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The EurAsian Times

Wed, 30 Sept 2020

Indian 5th-gen Aircraft to be fast-tracked as DRDO, French tech giant Safran set to join hands

As India looks to build its future fifth-generation fighter within its national boundaries, the country's Defence Research and Development Organisation (DRDO) has begun work on setting up a new fighter jet engine complex to develop a 110 kilonewton powered engine.

Having seen neighbours China sailing ahead with the development of indigenously produced fighters, the Indian Air Force (IAF) had rolled out plans to build an advanced multi-role fighter which would be powered by a new indigenously produced engine and home developed weapon systems.

AMCA Model Aircraft

According to reports, the new fighter jet complex under the leadership of DRDO will be a part of the HAL Advanced Medium Combat Aircraft (AMCA) program to produce future fifth-generation fighters, with advanced discussions already underway with a French manufacturer.

Under the programme, the new engine complex will take up to seven years to produce, with French engine manufacturer Safran offering a complete technology transfer to develop the engine and to use the offset credits from the French Dassault Rafale deal.

It is also looking to agree on a deal with HAL for the transfer of manufacturing technology for high-end engines.

"We are signing an agreement related to the technology needed for high thrust engine manufacturing. The technology will be common to the Rafale engines that can be supported by us and would also be useful for the 110 kn engine project," said HAL Chairman R Madhavan, while speaking to Economic Times.

According to reports, the new engine complex which is yet to be set up will be focused on developing high-end fighter jet engines as compared to HAL, who would cater to lower thrust engines for helicopters, light transport aircraft, drones (UAVs) and trainers.

The new engines will most probably equip the future squadrons of the IAF, as they would not be ready for the AMCA fighters which might be developed for the initial squadrons.

Moreover, the new complex will be a step forward for India to lessen its dependence on Russia and other Western nations for fighter jet engines. Another significant factor would be the immense cost-cutting due to the development of a homegrown engine.

However, the news of the engine complex comes at the back of a statement issued by the Comptroller and Auditor General of India on the Indian government's offset policy for defence procurement.

The corporation stated that the transfer of technology to DRDO for reviving the stalled Kaveri engine programme has not been completed. "DRDO wanted to obtain Technical Assistance for the indigenous development of engine (Kaveri) for the Light Combat Aircraft. Till date, the Vendor has not confirmed the transfer of this technology," the CAG says in its report.

According to Economic Times, India's plans to use the Rafale offsets to obtain jet engine technology has been in the air since the last four years despite Safran holding dialogues with Indian stakeholders. "French companies can modify offset plans at any point but have a huge obligation – to the tune of 3.5 billion Euro – that need to be completed in the next three years, though this timeline can be extended by the government."

https://eurasiantimes.com/indian-5th-gen-aircraft-to-be-fast-tracked-as-drdo-french-tech-giant-safran-set-to-join-hands/

समय भास्कर

Wed, 30 Sept 2020

भारतीय सेना नई बख्तरबंद गाड़ियों का परीक्षण कर रही, DRDO ने TATA के साथ मिलकर बनाया

नई दिल्ली: पूर्वी लद्दाख में अपनी स्थिति मजबूत करने के लिए भारतीय सेना नई बख्तरबंद गाड़ियों का परीक्षण कर रही है। इनके इस्तेमाल से सेना को जहां अपनी रफ्तार बढ़ाने में मदद मिलेगी वहीं चीनी गोलाबारी से सैनिकों को बचाया भी जा सकेगा।पूर्वी लद्दाख के चुशूल,चुमुर जैसे इलाकों में पिछले एक महीने में सेना ने कई किस्म की गाड़ियों का परीक्षण किया है।

इनमें से एक WHEELD AMPHIBIOUS PLATFORM यानि WHAP है जिसे DRDO ने TATA के साथ मिलकर बनाया है। इसमें 10-12 तक सैनिक बैठ सकते हैं या इसे एम्बुलैंस के तौर पर इस्तेमाल किया जा सकता है। ये हर तरह के इलाके में चल सकती है और इसे नदियों को भी पार किया जा सकता है। दूसरी तरह की गाड़ियों को गोलाबारी से सुरक्षित करने के लिए बख्तरबंद किया गया है और इसमें सैनिकों के फायर करने की जगह है। सूत्रों के मुताबिक,इन गाड़ियों से सैनिकों की पेट्रोलिंग के अलावा लड़ाई के मैदान से घायल सैनिकों को निकालने और रसद पहुंचाने के लिए भी किया जा सकेगा।

लद्दाख में मोर्चे पर भारतीय सेना ने बड़े पैमाने पर टैंकों और सेना द्वारा इस्तेमाल की जाने वाली आर्मर्ड पर्सनल कैरियर यानि APC को तैनात किया है। इस इलाके के खुले मैदानों में इन दोनों के इस्तेमाल से बड़ी सैनिक कार्रवाइयां की जा सकती हैं। लेकिन सेना इनके अलावा उस तरह की बख्तरबंद गाड़ियों का भी परीक्षण लद्दाख के मैदानों में कर रही है जिनमें सैनिकों को सुरक्षित रखा जा सके और रफ्तार से चला भी जा सके।

सूत्रों के मुताबिक,दो निजी कंपनियों की बख्तरबंद गाड़ियों का परीक्षण इस समय लद्दाख में चल रहा है। ये गाड़ियां ट्रैक यानि टैंकों या एपीसी की तरह पट्टियों पर नहीं बल्कि पहियों पर चलने वाली हैं। लेकिन इन्हें मजबूत बख्तर से सुरक्षित किया गया है और नीचे से किसी बारूदी सुरंग का इनपर कोई असर नहीं होगा। ये लद्दाख में ठंडे मौसम में जब तापमान शून्य से 40 डिग्री नीचे चला जाएगा तब कितनी कारगर होंगी इसका परीक्षण किया जा रहा है। एजेंसी

https://www.samaybhaskar.com/indian-army-is-testing-new-armored-vehicles-drdo-teamed-up-with-tata/

THE HINDU

Wed, 30 Sept 2020

DRDO centre to come up in Shivamogga

Hassan: Shivamogga Lok Sabha member B.Y. Raghavendra has said the Central government will take up many projects, including a research centre of the Defence Research and Development Organisation (DRDO), in Shivamogga district.

Mr. Raghavendra told presspersons in Shivamogga on Tuesday that the DRDO would set up its centre on the campus of Sahyadri College. A team of experts from the organisation visited the campus and met the officers of Kuvempu University in this regard. Recently, Chief Minister B.S. Yediyurappa had met Defence Minister Rajnath Singh and requested him to set up a full-fledged research centre in Shivamogga. Mr. Raghavendra said the Union government would be spending ₹30 crore on the project.

The Centre had considered a proposal to set up a science centre in Shivamogga city. The centre would include an 'innovation hub', which would encourage young scientists. "Nearly 7 acres of land has been identified at Ragi Gudda for the centre, which would be set at a cost of ₹17 crore," he said.

The Lok Sabha member said he had requested the Union government to set up one more Kendriya Vidyalaya in the city. "A Rapid Action Force has been sanctioned for Shivamogga district. An airport is also coming up. Gradually, the number of officers from Central government working in Shivamogga has been increasing. Considering these developments, one more Central school is required," he said.

Further, Mr. Raghavendra said the Union government had decided to include Shivamogga in the proposed Bengaluru–Mumbai Industrial Corridor project. This would encourage industries in the district in a big way.

https://www.thehindu.com/news/national/karnataka/drdo-centre-to-come-up-in-shivamogga/article32727293.ece

Defence News

Defence Strategic: National/International

Wed, 30 Sept 2020

Rajnath Singh launches Defence India Startup Challenge at iDEX event

iDEX4Fauji initiative and Product Management Approach (PMA) guidelines were also launched by the Raksha Mantri during the event

New Delhi: Raksha Mantri Shri Rajnath Singh launched the Defence India Startup Challenge (DISC 4) during the iDEX event, featuring the initiatives aimed at expanding the horizons of Innovations for Defence Excellence (iDEX) ecosystem in New Delhi today. iDEX4Fauji initiative and Product Management Approach (PMA) guidelines were also launched by the Raksha Mantri during the event. Each of these initiatives is expected to facilitate iDEX-DIO to scale up the program qualitatively and quantitatively.

iDEX4Fauji is a first of its kind initiative, launched to support innovations identified by members of the Indian Armed Forces and will bolster frugal innovation ideas from soldiers/ field formations. There are more than 13 Lakh service personnel working in the field and on borders, handling extreme conditions and equipment and would be having many ideas and innovations to improve such equipment. There was no mechanism to support such innovations. iDEX4Fauji would open this window and allow our Faujis to become part of the innovation process and get recognised and rewarded. Services Headquarters will provide support to the soldiers & field formations all over the country to ensure maximum participation.

iDEX4Fauji is a first of its kind initiative, launched to support innovations identified by members of the Indian Armed Forces and will bolster frugal innovation ideas from soldiers/ field formations. Image Credit: Twitter(@rajnathsingh)

Speaking on the occasion, Raksha Mantri Shri Rajnath Singh said that the iDEX initiative stands out as one of the most effective and well-executed defence Startup ecosystem created in our country and it would be a decisive step towards achieving self-reliance in the spirit of the AtmaNirbhar Bharat campaign. Shri Rajnath Singh said, for the first time, an atmosphere has been created in the country when different stakeholders have been brought together to push for innovations in the defence sector. "In order to further strengthen our defence system and make it self- reliant the participation of the private sector is also crucial. For this, we have taken certain steps like partnerships with the private sector, technology transfer, 74 % FDI through automatic route and the recently released negative list of 101 items for import ban after a stipulated period." Raksha Mantri also said that only yesterday the government launched Defence Acquisition procedure 2020 which seeks to encourage the private industry to participate in the defence sector. Raksha Mantri also exhorted the Armed Forces to "make full use of the Defence Innovation

Organisation (DIO) platform to meet their technical requirements and the Indian Startups to use this opportunity to become an integral part of our Defence enablers."

