequently for survival of the animal. "On the basis of these results obtained from the model organism Drosophila," says Stefan Luschnig, "we can gain fundamental insights into the structure and development of epithelial tissues in more complex animals, as well as in humans."

More information: Anna Wittek et al, The Transmembrane Proteins M6 and Anakonda Cooperate to Initiate Tricellular Junction Assembly in Epithelia of Drosophila, *Current Biology* (2020). DOI: 10.1016/j.cub.2020.08.003

Journal information: *Current Biology*

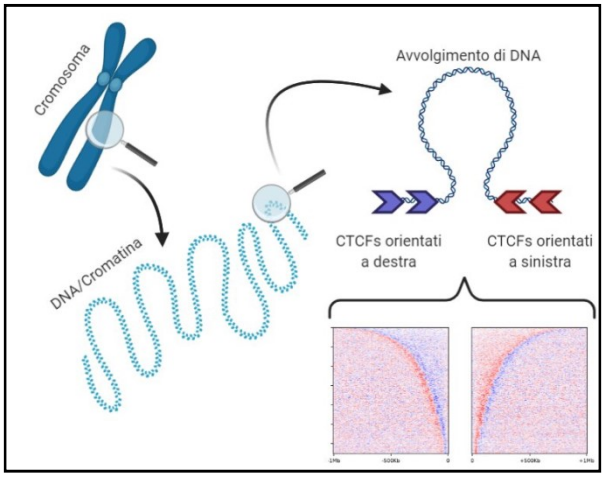
https://phys.org/news/2020-08-decoded-barrier-cells.html

Fri, 28 Aug 2020

Study reveals DNA 'grammar'

DNA three-dimensional structure is determined by a series of spatial rules based on particular protein sequences and their order. This was the finding of a study recently published in *Genome Biology* by Luca Nanni, Ph.D. student in Computer Science and Engineering at Politecnico di Milano, together with Professors Stefano Ceri of the same University and Colin Logie of the University of Nijmegen.

The first author of the study, Luca Nanni said, "Our study's greatest innovation lies in having identified precise rules for the disposition of CTCF proteins. The beauty and simplicity of CTCF's grammar shows us how nature and evolution produce regularity and incredibly ingenious and functional systems." "Knowing these rules allow CTCF sequences to be engineered to obtain the desired DNA three-dimensional structure. For example, it should be possible to make two disconnected genes interact. Molding DNA structure will open doors to the creation of pharmaceuticals for the treatment of diseases such as cancer."



CTCF proteins isolate the various topological DNA domains. The study found that topological domains can be divided into two sections with specular grammatical sequences, delimited by two "barriers" and with a "reversal point" in the middle separating the right (blue) and left (red) CTCF sequences. The human genome compresses following a "grammar" logic comprising CTCF sequences, orientation, and the distance between them. Credit: Luca Nanni

The DNA molecule, which would be about two meters long if completely unrolled, wraps itself based on a complex system that maintains its accessibility and correct reading to reside in the cell's nucleus. Crucial in the study of the three-dimensional structure of the genome are topological domains, which are thought to aggregate DNA zones with similar roles and behavior. For example, genes with similar function are likely to reside in the same topological domain. Nanni continued: "We focused on some specific DNA sequences that encode for the CTCF protein." "This protein isolates portions of DNA creating barriers between the various topological domains. With the help of computer simulations and the creation of a model for classifying these proteins according to their orientation, we identified a surprising regularity in their arrangement along the DNA sequence." The study showed that the orientation and order of these DNA sequences makes it possible to reconstruct topological domains. The human genome compresses following a 'grammar' logic comprising CTCF sequences, orientation, and the distance between them.

More information: Luca Nanni et al, Spatial patterns of CTCF sites define the anatomy of TADs and their boundaries, *Genome Biology* (2020). DOI: 10.1186/s13059-020-02108-x

Journal information: *Genome Biology*

https://phys.org/news/2020-08-reveals-dna-grammar.html

THE TIMES OF INDIA

Fri, 28 Aug 2020

Why ISRO plans to bring 'Moon craters' to Karnataka

By Chethan Kumar

Bengaluru: Indian Space Research Organisation (Isro), which is looking to launch Chandrayaan-3 next year, will be creating artificial Moon craters in Ullarthi Kavalu, Challakere, some 215km from Bengaluru, later this year.

