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समाचार पत्रों से चयित अंश Newspapers Clippings

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

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Press Information Bureau
Government of India

Ministry of Defence

Thu, 05 Aug 2021 3:39PM

2nd IEEE International Conference on Range Technology

- *DRDO virtually organises the conference*
- *Speakers to present their achievements related to Test & Evaluation of defence systems*
- *DRDO Chairman calls for embracing developments in Range Technology to meet future challenges in Test & Evaluation*

The 2nd Institute of Electrical and Electronics Engineers (IEEE) International Conference on Range Technology (ICORT-2021) is being held virtually on August 05, 2021. The conference has been organised by Integrated Test Range (ITR) Chandipur, a laboratory of Defence Research and Development Organisation (DRDO). It was inaugurated by Secretary, Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy. The event will host speakers from across the globe, who will present their technological achievements in multiple subjects related to Test and Evaluation of defence systems.

In his address, Dr G Satheesh Reddy highlighted the importance of embracing recent developments in Range Technology to meet the future challenges in Test and Evaluation. He emphasised on the importance of the conference in exploring current trends in Range Technology and Range Instrumentation, which are essential elements of a world class Test Range. The DRDO Chairman lauded the effort of ITR for organising an event of such scale amidst restrictions due to COVID-19 pandemic.

The conference will be a very effective platform for all the Range Technology enthusiasts to interact with each other and stay updated with recent developments in relevant fields. More than 250 technical articles were submitted by experts on the relevant subjects, out of which 122 articles have been selected by a specialised technical committee. The technical presentation will be done in four parallel sessions during August 05-06, 2021. A virtual industrial exhibition is also being held in which more than 25 industries and organisations from India and abroad will display their products and technologies.

The inaugural function of the conference was organised online with dignitaries joining over video conference from different locations. Former Scientific Advisor to Raksha Mantri Dr Avinash Chander was the Chief Guest on the occasion. The inaugural function was also attended by Director General (Missiles & Strategic Systems) Dr BHVS Narayanmurthy; ex-DG, DRDO Shri MSR Prasad; Director ITR Chandipur Shri HK Ratha along with other delegates and participants. The ICORT held biennially was first organised by ITR in 2019.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1742740>



रेंज टेक्नोलॉजी पर दूसरा आईईईई अंतर्राष्ट्रीय सम्मेलन

- डीआरडीओ ने वर्चुअल रूप से सम्मेलन आयोजित किया
- वक्ता रक्षा प्रणालियों के परीक्षण और मूल्यांकन से संबंधित उपलब्धियों को प्रस्तुत करेंगे
- डीआरडीओ के अध्यक्ष ने परीक्षण और मूल्यांकन में भविष्य की चुनौतियों का सामना करने के लिए रेंज टेक्नोलॉजी में हुए विकास को अपनाने का आह्वान किया

रेंज टेक्नोलॉजी पर दूसरा इंस्टीट्यूट ऑफ इलेक्ट्रिकल एंड इलेक्ट्रॉनिक्स इंजीनियर्स (आईईईई) अंतरराष्ट्रीय सम्मेलन (आईसीओआरटी-2021) वर्चुअल रूप से 05 अगस्त, 2021 को आयोजित किया जा रहा है। सम्मेलन का आयोजन रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के तहत चांदीपुर में एकीकृत परीक्षण रेंज प्रयोगशाला द्वारा किया जा रहा है। इसका उद्घाटन रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ. जी सतीश रेड्डी ने किया। यह आयोजन दुनिया भर के वक्ताओं की मेजबानी करेगा जो रक्षा प्रणालियों के परीक्षण और मूल्यांकन से संबंधित कई विषयों में अपनी तकनीकी उपलब्धियों को प्रस्तुत करेंगे।

अपने संबोधन में डॉ. जी सतीश रेड्डी ने परीक्षण और मूल्यांकन में भविष्य की चुनौतियों का सामना करने के लिए रेंज टेक्नोलॉजी में हाल के विकास को अपनाने के महत्व पर प्रकाश डाला। उन्होंने रेंज टेक्नोलॉजी और रेंज इंस्ट्रुमेंटेशन, जो विश्व स्तरीय टेस्ट रेंज के आवश्यक तत्व हैं, में मौजूदा ट्रेंड्स की खोज करने में इस सम्मेलन के महत्व पर जोर दिया। डीआरडीओ के अध्यक्ष ने कोविड-19 महामारी के कारण प्रतिबंधों के बीच इस तरह के आयोजन के लिए आईटीआर के प्रयास की सराहना की।

सम्मेलन रेंज प्रौद्योगिकी में रुचि रखने वाले सभी लोगों के लिए विचारों का आदान-प्रदान करने और क्षेत्र में नवीनतम विकास पर जानकारी प्रसारित करने के लिए एक मंच प्रदान करेगा। विशेषज्ञों द्वारा प्रौद्योगिकी पर 250 से अधिक लेख प्रस्तुत किए गए हैं, जिनमें से 122 लेखों का चयन एक विशेष विशेषज्ञ समिति द्वारा किया गया है। तकनीकी प्रस्तुति 5 - 6 अगस्त, 2021 के दौरान चार समानांतर सत्रों में की जाएगी। इसके अलावा, एक वर्चुअल औद्योगिक प्रदर्शनी का आयोजन किया गया है जिसमें 25 से अधिक भारतीय के साथ-साथ विदेशी उद्योग और संगठन अपने उत्पादों और प्रौद्योगिकियों को प्रस्तुत कर रहे हैं।

सम्मेलन का उद्घाटन समारोह ऑनलाइन आयोजित किया गया था जिसमें विभिन्न स्थानों से वीडियो कॉन्फ्रेंस में गणमान्य व्यक्ति शामिल हुए थे। इस अवसर पर रक्षा मंत्री के पूर्व वैज्ञानिक सलाहकार डॉ. अविनाश चंदर मुख्य अतिथि थे। उद्घाटन समारोह में अन्य प्रतिनिधियों और प्रतिभागियों के साथ महानिदेशक (मिसाइल एवं सामरिक प्रणाली) डॉ. बीएचवीएस नारायणमूर्ति, पूर्व महानिदेशक, डीआरडीओ श्री एमएसआर प्रसाद, निदेशक आईटीआर चांदीपुर श्री एच के रथ शामिल हुए। द्विवार्षिक रूप से आयोजित इस अंतरराष्ट्रीय सम्मेलन का आयोजन पहली बार 2019 में आईटीआर द्वारा किया गया था।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1742893>

Need to explore current trends in range technology & range instrumentation: DRDO Chairman

Dr Reddy, who is also the Secretary, Department of Defence R&D said this on Thursday while inaugurating the 2nd Institute of Electrical and Electronics Engineers (IEEE) International Conference on Range Technology (ICORT-2021) being held virtually

DRDO Chairman Dr G Satheesh Reddy has said that there is a need to explore the current trends in range technology and range instrumentation, which are essential elements of a world class test range.

Dr Reddy, who is also the Secretary, Department of Defence R&D said this on Thursday while inaugurating the 2nd Institute of Electrical and Electronics Engineers (IEEE) International Conference on Range Technology (ICORT-2021) being held virtually.

The conference is being organised by Integrated Test Range (ITR) Chandipur, a laboratory of DRDO.

"The event will host speakers from across the globe, who will present their technological achievements in multiple subjects related to test and evaluation of defence systems," said a spokesman.

In his address, the Defence Research Development Organisation (DRDO) Chairman highlighted the importance of embracing recent developments in range technology to meet the future challenges in test and evaluation. He emphasised on the importance of the conference in exploring current trends in range technology and range instrumentation, which are essential elements of a world class test range.

Reddy lauded the effort of ITR for organising an event of such scale amidst restrictions due to COVID-19 pandemic. The conference will be a very effective platform for all range technology enthusiasts to interact with each other and stay updated with recent developments in relevant fields.

More than 250 technical articles were submitted by experts on the relevant subjects, of which 122 articles have been selected by a specialised technical committee.

A virtual industrial exhibition is also being held in which more than 25 industries and organisations from India and abroad will display their products and technologies.

The inaugural function of the conference was organised online with dignitaries joining over video conference from different locations.