The event was addressed among others by Raksha Rajya Mantri Shri Shripad Yesso Naik, Chief of Defence Staff General Bipin Rawat, Defence Secretary Dr Ajay Kumar and Secretary, Department of Defence Production Shri Rajkumar.

Under Defence India Startup Challenge (DISC) 4, eleven challenges from Armed forces, OFB&DPSUs were thrown open to prospective startups, innovators, MSMEs alike to provide their innovative ideas on technologies which find their application in the defence sector. The challenges are as follows:

- Autonomous Underwater Swarm Drones
- Predictive, Preventive & Prescriptive Machine Monitoring
- Super Resolution for Improving Spatial Resolution
- AI-based Satellite Image Analysis
- Prediction and forecasting of atmospheric visibility
- Computer Generated Targets for Virtual Training
- Remote Real-Time In-Flight Health Monitoring of Aircrew
- MF-TDMA based Wideband SATCOM Modem
- Foliage Penetration Radar
- Reduction of RCS of Naval Warships
- Target Detection in Chaff Environment

In order to develop a 'right product and the product right', DIO has adopted the Product Management Approach to steer the prototype development to a market-ready product. These guidelines are first of their kind and their release by Raksha Mantri is intended to monitor product development milestones achieved by iDEX winners against the requirements set by the Services/ DPSUs/ OFB.

The iDEX initiative of the Department of Defence Production was launched by Prime Minister Shri Narendra Modi in April 2018 with the objective to encourage and nurture innovations in the Indian Defence sector and create an ecosystem where Startups, MSMEs and individual innovators could interact easily with the Indian defence establishment and provide the latest technological innovations for specific challenges experienced in operational environments through co-development and co-production of innovative solutions. The iDEX initiatives are executed by Defence Innovation Organisation, a Section 8 company of DPSUs BEL and HAL.

DIO has evolved and expanded the magnitude of its activities since its inception in 2018:

iDEX-DIO has launched three rounds of Defence India Startup Challenge (DISC) with 18 problem statements from Armed Forces, DPSUs&OFB and identified 55+ start-ups/ individuals to receive innovation grants in technological areas through the Prototype funding guidelines called "Support for Prototype and Research Kickstart" (SPARK), which entail provisioning of grants upto Rs 1.5 crore to the Startups on the basis of milestones through multiple tranches, for prototype development.DIO has entered into a strategic partnership with leading incubators of the country and undergone international collaborations especially with Defense Innovation Unit (DIU) in the US.

For efficaciously taking forward the activities, DIO is hiring manpower, doing outreach, launched own website (www.idex.gov.in) & portal, launched 2 cycles of an open challenge for supporting suo-moto innovations, SPARK II guidelines and an internship program etc. along with promulgating elaborate guidelines and Standard Operating Procedures.DDP has 9 Defence PSUs as pillars of defence production in the country and iDEX has enabled capacity building in DPSUs by seeding a culture of innovation and Research and Development. The iDEX event successfully brought together the iDEX stakeholders on a single platform i.e. Ministry of Defence (MoD), iDEX selected startups, partner incubators, Defence Innovation Organisation (DIO), nodal agencies

(Indian Army, Indian Navy, Indian Air Force), NITI Aayog, DRDO, DPSUs, OFB, think tanks, private industry and Industry associations. More than 500 startups and innovators participated in the event through video conference. (With Inputs from PIB)

https://www.devdiscourse.com/article/headlines/1232005-rajnath-singh-launches-defence-india-startup-challenge-at-idex-event

Hindustan Times

Wed, 30 Sept 2020

'No war, no peace in Ladakh,' says IAF Chief RKS Bhadauria

The IAF is operating its newly-inducted Rafale fighter jets in the Ladakh theatre where the military is on its highest state of alert

By Rahul Singh Edited By Sohini Sarkar

New Delhi: Indian Air Force Chief Air Chief Marshal RKS Bhadauria on Tuesday said the security scenario along the country's northern borders was at "an uneasy, no war-no peace status" and the Indian military was prepared for any eventuality, amid heightened military tensions with China in the sensitive Ladakh sector where both armies have made arrangements for a long haul.

Speaking at a conference on 'Energising Indian Aerospace Industry: Challenges in the New Environment', the IAF Chief said, "Air power will be a crucial enabler for our victory in any future conflict. It is really critical for any future conflict. It is imperative that the IAF obtains and maintains technological edge over our adversaries."

Air Chief Marshal RKS Bhadauria said the recent induction of several platforms including the Rafales, C-17s, Chinooks and Apaches had provided the IAF with "substantial tactical and strategic capability enhancement." (ANI PHOTO.)

He said the air force had swiftly responded to the developments in eastern Ladakh and was prepared to counter any misadventure by the adversary. The conference was organised by the Centre for Air Power Studies along with the Society of Indian Defence Manufacturers (SIDM) and Confederation of Indian Industry (CII).

Key military talks on September 21 over the dispute at the Line of Actual Control (LAC) between India and China remained inconclusive, with Indian negotiators firmly demanding comprehensive disengagement at all flashpoints and restoration of status quo ante as the only approach towards de-escalation, and China asking India to withdraw its soldiers from strategic heights on the southern bank of Pangong Tso to reduce friction.

The two sides, however, made some headway.

According to a joint statement issued on September 22 in New Delhi and Beijing, they agreed to stop sending more troops to the front line, and to hold a seventh round of commander-level talks "as soon as possible, take practical measures to properly solve problems on the ground, and jointly safeguard peace and tranquility in the border area".

The IAF is operating its newly-inducted Rafale fighter jets in the Ladakh theatre where the military is on its highest state of alert.

Bhadauria said the recent induction of several platforms including the Rafales, C-17s, Chinooks and Apaches had provided the IAF with "substantial tactical and strategic capability enhancement."

The IAF's current fleet of five Rafale fighters is fully operational and ready to undertake any mission. India ordered 36 Rafale jets from France in a deal worth Rs 59,000 crore in September 2016.

The air force formally inducted the planes at the Ambala air base on September 10 though they landed at their home base on July 29. At the induction, Bhadauria made it clear that the warplanes were mission-ready and the ceremony marked their "full operational induction" into the air force.

The Rafale jets are part of the IAF's No. 17 Squadron, which is also known as the "Golden Arrows."

"The IAF is always mission-ready and can strike its place of choosing when it so desires anywhere, anytime," said military affairs expert Air Marshal PS Ahluwalia (retd).

The IAF has been projecting its capability to carry out day-and-night, all-weather combat missions in the Ladakh sector, with front-line fighter jets, attack helicopters and multi-mission choppers getting airborne for demanding night-time missions from forward airbases.

The IAF Chief said the raising of two squadrons of the Tejas light combat aircraft and the integration of indigenous weapons on the Su-30 in reduced time frame were the most promising developments on the indigenisation front and the march towards self-reliance in the defence sector.

Talking about providing impetus to the Make in India initiative, he said the new Defence Acquisition Procedure-2020, released on Monday, addressed a number of issues "with bold and far reaching reforms".

He said to provide stimulus to the aerospace industry, IAF had committed to the purchase of 83 LCA Mk1 fighter jets and 106 HTT-40 trainer aircraft. "We strongly support the indigenous development of the fifth-generation fighter aircraft --- the advanced multirole combat aircraft (AMCA) --- and have a demand of at least six squadrons, and Avro replacement is planned under Make in India. This in itself amounts to more than 350 aircraft in next two decades. There cannot be a better time to indigenise," he said.

https://www.hindustantimes.com/india-news/no-war-no-peace-in-ladakh-says-iaf-chief-rks-bhadauria/story-zvetDKIXdWGKGXkPEoyk3I.html

The Tribune

Wed, 30 Sept 2020

Predicament of being pragmatic for MoD

General Rawat's intent to reduce some 1 lakh troops to save on salary and pensions to finance long-delayed military modernisation is unlikely to be realised. Two decades earlier, then Chief of Army Staff Gen VP Malik had similarly proposed a cutback of some 50,000 troops, but the Kargil war intervened. Hence, salary and pension bill will keep spiralling, particularly the latter due to 'pension equalisation' every five years under OROP

By Amit Cowshish & Rahul Bedi

China's enduring military adventurism along the Line of Actual Control (LAC) in eastern Ladakh is almost certain to stymie Chief of Defence Staff (CDS) General Bipin Rawat's plans to try and reduce the services' salary and pension bills that have risen by 288% and 535%, respectively, over the past decade.

General Rawat's concerns appear warranted, as the military's continually rising salary and pension payouts of Rs 1,30,989 crore and Rs 1,33,825 crore for the fiscal year (FY) 2020-21 together account for over 50% of the current overall defence outlay of Rs 4,71,378 crore. A decade earlier in FY 2010-11, these jointly accounted for 40% of the total defence budget of Rs 1,75,771.85 crore.

Hobson's choice: Financial woes of the armed forces present the government with difficult choices.

Correspondingly, the military's entire capital budget of Rs 1,13,734 crore for FY 2020-21, that caters to long-deferred modernisation, registered an increase of merely 189% during this decade. Alongside, the outlay for 'stores' or operational expenditure on fuel, transportation and rations, amongst other such costs, escalated 158% for this period, barely reaching Rs 33,142 crore this fiscal.

More tellingly, the services capital budget for FY 2020-21 is just Rs 3,340 crore more than the previous year's, whilst the funds earmarked for 'stores' are actually Rs 1,827 crore less than what the services had received in FY 2019-20. Furthermore, the gap between the funds demanded by and allocated to the military, has risen 4.4 times from Rs 23,014 crore a decade ago to Rs 1,03,536 crore presently.

To add to the military's financial woes, the procurement of equipment and ordnance necessitated by the military standoff with China, apart from the magnified expenditure on logistics along the LAC due to the imminent winter deployment, will further disrupt future defence spending.