"We've already called for tenders and the process of identifying a firm for the civil works will be complete by the month-end or early September. The craters will be created on our Challakere campus," said a source, adding that it would cost at least Rs 24.2 lakh.

The craters, another source said, would have a diameter of 10 metres and 3-metre depth. They are meant to simulate the lunar surface on which the Chandrayaan-3 lander would land. "The lander's sensors will undergo a crucial test — Lander Sensor Performance Test (LSPT) — which will involve us flying the sensors on an aircraft over the artificial lunar site and see how efficient they are in guiding the lander," a scientist said.

Just like Chandrayaan-2, India's next lunar mission will also be highly autonomous (pre-programmed), using multiple sensors, including those designed to help the lander assess its height from the landing spot, decide velocity and keep the craft away from boulders and uneven surface.

https://timesofindia.indiatimes.com/india/why-isro-plans-to-bring-moon-craters-to-karnataka/articleshow/77794818.cms

ScienceDaily

Thu, 27 Aug 2020

Researchers unravel two mysteries of COVID-19

Evidence for predicting how severe a patient's illness will become and why patients develop life-threatening blood clots

A team from Lawson Health Research Institute and Western University has made significant steps forward in understanding COVID-19 through two back-to-back studies published this week in *Critical Care Explorations*. In one study, the team has identified six molecules that can be used as biomarkers to predict how severely ill a patient will become. In the other study, they are the first to reveal a new mechanism causing blood clots in COVID-19 patients and potential ways to treat them.

The studies were conducted by analyzing blood samples from critically ill patients at London Health Sciences Centre (LHSC). They build on a growing body of work from the team who were first in the world to profile the body's immune response to the virus by revealing a separate six molecules that could act as potential targets to treat hyperinflammation in critically ill patients.

"We've begun answering some of the biggest COVID-19 questions asked by clinicians and health researchers," says Dr. Douglas Fraser, lead researcher from Lawson and Western's Schulich School of Medicine & Dentistry, and Critical Care Physician at LHSC. "While the findings need to be validated with larger groups of patients, they could have important implications for treating and studying this disease."

Predicting which COVID-19 patients will get worse

With no proven therapies, many COVID-19 patients admitted to intensive care units (ICUs) do not survive.

"When a patient is admitted to ICU, we normally wait to see if they are going to get worse before we consider any risky interventions. To improve outcomes, we not only need new therapies but also a way to predict prognosis or which patients are going to get worse," explains Dr. Fraser.

The researchers identified six molecules of importance (CLM-1, IL12RB1, CD83, FAM3B, IGFR1R and OPTC). They found that these molecules were elevated in COVID-19 patients who would become even more severely ill. They found that when measured on a COVID-19 patient's first day of ICU admission, the molecules could be used to predict which patients will survive following standard ICU treatment.

"While further research is needed, we're confident in these biomarkers and suspect these patterns may be present even before ICU admission, such as when a patient first presents to the emergency department," notes Dr. Fraser. "These findings could be incredibly important in determining how severely ill a patient will become."

The team measured 1,161 plasma proteins from the blood of 30 participants: 10 COVID-19 patients and 10 patients with other infections admitted to LHSC's ICU, as well as 10 healthy control participants. Blood was drawn on set days of ICU admission, processed in a lab and then analyzed using statistical methods and artificial intelligence.

The team notes that predicting a patient's disease severity can help in a number of ways. It could allow for medical teams to have important conversations with family members, setting goals of care based on the patient's health and personal wishes. Medical teams could use the knowledge to mobilize resources more quickly. If they know a patient is at higher risk of death, they may consider intervening sooner despite associated risks. The team also hopes the findings can be used

to better design COVID-19 clinical trials by grouping patients based on their risk. This could allow for stronger results when examining potential treatments for the disease.

Understanding why blood clots occur and how to treat them

A major complication occurring in most critically ill COVID-19 patients is clotting in the lung's small blood vessels which leads to low oxygen levels in the body.