Former Scientific Advisor to Defense Minister Dr Avinash Chander was the Chief Guest on the occasion. The inaugural function was also attended by Director General (Missiles & Strategic Systems) Dr BHVS Narayanmurthy; ex-DG, DRDO MSR Prasad; Director ITR Chandipur HK Ratha along with other delegates and participants.

<https://www.moneycontrol.com/news/trends/current-affairs-trends/need-to-explore-current-trends-in-range-technology-range-instrumentation-drdo-chairman-7286751.html>

GRSE AI Project qualifies for Technology Development Fund scheme of DRDO

QA Department, GRSE held a virtual techno-financial discussion on a feasibility study of two projects in the presence of representatives from DRDO Service Head Quarters, Industrialists and Academicians

New Delhi: Garden Reach Shipbuilders & Engineers Limited (GRSE) AI Project Qualifies for Technology Development Fund Scheme of DRDO. QA Department, GRSE held a virtual techno-financial discussion on a feasibility study of two projects (Steel Plate Tracking by QR Code & AI Enabled NDT) in the presence of representatives from DRDO Service Head Quarters, Industrialists and Academicians.

Further, it has qualified in the technical round of the TDF scheme of DRDO under the category of below Rs 1 Crore for indigenous development towards Aatma Nirbhar Bharat.

Garden Reach Shipbuilders & Engineers Ltd is the premier Warship building Company in India, under the administrative control of the Ministry of Defence. There is a team of highly skilled design engineers and state of art VR Lab & latest software cater to the in-house design capabilities.

<https://www.psuconnect.in/news/grse-ai-project-qualifies-for-technology-development-fund-scheme-of-drdo/28867>



‘Game of drones’ – Is India ready for next-gen battle as drones, UAVs take-over conventional weapons?

By Nitin J Ticku

The recent drone attack at the Indian Air Force (IAF) station in Jammu and Kashmir has posed a new security challenge for India, which has been observing a ceasefire along its border with Pakistan in Kashmir.

On June 27, 2021, two low-intensity improvised explosive devices (IEDs) were dropped by a drone at the IAF station at Jammu, an important base for helicopters operating along the Western Front and in the Himalayas. The Jammu and Kashmir police called this a terror attack and launched a probe.

Within 24 hours of the attack on the Jammu IAF base, two similar devices were spotted hovering over the Ratnuchak-Kaluchak military area in the region, prompting soldiers to open fire at them.

These incidents have prompted India to acquire counter-drone systems even as IAF sought responses from vendors about their equipment.

The security agencies in India had anticipated the possible use of drones to target sensitive locations. Drones have been used in the past to drop weapons and drugs along the Punjab region of the India-Pakistan border.

In the past year, drones have been spotted over the India-Pakistan border many times. In June 2020, a Pakistani drone, loaded with a rifle and seven grenades, was shot down by the Border Security Force (BSF) in the Kathua district of Jammu and Kashmir.

Drones were also spotted at three different locations in Jammu namely — Kunjwani, Sunjwan and Kaluchak areas on June 29 this year. Similar incidents have also occurred at Miran Sahib areas of Jammu.

Lull before The Storm?

India and Pakistan have been observing a ceasefire along the Line of Control (LoC), their de facto border in Kashmir, since February 25, 2021. However, India recently stated that there were 664 incidents of ceasefire violation and cross-border firing by the Pakistani side in Jammu and Kashmir by Pakistan till June 2021.

The original ceasefire agreement was reached four years after the Kargil War in 2003.

Minister of State For Home Nityanand Raid said in Parliament that a maximum of 380 incidents were reported in January this year followed by 278 in February, one in April, three in May, and two in June.

The United Arab Emirates played a crucial role in facilitating the February 2021 talks between India and Pakistan. They wanted to reduce the tension over the Kashmir issue and bring bilateral relations between the South Asian neighbors to a peaceful level.

The Jammu drone attack indicates that non-state actors are quickly adopting a new tactic to launch offensives against Indian armed forces, security personnel, or vital installations, which could disturb the peace and stability in the India-administered Kashmir.



A DRDO-developed directed energy weapon. (via Twitter)

Measures and strategies to counter future drone attacks were discussed in a high-level meeting chaired by Prime Minister Narendra Modi on June 29, 2021. The meeting was also attended by Defence Minister Rajnath Singh, Union Home Minister Amit Shah, and National Security Advisor Ajit Doval, among others.

India's Counter-Drone Systems

The Chief of India's Defence Research and Development Organisation (DRDO), G Satheesh Reddy, suggested during the meeting that the counter-drone technology developed by the agency can provide Indian armed forces with the capability to quickly detect and destroy drones causing a security threat.

According to Reddy, DRDO's anti-drone system can provide both "soft kill" and "hard kill" options to the military to tackle the fast-emerging aerial threats.

"Soft kill" refers to mere jamming of hostile drones and "hard kill" involves a laser-based destruction method.

The mechanism developed by the DRDO comprises a radar system that offers 360-degree coverage with detection of micro-drones that are 4 km away. The Electro-optical/infrared (EO/IR) sensors can detect drones up to 2 km away. A radio frequency (RF) detector can detect RF communications up to 3 km away.

The research and development agency of the military, DRDO, has demonstrated these counter-drone technologies to various security agencies in the past.

Hindustan Times reports that the technology has been transferred to Bharat Electronics Limited (BEL) for the production of the anti-drone system. Another report by The NDTV suggested that the IAF will act as the apex authority for such technology.

Earlier this week, Indian companies submitted their proposals to supply 10 sophisticated "counter unmanned aerial systems" to Indian Air Force. The formal acquisition will start later this year.

According to Col. Ajai Shukla (retired), a military analyst, the firms which are in the fray include state-owned Bharat Electronics Ltd, the Adani Group, reportedly with an Israeli partner, Elbit Systems, Zen Technologies, and three Indian start-ups — Big Bang Boom Solutions (BBBS), Gurutvaa Systems, and iSenses.

As reported earlier by The EurAsian Times, there is a possibility of India acquiring the Israeli ELI-4030 Drone Guard System.

Israel Aerospace Industries (IAI) announced that it sold its ELI-4030 Drone Guard counter-unmanned aircraft system (C-UAS) to an undisclosed South Asian nation, fuelling speculation about India procuring the system.

Agencies including the military and the Border Security Force (BSF) have done a preliminary evaluation of at least six-to-seven indigenous C-UAS solutions.

The C-UAS systems are meant to counter the increasing threat from technologically easy, inexpensive, commercially available drones that can cause damage to Indian facilities.

The Ministry of Defence (MoD) has requested Indian start-ups to develop C-UAS systems through its "Innovations for Defence Excellence" (iDEX) program.

The iDEX program describes an operational challenge the military is facing, that will allow the Indian companies to provide solutions to overcome these problems.

In addition, India has decided to create an airspace map to manage non-military UAS, probably to thwart terror attack threats. India's Ministry of Civil Aviation Ministry has issued Draft Drone Rules 2021 for public consultation, after which the guidelines will be finalized. However, these rules will not apply to UAVs used by the Indian armed forces.

<https://eurasianimes.com/game-of-drones-is-india-ready-for-next-gen-battle-as-drones-uavs-take-over-conventional-weapons/>

India needs to become drone-conscious to counter aerial cross-border threats

By Col. Anil Bhat (Retd)

Terrorism exported by Pakistan's military to Jammu and Kashmir (J&K) did not end with the abrogation of Article 370 – which had given limited autonomy to the then state – of the Indian constitution by the Modi government on August 5, 2019. But the decisive step had its effect as the wide and intricate network of pro-Pakistan separatists got disrupted owing to arrests and detentions.

Frustrated but desperate, the Pakistan Army as also the country's notorious intelligence agency, Inter-Services Intelligence (ISI), continued to pump in terrorists, but the Indian Army and security forces either killed or arrested most of them. It was then that Pakistan began using drones for reconnaissance and dropping drugs.



According to government figures reported in the media, there were 167 drone sightings recorded along the India-Pakistan border in 2019, and 77 in 2020. Some of these were also used for dropping/landing weapons for Pakistani/Pak-supported Kashmiri terrorists already present in J&K, or those sent after the abrogation of Article 370. One 6-rotor drone carrying weapons from Pakistan was destroyed by the Border Security Force in June 2020.