Moreover, in the prevailing operational circumstances, the prospects of downsizing India's 2,68,000-strong military seem remote, irrespective of the outcome of the impasse in Ladakh. Military officials agree that the number of soldiers needed to man the 3,488-km-long LAC from Arunachal Pradesh to Ladakh via Himachal Pradesh and Uttarakhand would actually multiply and in no way merit trimming of personnel.

Consequently, General Rawat's intent to reduce some 1 lakh troops to save on salary and pensions to finance long-delayed military modernisation is unlikely to be realised. Two decades earlier, then Chief of Army Staff General Ved Prakash Malik had similarly proposed a cutback of some 50,000 troops, but the Kargil war intervened, resulting in the proposal being shelved for additional troops were needed to man the 747-km-long Line of Control with Pakistan. Hence, salary and pension bills will continue spiraling, particularly the latter due to 'pension equalisation' every five years under the one-rank-one pension (OROP) scheme.

Conversely, the pension bill for civilians — that remain a red rag for services personnel — has also been growing, but at a comparatively slower pace. According to official figures, this has risen 408% from Rs 15,000 crore in FY 2010-11 to Rs 61,119.35 crore in the current fiscal, excluding the Indian Rail and India Post retirees. But more importantly, this expenditure will subsequently plateau out, as the federal government's New Pension Scheme (NPS) introduced in January 2004 onwards, has terminated assured monthly pension payouts for all civilian employees on subsequent superannuation.

In short, the NPS is a contributory pension scheme, in which both employees and the government contribute a certain percentage of the formers' emoluments to a financial fund in which the corpus continues earning interest till the person retires. Thereafter, the retiree can withdraw an optimum 60 per cent of the entire amount at one go, with the balance remaining invested in annuities that, in turn, will yield a monthly pension. Under the NPS, no fixed amount of monthly pension payout is guaranteed, as all returns depend on the market.

Meanwhile, in March, two months before the Chinese standoff surfaced, parliament's standing committee on defence was yet again informed by the MoD that reduction in military spending would adversely impact India's security. The three services argued that this shortfall would negatively impinge on procuring stores, varied ordnance, training, equipment maintenance, infrastructure development, and a host of associated activities. The committee was also informed that the paucity of funds would also 'interrupt' the MoD's ability to defray committed contractual payments for materiel and other kit procured from defence public sector units.

Verily, the fiscal crisis plaguing defence spending has been idling for long, with few willing to accept the monetary reality that the federal government is simply not solvent enough to meet the military's desired financial requirements. Successive finance ministers in their annual budget addresses have grandiosely promised unlimited funds to the defence and security sectors, but never vindicated their grandstanding later.

It also appears that no one in government has a clue to solving this financial apocalypse, even as the armed forces continue planning to acquire capabilities, presuming that funds are not an issue. In July 2017, for instance, the three services formulated a five-year plan which envisaged an outlay of Rs 27 lakh crore, an amount that would have necessitated doubling the defence budget, without taking into account the rapidly escalating pension bill for over 32 lakh retired military personnel.

Unable to strike a balance between financial pragmatism and security imperatives, the MoD turns helplessly to the Ministry of Finance (MoF) to provide the funds. This is despite knowing full well that the latter — confronted with the growing needs of other equally critical sectors like health, education, agriculture and infrastructure and recurring fiscal deficits — cannot possibly meet its demands.

The infallible certainty is that the financial woes of the armed forces, as indeed those of other sectors, can only be redressed through a steady increase in government revenue to match rising expenditure. The government, in turn, can achieve this either through higher taxation or disinvestment, both of which have inbuilt handicaps: the former recourse is politically sensitive, whilst the latter cannot provide a sustainable solution to India's unrelenting financial woes. This presents the government with the Hobson's choice of resorting either to enhanced borrowings or printing more money. But, then again, no one can live on loans forever or alternatively, sink into a morass of soaring inflation. Both options are equally forbidding.

https://www.tribuneindia.com/news/comment/predicament-of-being-pragmatic-for-mod-148708

FINANCIAL EXPRESS
Read to Lead

Wed, 30 Sept 2020

HAL rolls out 300th ALH (Dhruv)

On this occasion, the 'Ground Run' of the first Limited Series Production (LSP) of Light Combat Helicopter- Limited Series Production (LCH-LSP) was carried out

The 300th Advanced Light Helicopter (ALH-Dhruv) rolled out from Hindustan Aeronautics Limited's hangar here on Tuesday.

Speaking on the occasion, HAL CMD, R Madhavan said ALH never looked back from the day when the prototype took its maiden flight on August 30, 1992 and has "evolved into a world class helicopter with its unparalleled performance".

"The evolution from ALH Mark-I to Mark-IV has been phenomenal and is a boost to the indigenous design and development of helicopters," the Bengaluru-headquartered HAL quoted him as saying in a media statement.

Currently, HAL is producing 73 ALHs contracted for Army (41), Indian Navy (16) and Indian Coast Guard (16).

The Roll-out certificate of the 300thhelicopter was handed over to GVS Bhaskar, Chief Executive Officer, Helicopter Complex, by YK Sharma, Additional Director General (South Zone), Directorate General of Aeronautical Quality Assurance (DGAQA) at a programme held at HAL's Helicopter Division.

Bhaskar said "With over 2,80,000 flying hours ALH has proven to be a multirole helicopter for Any Mission, Any Place, Any Time."

Currently, HAL is producing 73 ALHs contracted for Army (41), Indian Navy (16) and Indian Coast Guard (16).

Out of this, 38 ALHs have already been produced and the remaining will be completed by 2022, it said.

On this occasion, the 'Ground Run' of the first Limited Series Production (LSP) of Light Combat Helicopter- Limited Series Production (LCH-LSP) was carried out.
https://www.financialexpress.com/defence/hal-rolls-out-300th-alh-dhruv/2094283/

Business Standard

Wed, 30 Sept 2020

Light combat helicopters being built for Rs 125 crore each, says HAL

HAL's high-altitude attack helicopter is one-third the cost of the Apache

By Ajai Shukla

New Delhi: In a double assertion of its proficiency in building different kinds of helicopters, Hindustan Aeronautics Ltd (HAL) on Monday achieved two significant landmarks: The company rolled out its 300th Dhruv advanced light helicopter (ALH) for the military; and also conducted the inaugural ground run of the first Light Combat Helicopter (LCH) it is series-producing for the Indian Air Force (IAF).

While the Dhruv, with over 280,000 flying hours logged, is already the backbone of the IAF and army's light helicopter fleet, the LCH is a crucial new induction that would play an important role in any armed confrontation between Indian and Chinese troops on the Ladakh border, or in the looming militarization of the Line of Actual Control (LAC).

The LCH project was sanctioned after the 1999 Kargil War, when a dire need was felt for a weapons platform that could provide dedicated fire support to army soldiers at high altitudes, who can carry only a limited amount of weaponry. The Ministry of Defence accordingly sanctioned the LCH project in October 2006.

Fourteen years later, the LCH has become a reality. Business Standard learns that HAL has agreed to build the first 15 "limited series production" LCH for about Rs 125 crore per helicopter – about one-third the cost of each of the 28 AH-64E Apaches attack helicopters the government is importing from The Boeing Company.

True, the Apache is a bigger, more heavily armed gunship with more advanced avionics and battle-tested night fighting capabilities. But, for those reasons, it is expensive and the army and IAF will be making up the numbers with LCHs.

The military is still to sign a contract for 15 LCHs, but HAL has decided to start building the helicopters with its own funds. HAL's board has sanctioned Rs 1,800 crore for this and production is well along.

A key attribute of the 5.8-tonne LCH is its ability to fly and fight at the altitudes the army is deployed at. In tests conducted in the Siachen Glacier sector, the LCH has demonstrated its capability to land and take off at altitudes of 5,000 metres with sufficient fuel and weaponry for combat missions against even higher targets.

Driving this performance is the LCH's twin Shakti engines, especially designed by French firm, Safran, to deliver extra power at high altitudes.

That makes the LCH an ideal platform for providing infantry soldiers fire support in 15,000-16,000 feet-high contested areas such as Depsang, Galwan and the heights north and south of the Pangong Tso, where Indian soldiers are facing off against Chinese intruders.

The military has already projected to HAL an eventual requirement of 65 LCH for the IAF and 97 for the army.

For such a small, light helicopter, the LCH is a formidable fighting machine. Its two pilots, who are seated one behind the other in a slim tandem cockpit, can choose between a menu of weapons that they fire using a helmet pointing system that lets a pilot aim at a target just by looking at it.

The LCH's weapons options include a nose-mounted, 20-millimetre turret gun; or 70-millimetre rockets; or air-to-air missiles that it carries on stub wings. The LCH is the first helicopter to fire air-to-air missiles against a flying target.

The LCH is also designed to carry anti-tank guided missiles (ATGMs) that can knock out enemy tanks at ranges of up to seven kilometres.

Allowing it to survive on a battlefield where it will be a prized target, the LCH is protected by a range of devices. The pilots are shielded against ground fire by armoured panels around the cockpit and by a bulletproof windshield. The LCH has self-sealing fuel tanks that automatically seal up bullet holes with a rubber compound. It has damage-tolerant rotor blades and a main gearbox that can run for 30 minutes even after a bullet hit drains out all its oil.

The LCH is also fitted with an electronic warfare (EW) system that detects enemy missiles; and then scatters flares and chaff as decoys to lure the incoming missile away from the helicopter.

https://www.business-standard.com/article/defence/hal-agrees-to-build-light-combat-helicopter-for-rs-125-crore-each-120092901464_1.html

Forbes

Wed, 30 Sept 2020

India wants to arm its drones with laser-guided missiles against China

By Michael Peck

India's military wants to arm the country's Israeli-made drones with smart bombs.