"The reason for this clotting has been unclear. Most suspect the clotting mechanisms in our blood are put into overdrive and so many clinicians have been treating with anticoagulant therapies like the drug heparin," says Dr. Fraser. "But we've uncovered an entirely different mechanism."

The team further analyzed the blood samples from their 30 participants, and found evidence to suggest that the inner linings of small blood vessels are becoming damaged and inflamed, making them a welcoming environment for platelets (small blood cells) to stick.

They discovered that COVID-19 patients had elevated levels of three molecules (hyaluronic acid, syndecan-1 and P-selectin.) The first two molecules are products broken down from small hair-like structures (the glycocalyx) which line the inside of the blood vessels. Their presence suggests the glycocalyx is being damaged with its breakdown products sent into the bloodstream. The presence of P-selectin is also significant as this molecule helps to make both platelets and the inner lining of blood vessels adhere to one another.

"The glycocalyx keeps platelets from touching the inside wall of the blood vessel and helps facilitate the production of nitric oxide, which has an important role in preventing platelets from sticking," explains Dr. Fraser. "We suspect the body's immune response is producing enzymes that shear off these little hair-like structures, inflaming blood vessels and making them a welcoming environment for platelets to form clots."

The team suggests that two therapies may hold promise for treating blood clots in COVID-19 patients: platelet inhibitors to stop platelets from sticking and molecules to protect and restore the inner lining of blood vessels.

"By exploring these therapies as potential alternatives to anticoagulant therapies, we may be able to improve patient outcomes," says Dr. Fraser. "Through our combined findings, we hope to provide tools to predict which patients will become the most severely ill and treatments for both hyperinflammation and blood clots."

Story Source:

Materials provided by **Lawson Health Research Institute**. *Note: Content may be edited for style and length.*

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hindustantimes

Fri, 28 Aug 2020

Covid-19: What you need to know today

The need to answer questions such as these is why vaccine development usually takes years. The global health and economic crisis caused by the Covid-19 pandemic has meant that vaccine developers have tried to shorten the development cycle

By R Sukumar

New Delhi: Scientists have found the answers (or the beginning of answers) to two important questions about Covid-19.

Healthcare workers collect swab for testing in Paris. (Reuters)

The first: why are men who contract the coronavirus disease at greater risk than women?

The answer — like many others where Covid-19 is concerned — lies in the immune response to the virus.

According to research by Akiko Iwasaki and others at the Yale School of Medicine, the male immune response is largely built around cytokines and chemokines, both signalling proteins that are part of the body's immune response. The female response, the research, published in Nature says, is driven by T-cells, a major (and stronger) component of the immune system. The research offers the first plausible answer on why the mortality rate among infected men, especially those over the age of 60, is higher than that among infected women. As an aside, those interested in the more scientific aspects of Covid-19 would do well to follow Iwasaki's work — she is among the clearest thinkers on many aspects of the disease.

The second question: can someone cured of Covid-19 be re-infected?

There have been many false starts to this answer, including some local ones, but according to a paper published on August 25 in the journal Clinical Infectious Diseases, the answer is yes.

The paper is based on research by doctors and scientists at the University of Hong Kong and speaks of a 33-year old man who recovered from Covid-19 in April, and was re-infected in August. The viral genome from the first and the second infections were sequenced, studied and, found to be genetically distinct. This wasn't simply a residual infection — it was a new one. Interestingly, the second time the man was infected, he remained asymptomatic, and his immune system kicked in, producing new antibodies.

HT reported the Hong Kong incident soon after it happened, but there is a larger (and a related) learning in the two studies for vaccine developers. The first study (the one on gender differences) shows that they will have to factor in gender while developing vaccines to ensure that these are effective across the population. The second study shows that being infected once does not always rule out a re-infection — more research is needed, but, in general, it still could in many cases. This isn't necessarily a blow for administrators and health care workers in regions hit hard by Sars-Cov-2, the virus that causes the coronavirus disease, who were hoping that the high prevalence of the disease, as measured by antibody surveys, bestowed some level of immunity on the population. That could still be the case — but it cannot be taken for granted. Typically, this is also one of the things vaccines are tested for — not just whether they can provoke an immune response against the disease, but whether they can prevent a re-infection.