However, for the first time in over three decades of Pakistan-sponsored terrorism in J&K, an attack was launched by using a weaponized drone, which entered the Jammu Indian Air Force (IAF) Base at about 1 AM on June 27, 2021. In quick succession, it dropped an improvised explosive device (IED) which reportedly penetrated the roof of a building and then another which exploded in the open injuring two IAF personnel. This was the second attack on the Jammu IAF Base in five years.

On June 28, a day after the Jammu IAF Base attack, fresh attempts to target the Ratnuchak-Kaluchak military station in Jammu with drones were thwarted by the Army. For the fourth day in succession, drones were reportedly spotted hovering at three different places near Jammu – Miran Sahib, Kaluchak and Kunjwani.

Pakistan-China nexus

The National Investigation Agency (NIA) – central counter-terrorism law enforcement agency – began investigating the case on June 29. Media reports have cited unnamed sources to report that the drones used by Pakistan-based perpetrators may be Chinese military-grade ones fitted with night vision and navigation aids. Media reports of July 12, 2021 say the investigation has revealed that the technique of a pressure fuse used in the bombs indicates the Pakistan army and/or ISI supported the Lashkar-e-Taiba in fabricating the IEDs.

Not only was the use of a weaponized drone on the Jammu IAF base an act of war but a violation of the ceasefire agreement concluded by DGs, military operations, of India and Pakistan, effective from midnight, 24-25 February 2021.

In a bizarre twist, Pakistan countered by accusing India's intelligence agency RAW of engineering the June 23 bomb attack near the residence of proscribed Jamaatud Dawa chief Hafiz Saeed in Lahore's Johar Town area that killed three people and injured 24 others. And as they proceed with more violations of the cease-fire/ more attacks against India, they will keep lying

about more attacks by RAW against Pakistan. This devious game only confirms that the Pakistani military/intelligence establishment is allergic to ceasefires, or feels too insecure about them lasting too long.

India can keep signing peace treaties/agreements, but it must also remember that no treaty so far since Independence has been honored by Pakistan. Every peace agreement signed by Pakistan with India has been violated by Islamabad. And the same will be the fate of the latest February agreement, the only difference being Pakistan's use of drones, which are safe for attackers, easily deniable by perpetrators, and difficult to detect by radar.

India's counter-strategy

Now comes the obvious question – what has India done to counter enemy drones?

Reportedly, counter-drone technology developed by the Defense Research and Development Organization (DRDO) can swiftly detect and disable or even destroy drones that pose a security threat to the country.

ThePrint, carrying an ANI report on July 2, 2021, quoted Dr. Jillelamudi Manjula, Director-General- Electronics and Communication Systems (ECS), DRDO, as stating that the D-4 drone system could detect close-range attacks like the one in Jammu on June 27.

“D-4 drone system would've detected attack (in Jammu) as its range is over 4 kilometers. The system aims to detect rogue drones that are likely to attack the most vulnerable places. The system has got multiple sensors and two different counterattacks to destroy the rogue drones,” she said. For Independence Day, 2020 celebrations at the Red Fort, New Delhi, DRDO reportedly deployed this device to counter the threat of drones/unmanned aerial vehicles.

The Indian Navy was the first to order in December 2021, Smart Shooter's SMASH 2000 Plus fire control systems, to be installed mainly on AK-47 and AK 203 rifles. SMASH is a kind of electro-optic sight system.

The Print quoted Michal Mor, the company's CEO as saying, “SMASH 2000 Plus provides an inimitable hard-kill solution against the growing threats of drones, and delivers proven ability to hit any ground or airborne targets and eliminate the threat quickly and effectively... We will be happy to keep offering the Indian Military diverse cutting-edge solutions for protection against ground and aerial threats at land, air, and sea.”

On July 6 it was reported that IAF has ordered ten counter-drone systems. Hopefully, steps that should be taken may have been taken. And the fact which has to be faced and factored in is that now, not only the Indian armed forces but also police, intelligence, and many other security-related as well as civil agencies/organizations need to become drone-conscious and be equipped accordingly to counteract the emerging threat.

This is because the Chinese Communist Party-Peoples Liberation Army combo, quite frustrated about their failed 2020 aggression, is in overdrive to cause whatever damage it can in whichever way possible to India. This involves espionage, sabotage, psychological warfare/propaganda, bio-war, cyber-war, creating crises and dissent by motivating/bribing ever-ready leftists and frustrated opposition leaders as also other gullible people, and not to forget, making good use of drones themselves and also through Pakistan.

(The writer is a strategic analyst and former spokesperson, Ministry of Defense and Indian Army.) South Asia Monitor

<https://www.indiapost.com/india-needs-to-become-drone-conscious-to-counter-aerial-cross-border-threats/>

With 3rd wave looming, Ludhiana gets 10 new O2 plants

With the spectre of a third wave looming large and haunting images of patients gasping for rapidly running out oxygen still fresh in memory, the district administration is doing its best to get ahead of another potential Covid crisis, while the cases are still in control

By Aneesha Sareen Kumar

With the spectre of a third wave looming large and haunting images of patients gasping for rapidly running out oxygen still fresh in memory, the district administration is doing its best to get ahead of another potential Covid crisis, while the cases are still in control.

Thanks to the concerted efforts of industries, district authorities and non-governmental organisations, hospitals and health centres across Ludhiana have received 10 new oxygen plants, which will boost the medical health infrastructure of the state.

An oxygen plant with a capacity of 1,000 LPM (litres per minute) is being installed at the ESI Hospital and will cost ₹1.7 crore. This oxygen plant, which is nearing completion, has been funded by HITES (HLL Infra Tech Services Ltd) under the ministry of health and family welfare.



An oxygen plant with a capacity of 1,000 LPM (litres per minute) is being installed at the ESI Hospital and will cost ₹1.7 crore. This oxygen plant, which is nearing completion, has been funded by HITES (HLL Infra Tech Services Ltd) under the ministry of health and family welfare (HT Photo)

A 1,000 LPM oxygen plant has been installed at the Ludhiana Civil Hospital by the Defence Research and Development Organisation (DRDO) under PM-Cares Fund in collaboration with the state government, while the state government has installed another 700-LPM capacity plant.

Ludhiana deputy commissioner Varinder Kumar Sharma said, “Now, hospitals will be able to generate on-site medical oxygen in a cost-effective manner rather than sourcing it from other places.

Raikot sub-divisional magistrate Himanshu Gupta, who is also the nodal officer for the project, said oxygen generation plants have been installed using medical oxygen plant (MOP) technology, which can produce a 93% concentration, that can be directly supplied to hospital beds or be used to fill medical oxygen cylinders. “All these 10 plants, which include six in Ludhiana city, have been set up in the last two months. There can be no question of oxygen shortage now in case of an emergency,” he said.

Private groups under their Corporate Social Responsibility (CSR) have also contributed oxygen plants. A plant of 250 LPM capacity, which cost ₹70 lakh, has been installed by Nabha Power at the Sub-Divisional Hospital (SDH), Raikot. At the Urban Health Centre, Jawaddi, the ADAMA group in collaboration with the Punjab government has also set up an oxygen generation plant of 165 LPM capacity that cost ₹65 lakh under the CSR initiative. At SDH, Khanna, ICICI bank in collaboration with the state has set up a plant of 300-LPM capacity, which cost 70 lakhs.

Similarly, ACT (an NGO) pitched in for an oxygen plant of 500 LPM capacity at Sant Baba Isher Singh Memorial Hospital, Rara Sahib, which cost ₹65 lakh. The NGO also donated a 500 LPM capacity plant at GTB Hospital, which cost ₹50 lakh.

At CMC Hospital, Ludhiana, an oxygen generation plant of 500 LPM capacity that cost ₹1.2 crore is being set up by the Confederation of Indian Industry (CII) and CMC Hospital. The project is expected to be completed by October this year. An oxygen plant of 500-LPM capacity has already been completed at Urban Health Centre, Vardhman.

“The deadly Covid surge has put enormous pressure on healthcare facilities in India. For those suffering from severe Covid symptoms, getting oxygen support well in time can save their lives,” said the deputy commissioner.