"Amid border tension with China, the armed forces are pushing a case for arming their Heron UAVs with laser-guided bombs, precision-guided munitions and anti-tank missiles for taking out enemy positions and armored regiments" according to India's Economic Times newspaper.

In addition, the Indian armed forces plans to request an armed version of the U.S.-made MQ-9B SeaGuardian, an upgraded maritime variant of the MQ-9 Reaper strike and surveillance drone. "The three services have come to a conclusion that India should opt for a weaponized drone rather than the 22 reconnaissance and surveillance Sea Guardian drones approved in 2017 by the U.S, administration for supply to India," government sources told the Hindustan Times.

An Indian Navy "Heron", an Israeli-made unmanned aerial vehicle (UAV,) flies over the Porbandar airfield in Porbandar, some 400 kms from Ahmedabad, on January 17, 2011. The Indian Navy's UAV Squadron INAS 343 namely Heron and Searcher MK II were commissioned by the governor of India's Gujarat state Shrimati Kamla on January 17. AFP PHOTO / Sam PANTHAKY (Photo credit should read SAM PANTHAKY/AFP via Getty Images) AFP via Getty Images

If the reports are true, then India will amass a formidable fleet of armed Israeli and U.S. unmanned aerial vehicles. India already has 90 Herons, split among the Indian Army, Navy and Air Force. The Heron, made by Israel Aerospace Industries, is a medium-altitude unmanned aerial vehicle. Designed as a surveillance drone equipped with cameras and radar, but like other drones such as the U.S. MQ-1 Predator and MQ-9 Reaper, it can be armed with missiles. The

Indian Army and Air Force have deployed surveillance Herons to the disputed Indian region of Ladakh, to keep an eye on Chinese forces with whom India has fought recent border clashes.

But China has been reinforcing the Sino-Indian border – known as the Line of Actual Control, or LAC — with advanced weapons, including new light tanks and artillery. China has also stationed additional jet fighters and possibly air defense sites along the LAC, which will make it more difficult for manned Indian Air Force aircraft to provide air support.

Project Cheetah calls for arming the 90 Herons into robotic air support. In addition to precision-guided munitions, the Herons would receive improved sensors. "The armed forces have proposed to equip the drones with stronger surveillance and reconnaissance payloads for keeping an eye on enemy locations and stations and take them out, if required," said the Times.

This suggests the Herons might be for armed reconnaissance, maintaining surveillance over the Himalayan mountains and valleys of Ladakh, and firing missiles and smart bombs if appropriate targets are spotted and ground controllers authorize the strike.

Significantly, Indian defense officials said that armed drones would also be useful for counterinsurgency operations. In addition to the Ladakh border, where Indian and Chinese troops have clashed over China's attempts to seize control of more territory, India also faces insurgencies in Kashmir and elsewhere.

The Heron has a maximum gross takeoff weight of 7 tons and can carry a 3-ton payload, according to the manufacturer. It has a wingspan of 54 feet, a speed of 161 miles per hour, a maximum altitude of 35,000 feet and a range of more than 1,000 kilometers (621 miles). With its bulbous nose and wide, slender wings, it looks somewhat like an MQ-9 Reaper, though a bit smaller. IAI also makes an upgraded Heron, known as the Heron TP or Eitan.

Reports surfaced in 2019 that India was looking to buy the Heron TP. But Project Cheetah appears to be aimed at arming India's existing fleet of Herons.

The MQ-9B SeaGuardian – a maritime version of the MQ-9B SkyGuardian – is a 7-ton unmanned UAV equipped with Lynx multimode radar for detecting naval targets. With a range of more than 5,500 miles and a maximum endurance of 35 hours in the air, it would be a useful tool for patrolling the vast stretches of the Indian Ocean, where China is expanding its naval presence.

However, the SeaGuardian can also be weaponized, but only if approved by the U.S. government. "Customers with special clearance can use their payload space to equip an MQ-9 with a weapon system," General Atomics spokesman C. Mark Brinkley told me. Deployed on the Line of Actual Control (LAC), the mountainous 2,500-mile border between China and India, a long-endurance drone that can fly at 40,000 feet over the Himalayas might be useful.

Meanwhile, Chinese drones have been spying on Indian forces in Ladakh, according to Indian media. China also has armed drone such as the Wing Loong. Which raises the strong possibility that the disputed border could be the scene for both India and China to employ drone strikes.

The Ladakh region of the Himalayas, where mountains tower as high as 15,000 feet, can make aerial and ground operations difficult in the thin air and extreme temperatures. Under those conditions, unmanned strike aircraft may be a good solution.

https://www.forbes.com/sites/michaelpeck/2020/09/29/india-wants-to-arm-its-drones-with-laser-guided-missiles-against-china/#4c56951e798c

Army Technology

Wed, 30 Sept 2020

Indian defense spending given boost by ongoing conflict with China

The Government of India has approved the acquisition of arms and military equipment worth Rs22.9bn ($310.1m) amid an ongoing military standoff with China

The Government of India has approved the acquisition of arms and military equipment worth Rs22.9bn ($310.1m) amid an ongoing military standoff with China.

New procurement will help improve India's capabilities

The procurement proposals were approved at a meeting of the Defence Acquisition Council (DAC) chaired by Indian Defence Minister Rajnath Singh, which cleared the acquisition of around 72,000 SIG Sauer assault rifles at a cost of Rs7.8bn ($105.62m).

The frontline troops of the Indian Army will be equipped with these SIG Sauer assault rifles, which have an effective range of 500m. According to The Times of India, the Indian Army has already inducted more than 72,400 of the rifles under a fast-track procurement deal signed last year.

Additionally, the DAC approved procurement of Static HF Tans-receiver sets and Smart Anti Airfield Weapon (SAAW), under the Buy Indian category.

The field units of the army and airforce will be equipped with HF radio sets to enable seamless communication. This procurement values around Rs5.4bn ($73.12m). The Smart Anti Airfield Weapon acquisition will amount to Rs9.7bn ($131.35m), boosting the firepower of the navy and airforce.

India has ramped up spending amid conflict with China

Recently, tensions have escalated tensions between China and India, initiated by the deadly border clash which occurred on June 15, leaving at least 20 Indian soldiers dead.

Following the face-off, India has ramped up efforts to boost its military capabilities through weaponry procurements, acquisitions and tests to improve its overall capabilities as part of its strategic positioning in the region.

Recently, Defence Research and Development Organisation (DRDO) transferred Authority Holding Sealed Particulars (AHSP) responsibility of Pinaka weapon system to the Directorate General of Quality Assurance (DGQA). The step will support the production of the Pinaka missile system, which has a range of around 37.5km.

A number of defense spending markets globally are expected to either achieve only weak growth or decline in 2020, due to cutbacks caused by the economic impact of the COVID-19 pandemic. However, according to in-house date the value of the Indian market is expected to grow by 5.2%, boosted by the conflict.

India has recently signed military pacts with Japan to strengthen its position

On September 10, 2020 India signed a key military agreement with Japan amid ongoing border tensions with China. The pact has established a mutual logistics support arrangement to facilitate further collaboration between the Indian Armed Forces and the Self-Defense Forces of Japan.

As agreed, the two forces will be able to access each other's bases for supplies and services during bilateral training, peacekeeping and humanitarian operations and other mutually agreed activities. This will help widen India's presence in the region.

Additionally, the reciprocal provision of supplies and services is expected to improve interoperability between the two armed forces facilitating bilateral defence engagements.

https://www.army-technology.com/comment/indian-defense-spending-given-boost-by-ongoing-conflict-with-china/

Hindustan Times

Wed, 30 Sept 2020

Post Ladakh, PLA no longer a bogey for Indian Army | Analysis

Sixteen years later, the Indian Army has finally shrugged off the bogey of the PLA and is staring down at the Chinese at Ladakh with the sole objective of restoring status quo ante at all friction points along the line of actual control

By Shishir Gupta

New Delhi: On the eve of the 2004 general elections, a meeting of China Study Group (CSG) was held to review the status of border roads along the Line of Actual Control (LAC) with the then Vice Chief of Army Staff briefing the apex group on strategic roads. At this meeting the then Home Secretary asked the Army general why we were not building strategic north-to-south roads and questioned the delays in doing so. The answer was that the People's Liberation Army (PLA) could use these roads to come into India. The Home Secretary shot back that at this rate India should also stop building roads in Delhi.

Sixteen years later, the Indian Army has finally shrugged off the bogey of the PLA and is staring down at the Chinese at Ladakh with the sole objective of restoring status quo ante at all friction points along the line of actual control. The change in the mindset of the Indian Army came after the June 15 Galwan flare-up where Col Santosh Babu and his men engaged in hand to hand combat with their adversaries, who are projected as Shaolin Temple warriors by the Chinese state media.

It is a contest between a volunteer Indian Army and conscript PLA. Karakoram winters will decide the outcome. (File photo)

Serving Indian Army officers say that once the Prime Minister of India went to Ladakh to boost the morale and the Indian public gathered to honour the fallen — in contrast to the PLA's hush-hush burial of its dead— the mood changed. Despite the raging pandemic that has origins in Wuhan, the honour bestowed on fallen Indian troops including a brave Junior Commissioned Officer of the elite special frontier force in August 29-30 operation on south Pangong Tso has boosted the morale of Indian forces.

While both armies are now stocking up for the polar winter on Ladakh heights, the PLA with its troops largely made of conscripts who were sent to Aksai Chin as part of an annual exercise must be asking questions of their military commanders. The conscripts are sole children of their parents in China, who join the army for a limited period to ensure State funding of their college education. The idea of spending their winters in Ladakh's rarefied heights will surely test not only their endurance but also their commitment to PLA as the exercise has the potential to take the turn for the worse at any given moment.