The need to answer questions such as these is why vaccine development usually takes years. The global health and economic crisis caused by the Covid-19 pandemic has meant that vaccine developers have tried to shorten the development cycle — something that could have a bearing on the efficacy of the vaccines or the length of the protection they offer (but that's another story).

Nature's website recently published a telling story (and graphic) on the extent to which the world is counting on the vaccines under development. Based on data from Airfinity, a research firm, the article said countries have struck deals or announced commitments for almost 4.5 billion doses of vaccines from nine vaccine developers. The UK, the article points out, has committed to buying 340 million doses. Its population is a little less than 70 million. The US, the European Union, and Japan have also committed to buying enough to vaccinate every one of their residents at least once, according to the article. India recently set up a committee to discuss various aspects of its vaccine strategy, from funding and sourcing to storage and delivery, but the global rush for vaccines only highlights the need to finalise this soon.

https://www.hindustantimes.com/india-news/covid-19-what-you-need-to-know-today/story-ZDV2fyGqjf5R54NuJqntAL.html

DNA
DAILY NEWS & ANALYSIS

Fri, 28 Aug 2020

India to have 'approved' coronavirus vaccine by 2021 Q1: Bernstein Research

The report estimates that coronavirus vaccine volumes will be split 55:45 between the government and private market

India is on course to have an 'approved' coronavirus vaccine within the first quarter of the calendar year 2021 and Pune based Serum Institute of India (SII), the world's largest vaccine manufacturer by volume, is well placed to deliver the first vaccine, according to a report out Thursday from Bernstein Research, a top Wall Street research and brokerage firm.

"Globally, there are four candidates that are close to approval by the end of the CY2020 or early 2021. Through partnerships India has access to two of those - AZ/Oxford's viral vector vaccine and Novavax's protein sub-unit vaccine with AZ/Oxford's vaccine ahead by a quarter," says the Bernstein report, which IANS has reviewed.

"With their existing capabilities and capacities, SII is best positioned to commercialise one or both of the partnered vaccine candidates depending on approval timing, capacities and pricing."

Data from Phase 1 and Phase trials look promising for both these candidates "in terms of safety and the vaccines ability to elicit an immune response". The way things look now, the report indicates that both vaccine candidates "will require two doses to be administered 21/28 days apart".

The report strikes an upbeat tone on India's "global capacity equation" and does not foresee "manufacturing scale-up challenges".

Serum Institute of India, the report says, could supply 600 million doses in 2021 and 1 billion doses in 2022, out of which 400 to 500 million "should be available in India in 2021" in the context of the company's commitments to Gavi The Vaccine Alliance and lower and middle-income markets.

The report estimates that vaccine volumes will be split 55:45 between the government and the private market.

"We believe the government channel will have first access to the capacities but also believe there will be a sizable private market. In terms of funding, manpower and delivery infrastructure the Government will struggle to shoulder the burden on its own and we expect the private market to step in and supplement."

SII has announced that Gavi will procure vaccines at $3 per dose. The Bernstein report uses that as a benchmark to estimate procurement price to be around $3 a dose for the government and end consumer price of about $6 per dose.

Apart from SII, the report lists at least three other Indian pharma companies - Zydus, Bharat Biotech and Biological E - which are working on their own vaccine candidates and are currently in Phase 1 and 2.

Between SII, Bharat Biotech, Biological E, and some smaller players, India produces around 2.3 billion doses of various vaccines every year.

SII alone is the globally largest manufacturer of vaccines with 1.5 billion doses capacity. Every two out of three children globally gets a shot manufactured by SII.

In early August, SII entered into a partnership with Gavi, The Vaccine Alliance and the Bill and Melinda Gates Foundation, to accelerate the manufacture and delivery of up to 100 million doses of COVID-19 vaccines for India and low- and middle-income countries (LMICs).

The collaboration pumps upfront capital to SII to help them increase manufacturing capacity now so that, once a vaccine, or vaccines, gains regulatory approval and WHO prequalification, doses can be produced at scale for distribution to India and lower and middle-income nations as quickly as the first half of 2021.