<https://www.hindustantimes.com/cities/chandigarh-news/with-3rd-wave-looming-ludhiana-gets-10-new-o2-plants-101628189395496.html>

अमर उजाला

Fri, 06 Aug 2021

जिला अस्पताल में ऑक्सीजन प्लांट लगाएगा डीआरडीओ

मुरादाबाद: कोरोना संक्रमण की संभावित तीसरी लहर में मरीजों को ऑक्सीजन की किल्लत से बचाने के लिए स्वास्थ्य विभाग तैयारियां कर रहा है। इसी के तहत जिला अस्पताल में ऑक्सीजन प्लांट लगवाने के लिए सीएमओ ने डीआरडीओ (रक्षा अन्वेषण एवं विकास संगठन) को पत्र लिखा है। उनका कहना है कि चार-पांच दिन में प्लांट आने की उम्मीद है।

दूसरी लहर में अस्पतालों में मरीजों को सबसे अधिक परेशानी बेड मिलने और ऑक्सीजन की व्यवस्था करने में हुई थी। ऑक्सीजन प्लांटों पर तीमारदार सिलिंडर लेकर खड़े रहते थे, फिर भी ऑक्सीजन की पूर्ति नहीं हो पाती थी। इन परेशानियों से बचाने के लिए मुरादाबाद जनपद में चार सीएचसी और जिला अस्पताल में ऑक्सीजन प्लांट लगवाया जा रहा है। डिलारी और ठाकुरद्वारा में प्लांट आ चुका है, जबकि जिला अस्पताल में फाउंडेशन का कार्य लगभग पूरा हो चुका है। मुख्य चिकित्सा अधीक्षक डॉ. एमसी गर्ग का कहना है कि एनएचआई ने बेस तैयार कर दिया है। दो-तीन दिन में वह प्लांट लगाने लायक स्थिति में आ जाएगा। जिला अस्पताल में एक हजार एलपीएम (लीटर प्रति मिनट) की क्षमता का ऑक्सीजन प्लांट लगवाया जा रहा है। प्लांट भेजने की जिम्मेदारी डीआरडीओ की है। उन्होंने बताया कि पीएम केयर फंड से लगाए जा रहे इस प्लांट का कार्य तीन चरणों में पूरा होना है। पहला चरण एनएचआई ने पूरा किया है, जबकि दूसरा चरण डीआरडीओ की जिम्मेदारी है। तीसरे चरण में पाइप लाइन बिछाने का कार्य किया जाना है। इस कार्य को पूर्ण करने की जिम्मेदारी आवास विकास परिषद की है। आवास विकास परिषद इसके लिए प्रस्ताव तैयार कर रहा है। एमसीएच विंग में पाइप लाइन पहले से है। अब महिला जिला अस्पताल की पाइप लाइन को जोड़ने का कार्य और जिला अस्पताल में पाइप लाइन बिछाने का कार्य होना है।

<https://www.amarujala.com/uttar-pradesh/moradabad/drdo-to-set-up-oxygen-plant-in-district-hospital-city-news-mbd3982864197>

THE TIMES OF INDIA

Fri, 06 Aug 2021

Bharat Dynamics Limited to set up unit in UP's Jhansi

Hyderabad: Bharat Dynamics Limited (BDL) and Uttar Pradesh Expressways Industrial Development Authority (UPEIDA), Uttar Pradesh have signed a Memorandum of Understanding (MoU) for setting up a unit in the UP Defence Corridor.

BDL, a mini-ratna Category-1 Company, having its registered office at Hyderabad, will be setting up a manufacturing unit in Jhansi, as a part of its diversification and expansion plan. BDL is the only Defence Public Sector Company in the country manufacturing missiles and underwater weapons for the armed forces.

The MoU was signed in the presence of UP CM Yogi Adityanath and CMD, BDL Commodore Siddharth Mishra, by N P Diwakar, Director (Technical), BDL and Shri Awanish Kumar Awasthi, IAS, Chief Executive Officer, UPEIDA in Lucknow on Thursday. Shirish Chandra Verma, ACEO, UPEIDA, Col Kuldeep Singh Tyagi (Retd), Senior Advisor (Defence), UPEIDA and Commodore T N Kaul (Retd), Executive Director (Marketing), BDL were present.



The MoU was signed in the presence of UP CM Yogi Adityanath and CMD, BDL Commodore Siddharth Mishra.

As per the MoU, BDL will acquire 215 acres of land in Jhansi under a lease agreement for an initial period of 30 years, which will be extendable up to 90 years.

Commodore Siddharth Mishra (Retd), CMD, BDL on this occasion stated that a new facility will be set up at this location to manufacture a propulsion system which will be used for various types of missiles manufactured by the Company. He said this was an important step towards the backward integration plan being implemented to further strengthen the capability to deliver world class weapon systems to the customers. He said BDL was planning to commence operations at this facility by 2023, which would create employment opportunities in the area. It is expected that MSMEs as ancillary units will also be established, once BDL unit is set up.

BDL, as per its expansion plan, is setting up units in various parts of the country. Presently, BDL has three manufacturing units, out of which two are located in Telangana State and one in Andhra Pradesh. Further, BDL is in the process of setting up manufacturing facilities at Amravati in Maharashtra and Ibrahimpatnam in Telangana. The upcoming facility at Jhansi will be the sixth one and the first in northern India.

Keeping pace with the current trends in the global defence industry, BDL is investing in acquiring futuristic technologies in the field of missiles, underwater weapons and airborne products to meet the requirements of the Indian Armed Forces. In pursuit of this, the Company is collaborating with leading major foreign Original Equipment Manufacturers like Naval Group,

France, Rafael Advanced Defence System Ltd Israel, Thales, UK, STE "SPETSTECHNOEXPORT", Ukraine, MBDA, France/UK for various missile and underwater weapon programmes, BDL said.

The new initiatives of the Government of India of being 'Vocal for Local' and 'Make in India, Made for the World' have opened up a lot of opportunities for the Indian defence industries like BDL. The 'ease of doing business' ecosystem has simplified export authorizations and the thrust for export is helping industries to expand their footprints in the global market. The Company has already exported Light Weight Torpedoes and is poised to export other products in its portfolio like the Akash Surface to Air missile, Counter Measure Systems and Anti-Tank Guided Missiles.

BDL plans to establish a facility in the UP Corridor for testing requirements under 'Defence Testing Infrastructure Scheme' of Ministry of Defence, Government of India. BDL said it was increasing its in-house R & D activities complementing the development programmes of DRDO to expand its product range and mitigate dependence on foreign companies for imports. The Company has also started undertaking development of Artificial Intelligence based products to offer latest weapons to the Indian Armed Forces, it said.

<https://timesofindia.indiatimes.com/city/hyderabad/bharat-dynamics-limited-to-set-up-unit-in-jhansi/articleshow/85076693.cms>

ThePrint

Fri, 06 Aug 2021

Heron, Searcher, Sea Guardian, SWITCH — the many UAVs that make up India's drone arsenal

UAVs are not just meant for long range surveillance but also for carrying out precision strikes.

ThePrint gives you a roundup of the various drones in India's unmanned aerial squadrons

By Raghav Bikhchandani, Edited by Neha Mahajan

New Delhi: India is currently pursuing multiple Unmanned Aerial Vehicles (UAVs) or drones programme in an attempt to arm its three services — Army, Navy and the Air Force — with weapons that would play a critical role in future wars.

These UAVs are not just meant for long range surveillance but also for carrying out precision strikes from standoff distances and for Kamikaze operations.

Among the several drone programmes that the Indian military is pursuing, one of them is Project Cheetah.

Project Cheetah, which is divided into two separate programmes, aims to upgrade and arm India's Heron drones, with the assistance of Israel, the manufacturer.

As reported by ThePrint earlier this week, the Indian Air Force (IAF) has "completed cost negotiations" and the project has "entered final stages of decision making".

Another programme that India is pursuing is the procurement of 30 MQ-9 Reaper or Predator B drones, which will be a tri-service initiative. ThePrint takes a look at the various UAVs that are part of India's unmanned aerial squadrons and possible future acquisitions.

Heron

Developed by the Israel Aerospace Industries (IAI), the Heron, also known as Machatz-1, is a Medium Altitude Long Endurance (MALE) UAV.



In November 2005, India had reportedly signed a \$220 million (approximately Rs 1,630 crore) deal with IAI to procure 50 Herons. According to Defense Industry Daily, the deal was said to have been near completion in 2004, but was postponed due to Lok Sabha elections that year.