Although the situation is tense on the border, India's national security planners say that the grossly mis-calculated aggression ordered by Commander in Chief Xi Jinping in Ladakh has finally removed the Chinese bogey from Indian backs. In the past two decades, China had become Lord Voldemort or he whose name shall not be taken in Indian diplomatic, military and intelligence circles. Former Indian defence minister George Fernandes had to face the brunt for

merely telling the truth that China was a threat. This has now changed with the Modi government not mincing words on China and seriously examining the penetration of Beijing into the Indian system. India is using software mining to identify parent companies and their country of origin from the details of front companies investing in India. This is a sea change from the 2000s when Chinese workers were given business visas in thousands to come to India. And when mandarins in the Ministry of External Affairs believed that the Tibet issue was like "flogging a dead horse" and had lost its relevance.

While predicting the military or diplomatic outcome of the LAC exercise is more difficult than reading tea leaves, the PLA aggression this summer in Ladakh, South China Sea, Taiwan and Senkaku Islands has revealed China's true colours to the world. It has revealed the weakness of European powers and the pusillanimity of the so called Tiger powers of South East Asia in taking on China due to their economic dependency on that country. It has shown that if you have money to throw around then not even a single Muslim power will question you on concentration camps for Sunni Uighurs in Xinjiang even as they rant over the treatment of Rohingyas by Myanmar. It has shown while the world will happily chant "om mani padme hum", it will maintain dead silence over the overt and planned Sinicization of Tibet.

In the run up to the 100th year of founding of Chinese Communist Party (CCP), its paramount leader Xi Jinping has bared China's strategic ambitions to become the sole global power under the mask of coronavirus pandemic.

The world has taken note of this. How it reacts is not difficult to predict.

https://www.hindustantimes.com/india-news/post-ladakh-pla-no-longer-a-bogey-for-indian-army/story-2NVkdELLl9pbkoUOryJvyL.html

Hindustan Times

Wed, 30 Sept 2020

India provides Dornier to Maldives, will help monitor movement of Chinese vessels

The Dornier aircraft will operate under the command and control of MNDF while running costs will be borne by India. It will assist in ongoing joint surveillance activities by India and the Maldives of the exclusive economic zone (EEZ) of the Indian Ocean archipelago

By Rezaul H Laskar

New Delhi: India on Tuesday provided a Dornier maritime surveillance aircraft to the Maldives National Defence Force (MDNF) that is expected to boost efforts to keep a closer eye on the movement of Chinese vessels in regional waters, people familiar with developments said.

The Dornier aircraft will operate under the command and control of MNDF while running csosts will be borne by India. It will assist in ongoing joint surveillance activities by India and the Maldives of the exclusive economic zone (EEZ) of the Indian Ocean archipelago.

Seven MDNF personnel, including pilots, air observers and engineers are being trained to operate the Dornier by the Indian Navy. The people cited above said on condition of anonymity that the aircraft was provided by the Indian Navy in line with and inter-governmental agreement.

The Dornier aircraft arrives at Maldives.(High Commission of India, Maldives/Twitter)

"The aircraft will also help in monitoring the activities of Chinese vessels in regional waters. The surveillance of the EEZ includes the

tracking of all adversarial movements, illegal, unreported and unregulated fishing, and drug and human trafficking," said one of the people cited above.

"In light of the Mahibadhoo and Laamu attacks by suspected terrorists, the Dornier aircraft will also be useful in the counter-terrorism sphere. The isolated and dispersed nature of islands and resorts can be safeguarded only by a technologically capable fixed wing aircraft," the person said.

The person was referring to attacks at the harbour of Mahibadhoo Island in the central Maldives on April 15 in which four speedboats, a sea ambulance and two dinghies were set on fire.

The Islamic State claimed responsibility for the attacks but Maldivian police described the incident as arson and said it could have been the work of extremists or drug traffickers retaliating against special operations conducted since September 2019.

The Indian high commission in Male tweeted: "As per Govt-to-Govt Agreement & discussions started in 2016, the Dornier arrives! It will engage in humanitarian relief efforts & joint-EEZ surveillance under command & control of #MNDF; It proudly dons #MNDF colours & crest, and will involve Maldivian pilots in its operations".

The people noted that previous Maldivian governments too had wanted a Dornier aircraft to be positioned in the Maldives to enhance security and joint surveillance of the EEZ and search and rescue and humanitarian assistance and disaster relief (HADR) operations, particularly in the northern atolls.

The requirement of the aircraft was first raised during previous Maldivian president Abdulla Yameen's visit to India in 2016.

"While it could not get implemented earlier, the present government of President Ibrahim Solih has been able to implement it. Maldivian pilots, observers and technical personnel are being trained to operate the Dornier aircraft since June 2017," said an official who declined to be named. The current government of the Maldives has been successful in getting more such training programmes organised by India, the official said.

During a recent EEZ surveillance operation, multiple large fishing trawlers were found illegally fishing in Maldivian waters, the official added.

The India government has been regularly sharing information with the government of the Maldives on the movement of drug traffickers headed for the archipelago based on reconnaissance flights by Dornier aircraft.

The Dornier will also complement medical evacuation operations currently being conducted by MNDF helicopters. More than 250 Maldivian lives have been saved during such medical evacuation flights.

The Maldives is an archipelago of nearly 1,200 islands grouped into 19 dispersed atolls that cover an area of nearly 90,000 km. The country's EEZ covers nearly one million kilometres.

https://www.hindustantimes.com/health/china-s-catque-virus-which-can-be-a-pandemic-in-india-what-is-this-virus/story-Y6PEy0Db8ClEnSlWHXtnVL.html

Hindustan Times

Wed, 30 Sept 2020

China on their radar, India, Japan, US, Australia to hold Quad meet on Oct 6

The four Quad partners have their own reasons for being upset with China's aggressive posture under paramount leader Xi Jinping under the mask of the deadly coronavirus disease (Covid-19) pandemic

By Shishir Gupta

New Delhi: Foreign ministers of the Quad, the informal security forum comprising India, the US, Japan and Australia, are expected to hold a much-awaited meeting in Tokyo on October 6 with the objective of tightening strategic cooperation and advance the goal of a free, open and inclusive Indo-Pacific region. The meeting is expected to be followed by consultations at senior officials' level in November.

The meeting will discuss collaboration among Quad countries in counter-terrorism, cyber and maritime security, development finance, humanitarian assistance and disaster response, according to South Block officials. The ministers are also expected to discuss practical collaborations in developing advanced technologies including 5G and 5G-plus telecom standards as well as securing the sea lanes of communications in the Indo-Pacific.

The Quad ministers are also expected to discuss practical collaborations in developing advanced technologies including 5G and 5G-plus telecom standards (Reuters)

While Beijing is expected to take aim at the four partners for seeking to target China at the meeting, there has been a sea change since the ministers met informally on the sidelines of the United Nations General Assembly on September 26, 2019. Quad is expected to take steps towards an institutionalized dialogue at the meeting, where Chinese actions since the rise of global pandemic from Wuhan will come under a magnifying glass.

The Quad ministerial comes at a time when the Donald Trump administration has made a U-turn on US policy towards China, which was guided by the rapprochement policy tailored by Henry Kissinger 50 years ago under the Republican administration of Richard Nixon. The tough, new US policy towards Communist China was defined by US secretary of state Mike Pompeo in his Nixon Library address on July 24.

The Indian relationship with China has taken a 180-degree turn since the Chennai summit on October 11-12, 2019, after the People's Liberation Army's aggression in eastern Ladakh in May. The armies of the two countries are still locked in a staring match in Ladakh with both sides losing soldiers in the June 15 Galwan Valley flare-up and firing in the air in the first week of September after the Indian Army pre-empted the PLA south of Pangong Tso. This is not all.

Australia's relationship with China, its largest trading partner, has nosedived with Beijing imposing an 80% tariff on barley, launching an anti-dumping investigation of Australian wine, blocking Australian beef, arresting an Australian journalist and banning two academics from visiting China.

The situation with Japan is no different, with Chinese warmongering over the Senkaku Islands in the East China Sea forcing Tokyo to increase its defence budget to a record. Tokyo is also upset over new security laws in Hong Kong and pressure put on democratic Taiwan by Beijing.

In short, all the four Quad partners have their own reasons for being upset with China's aggressive posture under paramount leader Xi Jinping under the mask of the deadly coronavirus disease (Covid-19) pandemic. The Chinese posture in the Indo-Pacific and the threat it poses to the

democratic world will be discussed at the Tokyo ministerial, with all Quadl partners sharing their experiences.

Given that all the Quad partners have a military supply and logistics sharing agreement with each other, the foreign ministers will also take a decision on a four-nation naval exercise under the rubric of Malabar in the Arabian Sea to signal their commitment for free and open navigation in the Indo-Pacific.

https://www.hindustantimes.com/india-news/india-japan-us-australia-to-hold-quad-meet-on-oct-6-china-on-their-radar/story-LhL2r3vuaTl3ndBQ0vT6LP.html

JAGRAN English

Wed, 30 Sept 2020

India, Japan concludes three days of naval exercise JIMEX-2020

During JIMEX 2020, the ships from both Japan and India undertook anti-submarine and anti-warfare exercises, tracking, weapon firings, and tactical manoeuvres

By Shailaja Tripathi

The 4th edition of India-Japan maritime bilateral exercise- JIMEX, between the Japanese Maritime Self-Defence Force (JMSDF) and the Indian Navy, completed the 3 days of exercise on September 28, 2020.

The naval exercise between the two nations was held in the North Arabian Sea from September 26 to September 28, 2020, and it was led by CCF2 & FOCWF. The exercises were conducted in no contact format and ships waved goodbye farewell to each other before parting ways.

During the exercise, the ships from both Japan and India undertook anti-submarine and anti-warfare exercises, tracking, weapon firings, and tactical manoeuvres. Surveillance helos and aircrafts also participated, making JIMEX 2020 the most intensive edition so far.