The overall vaccine market in India is estimated at "$6 billion spread over FY 21-22", according to Bernstein.

https://www.dnaindia.com/india/report-india-to-have-approved-coronavirus-vaccine-by-2021-q1-bernstein-research-2839801

INDIA TODAY

Fri, 28 Aug 2020

Oxford coronavirus vaccine at Phase II trials in India, Russia starts trials of second vaccine: Top developments

Coronavirus Vaccine News Update: The global race for a vaccine against Covid-19 is on with several countries having reached advanced stages of clinical trials. After announcing world's first coronavirus vaccine, now Russia has announced trials for a second vaccine. All you need to know about coronavirus vaccine research:

By Sanchari Chaterjee

As the global race for a successful coronavirus vaccine continues, coronavirus cases across the world have now reached 2.41 crore while over 8.25 lakh people have died so far. After announcing its first coronavirus vaccine Sputnik V, now Russia has announced that it has entered an advanced trial stage with a second Covid-19 vaccine despite skepticism surrounding the first.

Meanwhile, in India three coronavirus vaccines, including the one being jointly developed by Oxford University and Serum Institute of India (SII) are in different stages of trials.

The global race to find a successful coronavirus vaccine continues at full pace, meanwhile, the virus has claimed over 8 lakh lives across the world. (Reuters)

Top developments on coronavirus vaccine research:

1. Russia is preparing to approve a second vaccine against COVID-19 in late September or early October after President Vladimir Putin announced the world's first coronavirus vaccine earlier this month. Although the first vaccine was not received too well across the world and scientists, the World Health Organisation (WHO) expressed their doubts, Russia has now announced advance trials for its second vaccine.

2. Russian Deputy Prime Minister Tatiana Golikova said that early-stage clinical trials on the coronavirus vaccine, being developed by the Vector virology institute in Siberia, would be completed by the end of September.

3. Meanwhile, as Russia failed to impress scientists across the world, now the government has announced a new phase of clinic trials of the COVID-19 vaccine named Sputnik V that will involve more than 40,000 people in Moscow.

4. In India, the Oxford coronavirus vaccine that SII is testing at a Pune research lab has not shown any negative results in the Phase II clinical trial as of Thursday. Vital parameters of those who received the dosage are normal. The Covishield' vaccine is being manufactured by Pune-based SII at the Bharti Vidyapeeth's Medical College and Hospital. The vaccine dose will again be repeated after a month.

5. On the other hand, Moderna Inc said on Thursday (IST) its experimental COVID-19 vaccine has successfully induced immune responses in older adults similar to those in younger participants. The announcement has raised hopes that the Moderna coronavirus vaccine will be effective on people considered to be at high risk for severe complications from the coronavirus. The vaccine candidate, mRNA-1273, is already in late-stage human trials testing its ability to safely prevent infection.

6. Canada's National Research Council (NRC) said on Wednesday that it has ended its partnership for a coronavirus vaccine with CanSino Biologics, saying the Chinese company lacks the authority to ship the vaccine at this time.

7. The University of Cambridge has confirmed plans to begin trials of a potential new vaccine that will not only fight against COVID-19 but all coronaviruses that may reach humans from animals in the future. The new vaccine candidate, DIOS-CoVax2, uses banks of genetic sequences of all known coronaviruses, including those from bats.

8. American Medical Association (AMA) has urged the United States Food and Drug Administration (FDA) to ensure transparency in the development process of a coronavirus vaccine. In a letter, the AMA asked that physicians should be informed of the FDA's plan for review of potential vaccine candidates. This comes after US President Donald Trump recently said that a coronavirus vaccine may be available before the US presidential elections in November.

9. Johnson & Johnson has added Chile, Argentina and Peru to the Latin nations where it plans to conduct Phase III trials for its coronavirus vaccine. The US pharma company said on Thursday (IST) that the study will involve 60,000 volunteers from Brazil, Chile, Colombia, Peru, Argentina and Mexico and will be coordinated by J&J's pharmaceutical unit Janssen and local academic centers. The company told Reuters it was waiting for regulatory approval in Chile, Argentina and Mexico.

10. Pfizer Inc has said that the enrollment process of 30,000 volunteers for US trials of the coronavirus vaccine it is developing with German partner BioNTech is more than 50% complete.