The Daily also said that India had previously used 12 Heron-1 UAVs in its search and rescue operations following the December 2004 tsunami, and their performance in those operations played a part in sealing the deal for India and IAI.

In 2006 and 2011, the Indian Navy ordered Heron UAVs for squadrons set up in Kochi and Gujarat respectively.

In all, there are about 90 Herons in service with the country.

Heron II

One big lacuna in the Herons in use with India is that they are not equipped for satellite navigation, which helps in better range and wider coverage.

Following tensions at the Line of Actual Control (LAC) with China since May last year, the Army ordered on lease four latest generation of Herons, known as the Heron II.

While initially it was believed that the Army was leasing Heron TP, a variant of the Heron, sources in the defence and security establishment confirmed it was actually Heron II.

The Heron TP is 14-metre long with a wingspan of 26 metres and endurance of up to 30 hours, while its beyond line-of-sight range and altitude capabilities are the same as the Heron.

The Israelis also offered Heron TP to India for possible procurement.

Searcher

Also developed by IAI, the Searcher was first deployed in 1992, but it was the Searcher Mk II, introduced in 1998, that India procured after 2000.

Described by Israeli Weapons, an online database on the history, development and usage of arms by the Israeli Defence Forces and companies, as a “multi mission tactical UAV system”, the Searcher Mk II is 5.85-metre long with a wingspan of 8.55 metres, and endurance of up to 18 hours. Its range is listed as 300 km while altitude capabilities are at 20,000 feet.

In 2002, the IAF’s use of the Searcher Mk II caught the eye of Pakistani media when the Pakistani Air Force reportedly shot down an Indian UAV near Kasur, along the Line of Control (LoC).

Alongside the Heron UAVs, the Indian Navy also uses Searcher Mk II. However, currently, the biggest user of the Searcher is the Army.

Sea Guardian

Developed by the American firm General Atomics Aeronautical Systems (GA-ASI), the MQ-9B Sea Guardian is a variant of the MQ-9 Predator B, which is described by the United States Air Force as a “remotely piloted aircraft” instead of the widely-used UAV.

Unlike the Heron, the Sea Guardian comes under the High Altitude Long Endurance (HALE) UAVs. It is 11.7-metre long with a wingspan of 24 metres and a maximum endurance of 40 hours. Its range is listed as over 5,500 nautical miles, or over 10,000 km, while altitude capabilities are at 40,000 feet.

Indian Navy inducted two Sea Guardian drones on lease last year in order to expand on surveillance activities over the Indian Ocean Region.

SWITCH UAV

Developed by Navi Mumbai-based firm ideaForge Technology, the SWITCH UAV is termed as a “first of its kind” Vertical Take-Off and Landing (VTOL) aircraft and fixed wing hybrid UAV.

In January this year, the Army awarded a \$20 million deal (approximately Rs 148 crore) to ideaForge, for an undisclosed number of the advanced version of SWITCH tactical drones.

These specialised systems are made to operate in high altitude areas like Ladakh, for use by infantry soldiers and special forces.

While the Army ordered an upgraded version, the standard man portable SWITCH weighs 6.5 kg and is capable of vertical take-off, conventional flight with an endurance of two hours.

It can carry out surveillance up to 15 km from altitudes of 4,000 metres. It has a maximum operating altitude of 1,000 metres and has a wind resistance up to 10.8 knots or 20 km per hour.

Quadcopters

The infantry battalions of the Army use multiple varieties of quadcopters.

These drones are manufactured by the Defence Research and Development Organisation (DRDO) and also by private firms.

These drones are used for tactical surveillance by soldiers during anti-terrorism operations and patrolling for a much deeper situation awareness.

Costing no more than a few thousand rupees, these kind of drones are extensively used by the forces along the LoC and in Jammu and Kashmir.

Harpy and Harop

The IAF uses two kinds of kamikaze drones — Harpy and the upgraded Harops — both procured from Israel.

The Harpy is an all-weather day/night ‘Fire and Forget’ autonomous weapon system that is used to take out enemy radars and, hence, disables their air defence systems. It can also be used to take out other targets as well.

This is launched from a ground vehicle behind the battle zone.

It has a communication range of 200 km and an endurance of nine hours precision of less than 1 metre with a 16kg warhead.

The Harop is a loitering missile (LM) which serves as an Electro-Optically guided attack weapon.

The Harop can be used for taking out a number of targets, including moving vehicles.

<https://theprint.in/defence/heron-searcher-sea-guardian-switch-the-many-uavs-that-make-up-indias-drone-arsenal/709670/>

India's indigenous aircraft carrier setting sail for sea trials is a historic moment

This is a historic moment for the Indian Navy, which has long had aircraft carriers but until now, none built at home. The brand new INS Vikrant is said to be "75 per cent" indigenous, and as such, it is the first big ticket example of atmanirbhar India

With INS Vikrant embarking on its first sea trials, India can rightfully take its place in an elite club of six countries — US, UK, Spain, Russia, France, China — that have the capability and capacity to design and build an indigenous aircraft carrier. This is a historic moment for the Indian Navy, which has long had aircraft carriers but until now, none built at home. The first INS Vikrant, inducted in 1961, and INS Viraat which joined the Indian Navy in 1982, were British naval ships, and the INS Vikramaditya is a Russian aircraft carrier. The brand new INS Vikrant is said to be “75 per cent” indigenous, and as such, it is the first big ticket example of atmanirbhar India.



It will operate the Russian MiG-29K fighters and the Kamov 31 helicopters, as well as the soon to be acquired American MH-60R Seahawk helicopters.

Begun in 2009, Vikrant was to be commissioned by 2014, and has rolled out of the shipyard at a time of concurrence among strategic experts that in order to tackle China's expansionist tendencies on land at the Line of Actual Control, India needs to shed its sea blindness, and convey to its superpower neighbour that it not only means business on protecting its interests in the Indian Ocean, but is also willing to play further afield to recalibrate maritime equations. According to the Navy, the newly built warship will offer an “incomparable military instrument” for power projection over long distances. It will operate the Russian MiG-29K fighters and the Kamov 31 helicopters, as well as the soon to be acquired American MH-60R Seahawk helicopters.

Now that India has built an aircraft carrier, should the Navy make a second one, the planned Indigenous Aircraft Carrier 2, for which it has been seeking a go-ahead since 2015? In signing up to the Quad security grouping of four countries, each with its own China problem, India has in a sense already signalled a shifting of focus from land to sea. Strengthening the Navy should be the logical next step. The budget allocated to the Navy does not seem to suggest that this is the thinking in the top echelons of the military. Amidst all the talk of assertion at sea where Beijing might feel more threatened, another sobering reality check is that the People's Liberation Army Navy, which did not have an aircraft carrier until 2012, is rumoured to have almost finished building a second indigenous carrier. By comparison, India, which deployed the old INS Vikrant to good effect in the 1971 war against Pakistan, is an old hand at aircraft carriers. But going by how many years it took for the Vikrant to be completed, atmanirbharta takes long. A shorter delivery time may serve the purpose better.

<https://indianexpress.com/article/opinion/editorials/ins-vikrant-first-sea-trial-indigenous-aircraft-carrier-indian-navy-7440493/>

India pushes strategic interests in Indian Ocean island nations to counter China

Mauritius is one of India's key maritime neighbours in the Indian Ocean Region

By Pradip R Sagar

Earlier this week, a Qatar-based media outlet published an article claiming India is building a 3km-long airstrip and two large jetties designed for military purposes at the Mauritian island of Agalega. South Block, which houses the ministry of defence in New Delhi, is silent on the issue. However, some officials are maintaining that the construction project is only for the benefit of the islanders and that it is for non-military purpose. Mauritius Prime Minister Pravind Jugnauth has also categorically denied that the construction is for military purposes.



Indian strategists are keeping close watch on island nations like Mauritius, Maldives, Sri Lanka and Seychelles

In 2015, during Prime Minister Narendra Modi's visit to Mauritius, India signed an agreement for setting up and upgradation of infrastructure in the Agalega archipelago. The plan was to create an airstrip for landing bigger aircraft like Boeing 737-900 and Airbus 320. Setting up of communication systems, closer to the existing jetty was to identify any ship as friend or foe, was also planned. Aggressive presence of China's People's Liberation Army Navy (PLAN) and other Chinese commercial vessels in the Indian Ocean Region (IOR)--considered the backyard of the Indian Navy--poses a challenge for India's strategic interests. At a given time, PLAN has over a dozen of its warships in the IOR. And the Chinese research and fishing vessels are equally a threat to India's maritime interest in the region.