On the second day as well, the Japanese Maritime Self-Defence Force (JMSDF) and the Indian Navy ships undertook seamanship evolutions, weapon drills, and other advanced exercises.

Significance of JIMEX 2020:

The maritime bilateral exercise between India and Japan- JIMEX 2020 will help in further enhancing the cooperation and mutual confidence between the two nations. The naval exercise will also fortify the long-standing bond of friendship between the two countries.

Naval cooperation between India and Japan:

The naval cooperation between both nations has increased in scope and complexity over the years. The advanced level of exercises and operations planned during JIMEX-2020 are indicative of the continued efforts by both the governments. It also encourages bot India and Japan to work closely for a more open, secure, and inclusive global commons, as in accordance with the International regulations.

About JIMEX:

JIMEX series of exercises had commenced in January 2012 along with a special focus on maritime security cooperation. The last edition of JIMEX conducted in October 2018 in Vishakhapatnam, India.

https://www.jagranjosh.com/current-affairs/india-japan-concludes-three-days-of-naval-exercise-jimex-2020-1601384410-1

WION

Wed, 30 Sept 2020

ISRO marks 5 years of Space Observatory - AstroSat; more science missions in anvil

By Sidhartm MP

Story highlights

The Indian Space Research Organization (ISRO) marked five years of the lunch of AstroSat, which is India's first multi-wavelength mission, which was launched from Sriharikota spaceport on 28th September 2018

Chennai: The Indian Space Research Organization (ISRO) marked five years of the lunch of AstroSat, which is India's first multi-wavelength mission, which was launched from Sriharikota spaceport on 28th September 2018. The satellite is being operated as a proposal-based observatory, covering a wide band ranging from Ultraviolet (UV) to high energy X-rays.

While a vast majority of ISRO's satellites are meant to serve purposes like communication, surveillance, imagery, remote sensing etc. A handful of missions/satellites are purely for exploring and helping understand unexplored sciences. Such missions are Chandrayaan, Mangalyaan and AstroSat.

AstroSat is India's first multi-wavelength satellite Photograph: (Twitter)

ISRO says that the unique observation capability of AstroSat in this wide band makes it one of the major space science observatories in the world. According to the Indian Space agency, AstroSat was also the mission which led to the discovery of one of the earliest galaxies in extreme Ultraviolet light, marking a major breakthrough. Called AUDFs01, this galaxy is said to be 9.3 billion light years away from earth.

The discovery was made by an international team of astronomers led by Dr. Kanak Saha, at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune. This team was comprised of scientists from India, Switzerland, France, USA, Japan and Netherlands.

Speaking at a virtual event, to mark five years of AstroSat, R. Umamaheswaran, Scientific Secretary, ISRO said that the data generated from the AstroSat mission has been shared with over 1500 users across 43 countries, hailing the mission as an 'international success'. "AstroSat was launched into a unique circular orbit, with low incline of 6 degrees and five of its payloads can function simultaneously" he said.

Chairman ISRO, DR. K.Sivan said that, the study of the universe played a major role in defining research of ISRO and AstroSat has brought us into the big league of space astronomy and provided excellent results. He added that the satellite had served its mission life of five years, with all five on-board equipment in 'very fine' condition and that it would continue to serve for years to come.

Referring to AstroSat as a multi-agency mission, Dr.Sivan elaborated that academia and R&D institutions had worked in the engineering and testing phase of this project.

Speaking of ISRO's 'big future plans' in space exploration and science, he said, that Exposat and Aditya L-1 were upcoming missions which would open exciting possibilities. While Exposat was meant to study X-ray polarisation from cosmic sources, it would also be the first polarimetric

mission after half a century, Sivan added. Aditya L-1 is a mission that was slated for launch by mid-2020, the scientific objective of the mission was to study the Sun.

"There are exciting possibilities - missions to detect Eletromagnetic counterparts of gravitational events, to study atmospheric composition of rocky planets and discovery of all life forms outside our solar system" he said. He urged the scientific community to use the scientific data and research to the maximum extent and also indicate the importance of generating future Human Resources by involving school students.

Thus far, in 2020 ISRO has not had any launches owing to the pandemic-induced lockdowns and logistical challenges etc. ISRO officials have said that 4 satellites are ready for launch, namely - GISAT-1, Microsat 2-A, GSAT-12R and RISAT-2BR2.

https://www.wionews.com/india-news/isro-marks-5-years-of-space-observatory-astrosat-more-science-missions-in-anvil-331170

PHYS.ORG

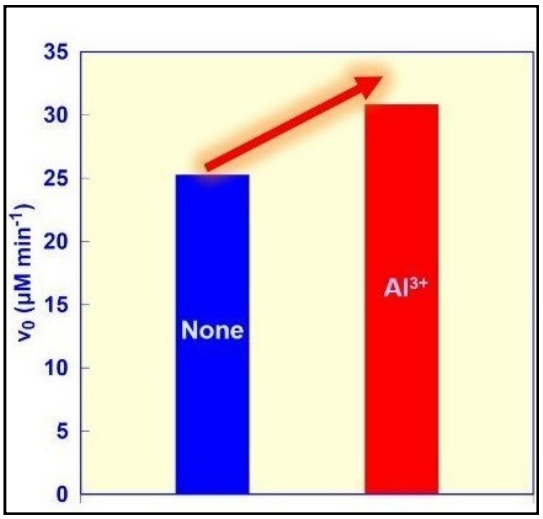
Wed, 30 Sept 2020

The key to lowering carbon dioxide emissions is made of metal

Carbon dioxide (CO_2) levels are rising and our planet is heating up. What do we do? What if we used this excess CO_2 as a raw material to produce things we need—similar to how plants use it to produce oxygen.

This is one thing artificial photosynthesis has set out to do.

Artificial photosynthesis is a chemical process that mimics the natural process of photosynthesis to convert sunlight, water, and carbon dioxide into useful things like carbohydrates and oxygen. The problem is that current technologies can only produce molecules with 1 carbon atom. These molecules are too weak to be used for the production of more complex materials. Standard experimental conditions have not been stable enough to allow for molecules with bonds of more than one carbon atom to form.



The apparent rates for the ME-catalyzed malate (v0) under the condition of NADPH, pyruvate, sodium bicarbonate and ME containing aluminium ions (red). Credit: Yutaka Amao, Osaka City University

New research at Osaka City University has found that simply adding metal ions like aluminum and iron was enough to allow the production of malic acid, which contains four carbon atoms. The study appeared recently online in the *New Journal of Chemistry* published by the Royal Society of Chemistry.

"I was surprised that the solution was found in such a common thing as aluminum ions," said lead author Takeyuki Katagiri.

"Our goal is to create groups of molecules with as many as 100 carbon atoms," added supporting author Yutaka Amao. "Then we can finally explore possibilities of using CO_2 as a raw material."

More information: Takayuki Katagiri et al. Trivalent metal ions promote the malic enzyme-catalyzed building of carbon–carbon bonds from CO2 and pyruvate, *New Journal of Chemistry* (2020). DOI: 10.1039/D0NJ03449E

https://phys.org/news/2020-09-key-lowering-carbon-dioxide-emissions.html

PHYS.ORG

Wed, 30 Sept 2020

Researchers develop a new membraneless fuel cell

The research team of INRS Professor Mohamed Mohamedi has designed a green membraneless fuel cell that uses oxygen from the air. The results of this innovative microfluidic application—a first in Canada—were published in *Renewable and Sustainable Energy Reviews.*

Conventional fuel cells are ubiquitous. They power electric cars and powered the computers used in the 1969 Apollo moon landing. These fuel cells lose voltage as they are used and eventually stop working. This happens because alcohol molecules (methanol or ethanol) in the fuel cell's anode compartment cross over the membrane separating them from the cathode compartment. Oxygen molecules in the cathode compartment react with the alcohol, causing a drop in voltage.

Credit: Pixabay/CC0 Public Domain

Scientists have unsuccessfully tried to develop a membrane that stops alcohol molecules from passing through it. Professor Mohamed Mohamedi, a lead author of the study published on September 8, took another tack: developing a fuel cell without a membrane.

His novel solution costs less and requires fewer steps to manufacture, but it fails to address a key challenge. "When the membrane is removed, the methanol or ethanol reacts with the oxygen, just like in conventional fuel cells. To prevent voltage drops, we had to develop selective electrodes in the cathode compartment. These electrodes, designed by doctoral student Juan Carlos Abrego-Martinez, remain inactive in the presence of alcohol molecules, but are sensitive to the oxygen that generates electricity," Professor Mohamedi explains. He notes another unique property of this membraneless fuel cell: it uses oxygen from the air around it.

From Model to Prototype

The first step the researchers took in building a working prototype was to run numerical simulations created by Alonso Moreno Zuria, INRS postdoctoral fellow and a lead author of the study. Through computer modeling, the team tested different configurations of selective electrodes in the fuel cell. "Conventional fuel cells are like sandwiches with the membrane in the middle. We chose instead to work on a single-layer design. We had to determine how to arrange and space the electrodes to maximize fuel use while keeping ambient air oxygen concentration in mind," says Professor Mohamedi.

Once the researchers settled on a configuration, they tested a prototype that became a proof of concept. The membraneless fuel cell powered an LED for four hours using only 234 microlitres of methanol. The researchers want to optimize the fuel cell so it can use ethanol, a greener fuel that can be produced from biomass and agricultural waste. Ethanol also provides more power per equivalent unit of volume.

The team expects the fuel cell to power portable electronics such as mobile phones and microsystems such as air pollution sensors. Unlike conventional batteries that store electricity and must be recharged, fuel cells continue to produce energy as long as fuel is available. "This energy supply method is particularly effective when recharging is not possible. Imagine being in the middle of the desert, without electricity. You could recharge your mobile phone using a small capsule of ethanol that you connect to the device," says Professor Mohamedi.

This pioneering technology has already attracted industry attention even though the research team is only at the prototype stage.