(With inputs from Reuters)

https://www.indiatoday.in/science/story/coronavirus-vaccine-news-update-second-russia-covid19-vaccine-india-oxford-vaccine-trials-top-developments-1715663-2020-08-27

ThePrint

Fri, 28 Aug 2020

HCQ reduces death risk upto 30% in hospitalised Covid patients, says new study

From risks of obesity to how nitric oxide can help pregnant Covid-19 patients, ThePrint brings you the latest research on the novel coronavirus

By Mohana Basu

New Delhi: With the novel coronavirus continuing to claim lives across the world, scientists are racing against the clock to finds ways of treating and managing Covid-19 infection.

Here are some of the latest research studies on the Covid-19 front.

Low doses of HCQ reduces mortality in Covid patients

An observational study conducted in 33 hospitals of Italy has shown that use of hydroxychloroquine (HCQ) reduces the risk of death in hospitalised Covid-19 patients by as much as 30 per cent.

The research, published in the *European Journal of Internal Medicine*, was conducted on 3,451 patients.

The drug efficacy was evaluated in various subgroups of patients. The positive results of hydroxychloroquine treatment remained unchanged, the researchers have said, especially in those patients who showed a more evident inflammatory state at the time of admission to the hospital.

The researchers have also said that doses of hydroxychloroquine adopted in Italy (200 mg, twice a day) was lower than what was administered in studies carried out in other countries, where efficacy of the drug was not observed.

Obese people, with BMI over 30, at higher risk of severe Covid

A review of Covid-19 studies has revealed that obese people are more vulnerable to severe forms of Covid-19. The team of researchers from University of North Carolina at the Chapel Hill has also suggested that the prevalence of obesity may have implications on the effectiveness of a future Covid-19 vaccine.

The team looked at the published literature on individuals infected with the virus and found that those with BMI over 30 were at an increased risk of hospitalisation, more likely to be admitted to the intensive care unit, and had a higher risk of death from the virus.

Obesity is already associated with numerous underlying risk factors for Covid-19, including hypertension, heart disease, type 2 diabetes, and chronic kidney and liver illnesses.

Metabolic changes caused by obesity — such as insulin resistance and inflammation — make it difficult for individuals with obesity to fight some infections, the study had found. A similar trend is also seen in other infectious diseases, such as influenza and hepatitis.

During times of infection, uncontrolled serum glucose, which is common in individuals with hyperglycemia, can impair immune cell function.

Nitric oxide can improve outcomes for pregnant patients

Inhaling nitric oxide (NO) can serve as a supporting respiratory therapy for pregnant women with severe and critical Covid-19, a study has suggested.

Researchers from the Massachusetts General Hospital (MGH) have treated six Covid-19 pregnant patients. The therapy reduced breathlessness in these patients and also lowered levels of proteins linked to inflammation.

The team has reported that the therapy also helped clear the virus in five of the six patients. They have said that the findings may have important implications for treating SARS-CoV-2.

The treatment started within 48 hours of admission at a high, but safe, dosage of 160 to 200 parts per million (ppm) of inhaled NO for 30 to 60 minutes twice a day.

Inhaled NO increases oxygenation in the body by opening up constricted blood vessels. It was approved by the US Food and Drug Administration (FDA) in 1999 for the treatment of persistent pulmonary hypertension in newborns.

Healthcare should prepare to support recovered patients

People experiencing long-term post-Covid symptoms may put additional strain on health care systems, scientists have said. They have also said that hospitals need to develop ways of supporting people in the community who are recovering from Covid-19.

Although Covid-19 starts as an acute infection of the lungs, it is now known to affect other organs. This can leave people with symptoms such as breathlessness, fatigue, weakness, pain, cardiac problems, cognitive and psychological issues that can last for months.

More than one-third of the people who have been severely ill with the disease can have long-term symptoms, the study published in the *Journal of Rehabilitation Medicine* has suggested.

The team has also said that up to one million people will have after effects that will last for many months and possibly years.

https://theprint.in/health/hcq-reduces-death-risk-upto-30-in-hospitalised-covid-patients-says-new-study/490417/