So, to counter Chinese influence growing in the region with a military base in Djibouti, Indian strategists, too, have kept close watch on island nations like Mauritius, Maldives, Sri Lanka and Seychelles. And deep defence ties will anyway benefit India at the time of crisis, as it is in New Delhi's strategic interests.

Mauritius is one of India's key maritime neighbours in the Indian Ocean Region and occupies a special place in Modi's vision of 'SAGAR' (Security and Growth for All in the Region). The island nation is also part of India's security grid including Coastal Surveillance Radar (CSR) station of Indian Navy's National Command Control Communication Intelligence network (NC3I Network). Information Management and Analysis Centre (IMAC), at Gurgaon is the nodal centre for NC3I Network, which was set up to provide coastal security and to avert tragic incidents like the 26/11 terror attack on Mumbai and to improve coastal surveillance. The NC3I network links 51 Naval and Coast Guard stations, located along the coast and on island territories. The network provides these stations coastal surveillance information obtained from various sensors such as the coastal radar chain of the Indian Coast Guard and automatic tracking systems as well as electro-optical cameras. The network rides on dedicated terrestrial data circuits, as well as, satellite communication, which help the stations in remote locations to be networked. "We do not want to be offensive but we must be strong enough to deter our enemies from casting an evil eye upon us", former defence minister Manohar Parrikar had once said.

Early this year, India extended a \$100-million Line of Credit to Mauritius to facilitate the procurement of Indian defence equipment. A defence official claimed that Agalega island is in close proximity with Seychelles and Maldives and the Diego Garcia military base of US to its east.

An agreement to provide a HAL-manufactured Dornier aircraft and an Advanced Light Helicopter Dhruv on lease to Mauritius on gratis basis for two years will boost their capabilities to patrol and monitor the extensive maritime domain more effectively. Interestingly, the Head of Mauritius Navy and the Mauritian National Security Advisor are Indian officers.

Similar to Mauritius, India went ahead with a deal to develop Assumption Island in Seychelles for military use, as both nations share close defence ties. Seychelles is of strategic importance to India as it lies close to global lanes of shipping and commerce and is an important base in the fight against seaborne terrorism and piracy in the Indian Ocean Region. In June 1986, under Operation Flowers are Blooming, the Indian Navy deployed its INS Vindhyagiri at the Seychelles Port of Victoria to abort an attempted coup against President Rene by Defence Minister Berlouis.

Besides monetary support to Seychelles, India also provided Dornier 228s and Chetak helicopters for their defence needs. India also deployed its military officers in Seychelles to train their armed forces.

Maldives is also another island, in which India has very strong interest. New Delhi extended a \$50-million line of credit to the Maldives for defence projects along with an agreement to develop and maintain a key naval facility for the armed forces of the Indian Ocean archipelago. India shares strong maritime cooperation with Maldives, and in the past, New Delhi has provided patrol vessels and maritime surveillance aircraft to bolster Maldives National Defence Force's (MNDF) capabilities. India is also making efforts to elbow China's growing presence in Maldives as erstwhile government of Abdullah Yameen had leased out an island to China.

India's strategic ties with Sri Lanka is deep, and India's role in the civil war in Sri Lanka proves it. And, China's role in the development of the Hambantota port in Sri Lanka and now coming out with a port city in Colomobo, close to Indian waters have irked the New Delhi. Moreover, the growing transfer of arms and cooperation between Beijing and Colombo is a matter of concern for India, especially after Sri Lanka allowed two Chinese submarines and a warship to dock at its port in Colombo in 2014. Since, then India has been making efforts to enhance defence cooperation with the island nation. India and Sri Lanka have deep defence cooperation, as India has named Sri Lanka as "Priority One" partner in the defence sphere. India is active in a number of areas of development activities in Sri Lanka. About one-sixth of the total development credit granted by India is made available to Sri Lanka.

"Its high time to invest more in these tiny islands, as they are strategically important for India. Our presence in these island nations not only gives us long legs, but also a way to keep a close eye on movement of aggressive Chinese military in the IOR," said a senior defence official.

<https://www.theweek.in/news/india/2021/08/05/india-pushes-indian-ocean-island-nations-counter-china-presence.html>

Ex-INDRA 21: Indian and Russian ground forces kick off counter terrorism drills

The mandate is to practice joint planning and enhancing interoperability between the armed forces of both sides not only in peacekeeping but also on dealing with terrorism at multinational level

By Huma Siddiqui

Ahead of the first ever Indo-Russian 2+2 Ministerial level talks and annual summit later this year, to further enhance Indo-Russian Defence Cooperation, the armies of both countries commenced joint training exercise INDRA 2021.

The fortnight long Ex-INDRA 2021 started on August 4, 2021 at Prudboy Ranges, Volgograd, Russia with the unfurling of the flags of both sides and an impressive ceremony.

Aim of the Exercise — Interoperability

According to the Indian Army the main aim is joint training between the two armies, and to plan and conduct counter-terror operations as per the mandate of the United Nations. Perception management, intelligence gathering and sharing as well as cordon & search operations as part of anti-terrorist operations.

And to share best practices between the forces of India and Russia. Also on the agenda of the drills is academic discussions between the expert groups of both contingents. Counter Drone Drills, Electronic Warfare, launching of Eleron 3 are part of the routine.

More about Ex-INDRA

It has been conducted since 2003 and it takes place alternately between the two countries and ground and naval forces participate.

The mandate is to practice joint planning and enhancing interoperability between the armed forces of both sides not only in peacekeeping but also on dealing with terrorism at multinational level. The two countries have been working towards further deepening the long-standing military relations and are identifying ways to “upgrade and intensify” the ties.

The 12th edition of Indo-Russia joint military exercise INDRA-21 has the Indian Army’s a mechanised infantry battalion and there will be 250 personnel from both sides.

There will be Russian Intelligence troops too, as well as 100 units of military hardware, which the two sides will use during the drills. The drills at the Unit level will be tasked to destroy mobile targets as well as mock enemy buildings.

China & Russia Exercise

Later this month there will be drills between the Russia and Chinese forces – operational-tactical exercise ZAPAD/Interaction-2021 in which there will be a participation of around 10,000 personnel. This exercise will take place in China and besides the personnel, there will be armoured vehicles, artillery as well as fighter aircraft.

According to reports, the troops from the Chinese PLA will be from Western Theatre Command and the Russian will send troops from Eastern Military District.

<https://www.financialexpress.com/defence/ex-indra-21-indian-and-russian-ground-forces-kick-off-counter-terrorism-drills/2305109/>



The fortnight long Ex-INDRA 2021 started on August 4, 2021 at Prudboy Ranges, Volgograd, Russia with the unfurling of the flags of both sides and an impressive ceremony. (Images provided by Indian Army)

ISRO to launch EOS 3 aboard GSLV Mk III in its first flight since Chandrayaan-2

With the mission, the agency will resume the country's space activities after a gap of over four months due to the second wave of the coronavirus disease (Covid-19) pandemic

By Anonna Dutt

The Indian Space Research Organisation (Isro) has confirmed that it will launch the earth observation satellite EOS-3 aboard its GSLV Mk III vehicle on August 12 at 5.43am from the country's only spaceport at Sriharikota. With the mission, the agency will resume the country's space activities after a gap of over four months due to the second wave of the coronavirus disease (Covid-19) pandemic.

"The launch is tentatively scheduled at 0543 hours IST on August 12, 2021, subject to weather conditions," the space agency said in a release.

This will be the second operational flight of GSLV Mk III after the Chandrayaan-2 mission when the launch vehicle "over-performed" placing the spacecraft in a higher orbit and saving fuel for upcoming manoeuvres.

This will be the first time that the vehicle's payload fairing, the nose of the rocket where the satellites are carried, will be a 4m ogive (bullet-like shape). The changes will make the vehicle more aerodynamic and the same payload fairing is likely to be used for the country's human spaceflight.

The EOS-3 satellite, also known as GISAT-1 as per previous nomenclature, is one of the two paired satellites, the other being GISAT—2 or EOS-5, that will be able to provide image of the Indian landmass every 30 minutes as a spatial resolution of 50 metres.