More information: Alonso Moreno Zuria et al, Prospects of membraneless mixed-reactant microfluidic fuel cells: Evolution through numerical simulation, *Renewable and Sustainable Energy Reviews* (2020). DOI: 10.1016/j.rser.2020.110045
https://phys.org/news/2020-09-membraneless-fuel-cell.html

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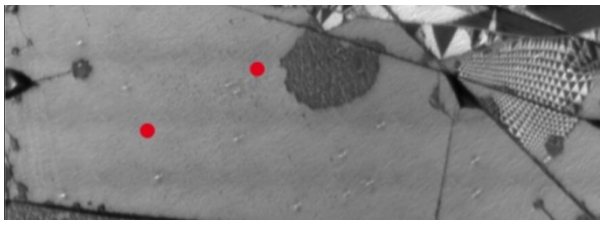
Wed, 30 Sept 2020

Superconductivity with a twist explained

By Bruno Van Wayenburg

Leiden physicists and international colleagues from Geneva and Barcelona have confirmed the mechanism that makes magic-angle graphene superconducting. This is a key step in elucidating high-temperature superconductivity, a decades-old mystery central to physics, which may lead to technological breakthroughs.



LEEM image of the sample. The triangles on the right indicate a low angle patch. Credit: Leiden University

Magic-angle materials form a surprising recent physics discovery. "You take a sheet of graphene," says Sense Jan van der Molen, referring to the two-dimensional material made of carbon atoms in a hexagonal pattern, "then you put another layer on top of it and twist the latter by 1 degree. This way, you suddenly get a superconductor."

At a temperature of 1.7 Kelvin, twisted bilayer graphene (tbg) conducts electricity without resistance. Now, Van der Molen, his Leiden colleague Milan Allan and international colleagues have finally confirmed the mechanism behind these fascinating new superconductors.

In the journal *Nature Physics*, they show that the slight twist in graphene causes the electrons to slow down enough to sense each other. This enables them to form the electron pairs necessary for superconductivity.

Moiré patterns

How can such a small twist make such a big difference? This is connected with moiré patterns, a phenomenon seen in the everyday world. For instance, when two chicken-wire fences are in front of another, one observes additional dark and bright spots, caused by the varying overlap between the patterns. Such moiré patterns (from the french moirer, to crease) generally appear where periodical structures overlap imperfectly.

Twisted bilayer graphene is just such a situation: the interplay between the two hexagonal carbon lattices, slightly twisted, causes a much larger hexagonal moiré pattern to emerge. By creating this new periodicity, the interaction between the electrons changes, yielding these "slow" electrons. In numerous papers, clear signs of the superconductivity have been measured, but the intermediate step of slow electrons has been much harder to pin down.

Looking for patches

"You need to have good samples," Van der Molen explains the success. Fortunately, the co-authors from Barcelona are known to make high-quality samples. "Next, you need to know exactly where to look." Even in a good sample, the correct twist angle is only achieved in small patches of double-layer graphene.

Van der Molen's Low-Energy Electron Microscope (LEEM) and Allan's Scanning Tunneling Microscope (STM) helped find exactly those patches.

Then, a group in Geneva used nano-ARPES, an imaging technique, to demonstrate the slowing down of the electrons. Allan: "Many groups tried hard to do that. Only one other group succeeded, and they have a parallel publication."

Hypersensitive detectors

Elucidating and then optimizing this type of superconductivity could also lead to numerous technological applications, ranging from lossless energy transport to hypersensitive light detectors.

In fact, Michiel de Dood, also at Leiden, is now pioneering such detectors. Van der Molen: "It's fundamental work, but we keep our eyes open for applications too."

More information: Simone Lisi et al. Observation of flat bands in twisted bilayer graphene, *Nature Physics* (2020). DOI: 10.1038/s41567-020-01041-x

Journal information: *Nature Physics*

https://phys.org/news/2020-09-superconductivity.html

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Wed, 30 Sept 2020

Stepwise inversion method to profile near-borehole formation velocities

By Li Yuan

The radial heterogeneity of near-wellbore formation, usually manifested as the variations of formation wave velocities in radial position, is encountered in petroleum exploration and production. Mapping radial variations of formation velocities is significant in identifying invaded zones and determining rock properties, which are valuable for engineering measures.

Credit: CC0 Public Domain

Inversion methodologies are the main methods to determine radial wave velocity profiles. For monopole acoustic well logging, the calculation on arrival time of the waves is required in profiling the P-wave velocity, which is unstable and inaccurate in processing field data with noise.

Recently, researchers from the Institute of Acoustics of the Chinese Academy of Sciences (IACAS) proposed a stepwise inversion method based on monopole acoustic well logging data to radially profile the near-borehole formation velocities.

The inversion method did not require calculation on the arrival time of waves, thus mitigating the inaccuracy in processing field data with noises. In addition to profiling formation P-wave velocity, the proposed methodology also could be applied in mapping formation S-wave velocity.

Instead of inverting the formation velocity variation and its corresponding radial position simultaneously as traditional methods do, the researchers divided the inversion procedure into two steps: extracting the velocity array by semblance processing of contiguous receiver pairs of acoustic array data, and then getting the thickness of the layer (radial position) based on ray theory.

The inversion results from Step 1 could be used to guide the operation and decide whether Step 2 was necessary.

The modeling-based inversion results and the application to field data indicated the efficiency and accuracy of the stepwise inversion method. With its fast speed and stability in calculation, this work could provide real-time data processing results in the oilfield.

The research, published in the *Journal of Petroleum Science and Engineering*, was supported by the National Natural Science Foundation of China.

More information: Ying Liu et al. Radial profiling of near-borehole formation velocities by a stepwise inversion of acoustic well logging data, *Journal of Petroleum Science and Engineering* (2020). DOI: 10.1016/j.petrol.2020.107648

https://phys.org/news/2020-09-stepwise-inversion-method-profile-near-borehole.html

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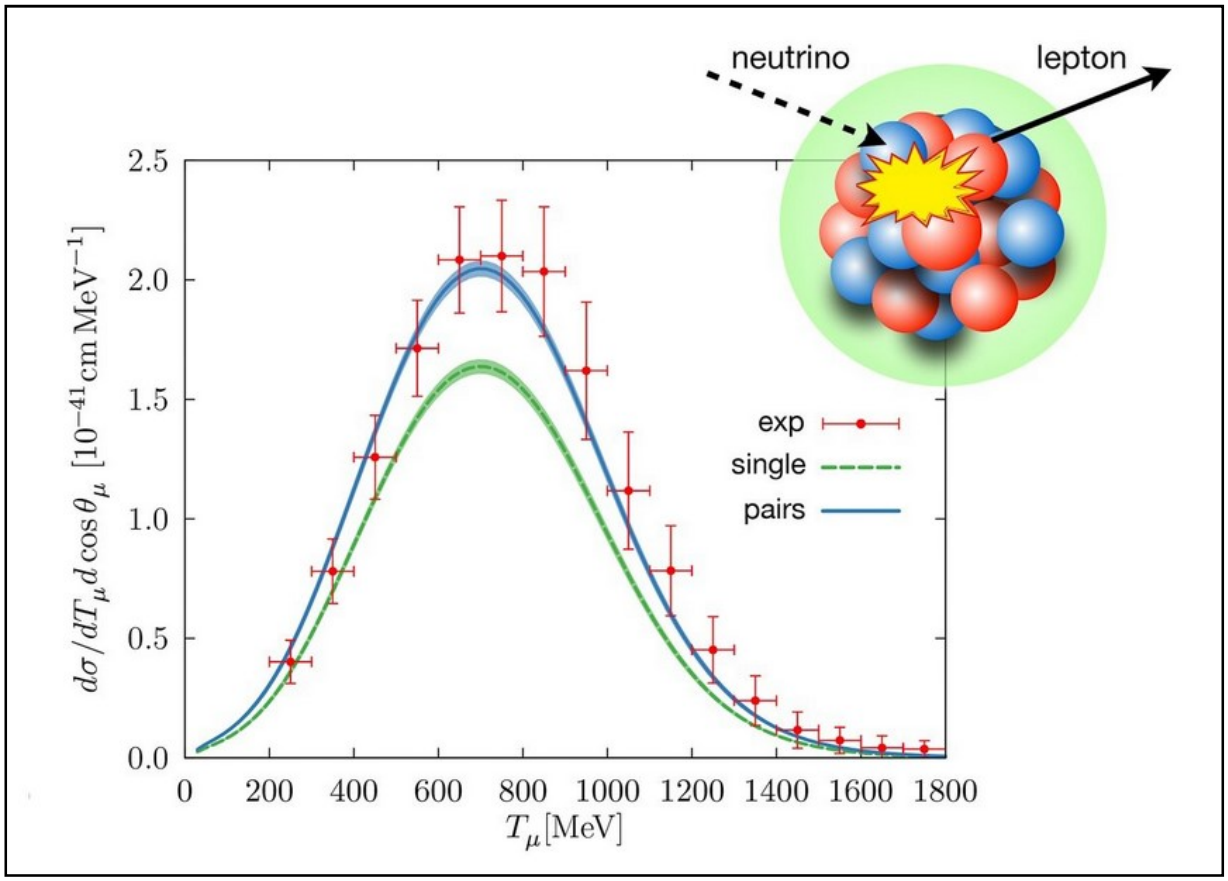
Wed, 30 Sept 2020

Understanding ghost particle interactions

By Joseph E. Harmon

Scientists often refer to the neutrino as the "ghost particle." Neutrinos were one of the most abundant particles at the origin of the universe and remain so today. Fusion reactions in the sun produce vast armies of them, which pour down on the Earth every day. Trillions pass through our bodies every second, then fly through the Earth as though it were not there.



Cross sections of neutrino-nucleus interactions versus energy. Improved agreement between experiment and model calculations clearly shown for case of nucleon pair rather than single nucleon. Inset shows neutrino interacting with nucleus and ejecting a lepton. Credit: Argonne National Laboratory

"While first postulated almost a century ago and first detected 65 years ago, neutrinos remain shrouded in mystery because of their reluctance to interact with matter," said Alessandro Lovato, a nuclear physicist at the U.S. Department of Energy's (DOE) Argonne National Laboratory.

Lovato is a member of a research team from four national laboratories that has constructed a model to address one of the many mysteries about neutrinos—how they interact with atomic nuclei, complicated systems made of protons and neutrons ("nucleons") bound together by the strong force. This knowledge is essential to unravel an even bigger mystery—why during their journey through space or matter neutrinos magically morph from one into another of three possible types or "flavors."

To study these oscillations, two sets of experiments have been undertaken at DOE's Fermi National Accelerator Laboratory (MiniBooNE and NOvA). In these experiments, scientists generate an intense stream of neutrinos in a particle accelerator, then send them into particle detectors over a long period of time (MiniBooNE) or five hundred miles from the source (NOvA).

Knowing the original distribution of neutrino flavors, the experimentalists then gather data related to the interactions of the neutrinos with the atomic nuclei in the detectors. From that information, they can calculate any changes in the neutrino flavors over time or distance. In the case of the MiniBooNE and NOvA detectors, the nuclei are from the isotope carbon-12, which has six protons and six neutrons.

"Our team came into the picture because these experiments require a very accurate model of the interactions of neutrinos with the detector nuclei over a large energy range," said Noemi Rocco, a postdoc in Argonne's Physics division and Fermilab. Given the elusiveness of neutrinos, achieving a comprehensive description of these reactions is a formidable challenge.

The team's nuclear physics model of neutrino interactions with a single nucleon and a pair of them is the most accurate so far. "Ours is the first approach to model these interactions at such a microscopic level," said Rocco. "Earlier approaches were not so fine grained."

One of the team's important findings, based on calculations carried out on the now-retired Mira supercomputer at the Argonne Leadership Computing Facility (ALCF), was that the nucleon pair interaction is crucial to model neutrino interactions with nuclei accurately. The ALCF is a DOE Office of Science User Facility.

"The larger the nuclei in the detector, the greater the likelihood the neutrinos will interact with them," said Lovato. "In the future, we plan to extend our model to data from bigger nuclei, namely, those of oxygen and argon, in support of experiments planned in Japan and the U.S."

Rocco added that "For those calculations, we will rely on even more powerful ALCF computers, the existing Theta system and upcoming exascale machine, Aurora."

Scientists hope that, eventually, a complete picture will emerge of flavor oscillations for both neutrinos and their antiparticles, called "antineutrinos." That knowledge may shed light on why the universe is built from matter instead of antimatter—one of the fundamental questions about the universe.

The paper, titled "Ab Initio Study of $(\nu\ell,\ell-)$ and $(\bar{\nu}\ell,\ell+)$ Inclusive Scattering in C12: Confronting the MiniBooNE and T2K CCQE Data," is published in *Physical Review X*. Besides Rocco and Lovato, authors include J. Carlson (Los Alamos National Laboratory), S. Gandolfi (Los Alamos National Laboratory), and R. Schiavilla (Old Dominion University/Jefferson Lab).

More information: A. Lovato et al, Ab Initio Study of $(\nu\ell,\ell-)$ and $(\bar{\nu}\ell,\ell+)$ Inclusive Scattering in C12 : Confronting the MiniBooNE and T2K CCQE Data, *Physical Review X* (2020). DOI: 10.1103/PhysRevX.10.031068

Journal information: *Physical Review X*

https://phys.org/news/2020-09-ghost-particle-interactions.html

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Wed, 30 Sept 2020

App analyzes coronavirus genome on a smartphone

A new mobile app has made it possible to analyze the genome of the SARS-CoV-2 virus on a smartphone in less than half an hour.

Cutting-edge nanopore devices have enabled scientists to read or 'sequence' the genetic material in a biological sample outside a laboratory, however analyzing the raw data has still required access to high-end computing power—until now.

The app Genopo, developed by the Garvan Institute of Medical Research, in collaboration with the University of Peradeniya in Sri Lanka, makes genomics more accessible to remote or under-resourced regions, as well as the hospital bedside.

The app Genopo makes genomics more accessible to remote or under-resourced regions. Credit: Dr Ira Deveson

"Not everyone has access to the high-power computing resources that are required for DNA and RNA analysis, but most people have access to a smartphone," says co-senior author Dr. Ira Deveson, who heads the Genomic Technologies Group at Garvan's Kinghorn Centre for Clinical Genomics.

"Fast, real-time genomic analysis is more crucial today than ever, as a central method for tracking the spread of coronavirus. Our app makes genomic analysis more accessible, literally placing the technology into the pockets of scientists around the world."

The researchers report the app Genopo in the journal *Communications Biology*.

Taking genome analysis off-line

Genomic sequencing no longer requires a sophisticated lab setup.

At the size of a USB stick, portable devices such as the Oxford Nanopore Technologies MinION sequencer can rapidly generate genomic sequences from a sample in the field or the clinic. The technology has been used for Ebola surveillance in West Africa, to profile microbial communities in the Arctic and determine coronavirus evolution during the current pandemic.

However, analyzing genome sequencing data requires powerful computation. Scientists need to piece the many strings of genetic letters from the raw data into a single sequence and pinpoint the instances of genetic variation that shed light on how a virus evolves.

"Until now, genomic analysis has required the processing power of high-end server computers or cloud services. We set out to change that," explains co-senior author Hasindu Gamaarachchi, Genomics Computing Systems Engineer at the Garvan Institute.

"To enable in situ genomic sequencing and analysis, in real time and without major laboratory infrastructure, we developed an app that could execute bioinformatics workflows on nanopore sequencing datasets that are downloaded to a smartphone. The reengineering process, spearheaded by first author Hiruna Samarakoon, required overcoming a number of technical challenges due to various resource constraints in smartphones. The app Genopo combines a number of available

bioinformatics tools into a single Android application, 'miniaturised' to work on the processing power of a consumer Android device."

Coronavirus testing

The researchers tested Genopo on the raw sequencing data of virus samples isolated from nine Sydney patients infected with SARS-CoV-2, which involved extracting and amplifying the virus RNA from a swab sample, sequencing the amplified DNA with a MinION device and analyzing the data on a smartphone. The researchers tested their app on different Android devices, including models from Nokia, Huawei, LG and Sony.

The Genopo app took an average 27 minutes to determine the complete SARS-CoV-2 genome sequence from the raw data, which the researchers say opens the possibility to do genomic analysis at the point of care, in real time. The researchers also showed that Genopo can be used to profile DNA methylation—a modification which changes gene activity—in a sample of the human genome.

"This illustrates a flexible, efficient architecture that is suitable to run many popular bioinformatics tools and accommodate small or large genomes," says Dr. Deveson. "We hope this will make genomics much more accessible to researchers to unlock the information in DNA or RNA to the benefit of human health, including in the current pandemic."

Genopo is a free, open-source application available through the Google Play store.

More information: *Communications Biology* (2020). DOI: 10.1038/s42003-020-01270-z

Journal information: *Communications Biology*

https://phys.org/news/2020-09-app-coronavirus-genome-smartphone.html

Hindustan Times

Wed, 30 Sept 2020

Saliva tests could quickly detect asymptomatic Covid-19 cases, study says

Testing self-collected saliva samples could offer an easy, quick and effective mass testing approach for detecting asymptomatic Covid-19 cases

Testing self-collected saliva samples could offer an easy, quick and effective mass testing approach for detecting asymptomatic Covid-19 cases, according to a study.

The research, published in the journal Clinical Infectious Diseases, tested and compared the nasopharyngeal swabs and saliva samples of almost 2,000 people in Japan who did not have Covid-19 symptoms.

"Rapid detection of asymptomatic infected individuals will be critical for preventing Covid-19 outbreaks within communities and hospitals," (Unsplash)

"Rapid detection of asymptomatic infected individuals will be critical for preventing Covid-19 outbreaks within communities and hospitals," said Takanori Teshima from Hokkaido University in Japan.

Two different virus amplification tests were performed on most of the samples: the widely available PCR test, and the less commonly used but faster and more portable RT-LAMP test.

The number of positive and negative results in all samples was very similar, with the nasopharyngeal swabs and saliva samples able to detect those with the infection in 77-93 per cent and 83-97 per cent of subjects, respectively.

Both the tests were also able to identify those without the infection in greater than 99.9 per cent of subjects, the researchers said.

The virus loads detected in nasopharyngeal swab and saliva were equivalent and highly correlated, they said.

"PCR sensitivity is much higher than previously thought 70 per cent that came from initial data of symptomatic patients," Teshima said.

While finding both nasopharyngeal and saliva samples have high sensitivity and specificity to the SARS-CoV-2, Teshima said "saliva testing has significant logistic advantages over the commonly used nasopharyngeal swab testing."

"Self-collection of saliva is painless for examinees, and more importantly, it eliminates the close contact with the examiners, reducing the risk of viral exposure," said Teshima.

"We also found that it is unlikely that the sensitivity of RT-LAMP is significantly less than that of the PCR test, suggesting that it might be a useful alternative for diagnosing Covid-19 infection, especially where diagnosis is required at the point of sample collection, like in sports venues or at airports," Teshima said.

Researchers point to a limitation of the study that they did not follow up with clinical outcomes.

They suggest that the results give good indication that mass screening using self-collected saliva and rapid RT-LAMP testing could provide easy, non-invasive, quick and relatively accurate results, with minimal risk of viral transmission to healthcare workers.

(This story has been published from a wire agency feed without modifications to the text.)

https://www.hindustantimes.com/health/saliva-tests-could-quickly-detect-asymptomatic-covid-19-cases-study-says/story-0C8zGV1AwBKvmU2F5jDq8O.html