The space agency is targeting four launches over the next five months – all earth observation satellites. One of the four will be carried by the small satellite launch vehicle in its maiden flight. All big-ticket missions, such as the first uncrewed flight under Gaganyaan mission, Chandrayaan-3 mission, and India's first solar mission Aditya L1 have all been delayed due to the pandemic.

<https://www.hindustantimes.com/india-news/isro-to-launch-eos-3-aboard-gslv-mk-iii-in-its-first-flight-since-chandrayaan2-101628164073071.html>

Decades of research bring quantum dots to brink of widespread use

A new article in *Science* magazine gives an overview of almost three decades of research into colloidal quantum dots, assesses the technological progress for these nanometer-sized specs of semiconductor matter, and weighs the remaining challenges on the path to widespread commercialization for this promising technology with applications in everything from TVs to highly efficient sunlight collectors.

"Thirty years ago, these structures were just a subject of scientific curiosity studied by a small group of enthusiasts. Over the years, quantum dots have become industrial-grade materials exploited in a range of traditional and emerging technologies, some of which have already found their way into commercial markets," said Victor I. Klimov, a coauthor of the paper and leader of the team conducting quantum dot research at Los Alamos National Laboratory.

Many advances described in the *Science* article originated at Los Alamos, including the first demonstration of colloidal quantum dot lasing, the discovery of carrier multiplication, pioneering research into quantum dot light emitting diodes (LEDs) and luminescent solar concentrators, and recent studies of single-dot quantum emitters.

Using modern colloidal chemistry, the dimensions and internal structure of quantum dots can be manipulated with near-atomic precision, which allows for highly accurate control of their physical properties and thereby behaviors in practical devices.

A number of ongoing efforts on practical applications of colloidal quantum dots have exploited size-controlled tunability of their emission color and high-emission quantum yields near the ideal 100 percent limit. These properties are attractive for screen displays and lighting, the technologies where quantum dots are used as color converting phosphors. Due to their narrowband, spectrally tunable emission, quantum dots allow for improved color purity and more complete coverage of the entire color space compared to the existing phosphor materials. Some of these devices, such as quantum dot TVs, have already reached technological maturity and are available in commercial markets.

The next frontier is creating technologically viable LEDs, powered by electrically driven quantum dots. The *Science* review describes various approaches to implement these devices and discusses the existing challenges. Quantum LEDs have already reached impressive brightness and almost ideal efficiencies near the theoretically defined limits. Much of this progress has been driven by continuing advances in understanding the performance-limiting factors such as nonradiative Auger recombination.

The article also discusses the status and challenges of solution-processable quantum dot lasers.

"Making these lasers available would benefit a range of technologies, including integrated photonic circuits, optical communication, lab-on-a-chip platforms, wearable devices, and medical diagnostics," Klimov said.



The tiny specs of matter called quantum dots can be tuned to emit light in specific wavelengths. That's just one quality that makes them valuable in a range of technology applications. Credit: Los Alamos National Laboratory

Los Alamos researchers have contributed key advances in this area including the elucidation of mechanisms for light amplification in colloidal nanostructures and the first demonstration of a lasing effect using these materials.

"The primary current challenge is demonstrating lasing with electrical pumping," Klimov said. "Los Alamos has been responsible for several important milestones on the path to this objective including the realization of optical gain with electrical excitation and the development of dual-function devices that operate as an optically pumped laser and a standard electrically driven LED."

Quantum dots are also of great potential utility in solar harvesting and light sensing technologies. Due to their tunable bandgap, they can be engineered to target a particular range of wavelengths, which is especially attractive for realizing inexpensive photodetectors for the infrared spectral range. In the realm of solar energy technologies, colloidal quantum dots have been exploited as active elements of both solar cells and luminescent sunlight collectors.

In the case of photovoltaics (PV), the quantum dot approach could be used to realize a new generation of inexpensive, thin-film PV devices prepared by scalable solution-based techniques such as roll-by-roll processing. In addition, they could enable conceptionally new photoconversion schemes derived from physical processes unique to ultrasmall "quantum-confined" colloidal particles. One such process, carrier multiplication, generates multiple electron-hole pairs by a single absorbed photon. This process, first reported by Los Alamos researchers in 2004, has been the subject of intense research in the context of its applications in both PVs and solar photochemistry.

"Another highly promising area is quantum dot luminescent solar concentrators or LSCs," Klimov said. "Using the LSC approach, one can, in principle, convert standard windows or wall sidings into power generating devices. Along with roof-top solar modules, this could help supply an entire building with clean energy. While the LSC concept was introduced back in 1970s, it truly flourished only recently due to introduction of specially engineered quantum dots."

Los Alamos researchers have contributed many important advances to the LSC field including the development of practical approaches for tackling the problem of light self-absorption and developing high-efficiency bi-layer (tandem) devices. Several start-ups, including a Laboratory spin-off, UbiQD Inc., have been actively pursuing commercialization of a quantum dot LSC technology.

More information: F. Pelayo García de Arquer et al, Semiconductor quantum dots: Technological progress and future challenges, *Science* (2021). DOI: [10.1126/science.aaz8541](https://doi.org/10.1126/science.aaz8541)

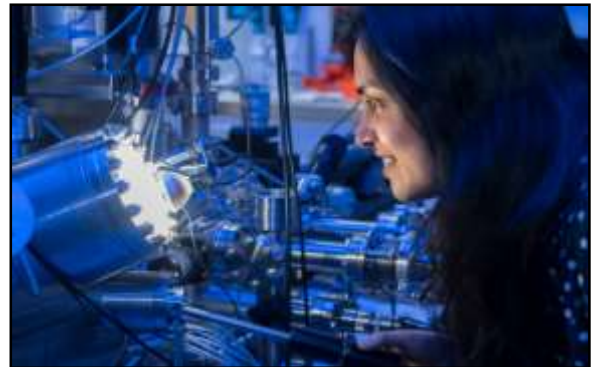
Journal information: [Science](https://phys.org/news/2021-08-decades-quantum-dots-brink-widespread.html)
<https://phys.org/news/2021-08-decades-quantum-dots-brink-widespread.html>

Joining topological insulators with magnetic materials for energy-efficient electronics

A new Monash review throws the spotlight on recent research in heterostructures of topological insulators and magnetic materials.

In such heterostructures, the interesting interplay of magnetism and topology can give rise to new phenomena such as quantum anomalous Hall insulators, axion insulators and skyrmions. All of these are promising building blocks for future low-power electronics.

Provided suitable candidate materials are found, there is a possibility to realize these exotic states at room temperature and without any magnetic field, hence aiding FLEET's search for future low-energy, beyond-CMOS electronics.



Lead author Dr Semonti Bhattacharyya. Credit: Monash University School of Physics and Astronomy

Finding the right mix of topology and magnetism

"Our aim was to investigate promising new methods of achieving the quantum Hall effect," says the new study's lead author, Dr. Semonti Bhattacharyya at Monash University.

The quantum Hall effect (QHE) is a topological phenomenon that allows high-speed electrons to flow at a material's edge, which is potentially useful for future low-energy electronics and spintronics.

"However, a severe bottleneck for this technology being useful is the fact that quantum Hall effect always requires high magnetic fields, which are not possible without either high energy use or cryogenic cooling."

"There's no point in developing 'low energy' electronics that consume more energy to make them work!" says Dr. Bhattacharyya, who is a Research Fellow at FLEET, seeking new generation of low-energy electronics.

However, a 'cocktail' of topological physics and magnetism can make it possible to achieve a similar effect, the quantum anomalous Hall effect, where similar edge states appear without applying external magnetic field.

Several strategies have been followed to induce magnetism in topological insulators:

1. by incorporating magnetic impurity,
2. by using intrinsically magnetic topological insulators
3. by inducing magnetism through a proximity effect in topological insulator–magnetic insulator heterostructures.

"In our review, we focussed on the recent scientific research into heterostructures on the third approach," says co-author Dr. Golrokh Akhgar (FLEET/Monash). Ie, a single structure incorporating thin-film layers of topological insulators and magnetic materials adjacent to each other, allowing the topological insulator to borrow magnetic properties from its neighbor.

This approach allows researchers to tune each type of material, for example increasing the critical temperature for the magnetic material, and increasing the band gap, and decreasing the defect states, in topological materials.

"We think this approach for inducing magnetism in topological insulators is the most promising for future breakthroughs, because the magnetism and topology can be individually tuned in two

different materials, thereby optimizing both to our advantage," says co-author Matt Gebert (FLEET/Monash).

Another important feature of this heterostructure is that the induced magnetism only depends on the magnetic moments of the nearest plane inside the magnetic material, hence the magnetic materials do not have to be ferromagnets—ferrimagnets, or antiferromagnets can also be used. This increases the number of candidate magnetic materials, allowing choice of materials with magnetism at higher temperatures, for operation closer to room temperature.

"This is an exciting new field of research," says corresponding author Prof Michael Fuhrer, also at Monash University.

"Progress is happening extremely rapidly, and we felt it was time for a review article summarizing the recent accomplishments, and outlining a future roadmap of this field," says Prof Fuhrer, who is director of FLEET.

This review provides all the information necessary to introduce new researchers to the field. It explains the conceptual ideas behind the mechanisms of magnetic proximity effect in topological insulators, introduces the materials systems that have been explored and the various emergent phenomenon that have been detected, and outlines a future roadmap towards increasing the temperature and innovative applications.

"We hope others will find it a timely review clarifying the important concepts of the field and recent publications," says Semonti.

"Recent Progress in Proximity Coupling of Magnetism to Topological Insulators" was published in *Advanced Materials* in June 2021.

More information: Semonti Bhattacharyya et al, Recent Progress in Proximity Coupling of Magnetism to Topological Insulators, *Advanced Materials* (2021). [DOI: 10.1002/adma.202007795](https://doi.org/10.1002/adma.202007795)

Journal information: [Advanced Materials](https://phys.org/news/2021-08-topological-insulators-magnetic-materials-energy-efficient.html)
<https://phys.org/news/2021-08-topological-insulators-magnetic-materials-energy-efficient.html>



Fri, 06 Aug 2021

New approach to information transfer reaches quantum speed limit

By Bailey Bedford

Even though quantum computers are a young technology and aren't yet ready for routine practical use, researchers have already been investigating the theoretical constraints that will bound quantum technologies. One of the things researchers have discovered is that there are limits to how quickly quantum information can race across any quantum device.

These speed limits are called Lieb-Robinson bounds, and, for several years, some of the bounds have taunted researchers. For certain tasks, there was a gap between the best speeds allowed by theory and the speeds possible with the best algorithms anyone had designed. It's as though no car manufacturer could figure out how to make a model that reached the local highway limit.

But unlike speed limits on roadways, information speed limits can't be ignored when you're in a hurry—they are the inevitable results of the fundamental laws of physics. For any quantum task, there is a limit to how quickly interactions can make their influence felt (and thus transfer information) a certain distance away. The underlying rules define the best performance that is possible. In this way, information speed limits are more like the max score on an old school arcade game than traffic laws, and achieving the ultimate score is an alluring prize for scientists.

Now a team of researchers, led by JQI Fellow Alexey Gorshkov, have found a quantum protocol that reaches the theoretical speed limits for certain quantum tasks. Their result provides new insight

into designing optimal quantum algorithms and proves that there hasn't been a lower, undiscovered limit thwarting attempts to make better designs. Gorshkov, who is also a Fellow of the Joint Center for Quantum Information and Computer Science (QuICS) and a physicist at the National Institute of Standards and Technology, and his colleagues presented their new protocol in a recent article published in the journal *Physical Review X*.

"This gap between maximum speeds and achievable speeds had been bugging us, because we didn't know whether it was the bound that was loose, or if we weren't smart enough to improve the protocol," says Minh Tran, a JQI and QuICS graduate student who was the lead author on the article. "We actually weren't expecting this proposal to be this powerful. And we were trying a lot to improve the bound—turns out that wasn't possible. So, we're excited about this result."

Unsurprisingly, the theoretical speed limit for sending information in a quantum device (such as a quantum computer) depends on the device's underlying structure. The new protocol is designed for quantum devices where the basic building blocks—qubits—influence each other even when they aren't right next to each other. In particular, the team designed the protocol for qubits that have interactions that weaken as the distance between them grows. The new protocol works for a range of interactions that don't weaken too rapidly, which covers the interactions in many practical building blocks of quantum technologies, including nitrogen-vacancy centers, Rydberg atoms, polar molecules and trapped ions.

Crucially, the protocol can transfer information contained in an unknown quantum state to a distant qubit, an essential feature for achieving many of the advantages promised by quantum computers. This limits the way information can be transferred and rules out some direct approaches, like just creating a copy of the information at the new location. (That requires knowing the quantum state you are transferring.)

In the new protocol, data stored on one qubit is shared with its neighbors, using a phenomenon called quantum entanglement. Then, since all those qubits help carry the information, they work together to spread it to other sets of qubits. Because more qubits are involved, they transfer the information even more quickly.

This process can be repeated to keep generating larger blocks of qubits that pass the information faster and faster. So instead of the straightforward method of qubits passing information one by one like a basketball team passing the ball down the court, the qubits are more like snowflakes that combine into a larger and more rapidly rolling snowball at each step. And the bigger the snowball, the more flakes stick with each revolution.

But that's maybe where the similarities to snowballs end. Unlike a real snowball, the quantum collection can also unroll itself. The information is left on the distant qubit when the process runs in reverse, returning all the other qubits to their original states.

When the researchers analyzed the process, they found that the snowballing qubits speed along the information at the theoretical limits allowed by physics. Since the protocol reaches the previously proven limit, no future protocol should be able to surpass it.

"The new aspect is the way we entangle two blocks of qubits," Tran says. "Previously, there was a protocol that entangled information into one block and then tried to merge the qubits from the second block into it one by one. But now because we also entangle the qubits in the second block before merging it into the first block, the enhancement will be greater."

The protocol is the result of the team exploring the possibility of simultaneously moving information stored on multiple qubits. They realized that using blocks of qubits to move information would enhance a protocol's speed.

"On the practical side, the protocol allows us to not only propagate information, but also entangle particles faster," Tran says. "And we know that using entangled particles you can do a lot of interesting things like measuring and sensing with a higher accuracy. And moving information fast also means that you can process information faster. There's a lot of other bottlenecks in building quantum computers, but at least on the fundamental limits side, we know what's possible and what's not."

In addition to the theoretical insights and possible technological applications, the team's mathematical results also reveal new information about how large a quantum computation needs to be in order to simulate particles with interactions like those of the qubits in the new protocol. The researchers are hoping to explore the limits of other kinds of interactions and to explore additional aspects of the protocol such as how robust it is against noise disrupting the process.

More information: Minh C. Tran et al, Optimal State Transfer and Entanglement Generation in Power-Law Interacting Systems, *Physical Review X* (2021). DOI: [10.1103/PhysRevX.11.031016](https://doi.org/10.1103/PhysRevX.11.031016)

Journal information: [Physical Review X](https://phys.org/news/2021-08-approach-quantum-limit.html)
<https://phys.org/news/2021-08-approach-quantum-limit.html>

COVID-19 Research News



Fri, 06 Aug 2021

Influenza vaccine may protect against severe effects of COVID-19: Study

COVID-19 Study: The researchers from the University of Miami Miller School of Medicine, US, also found that patients with COVID-19 who had been vaccinated against the flu were significantly less likely to visit the emergency department (ED) and be admitted to the intensive care unit

Washington: The annual influenza vaccine may reduce the risk of stroke, sepsis, blood clots and several other severe effects in patients with COVID-19, according to the largest study of its kind.

The researchers from the University of Miami Miller School of Medicine, US, also found that patients with COVID-19 who had been vaccinated against the flu were significantly less likely to visit the emergency department (ED) and be admitted to the intensive care unit.

"Only a small fraction of the world has been fully vaccinated against COVID-19 to date, and with all the devastation that has occurred due to the pandemic, the global community still needs to find solutions to reduce morbidity and mortality," said senior study author Devinder Singh, professor at the Miller School.

"My team has been able to observe an association between the flu vaccine and reduced morbidity in COVID-19 patients," said Singh, who conducted the study with lead authors Susan Taghioff and Benjamin Slavin.

The study, published in the journal PLoS One on August 3, analysed patient records from a number of countries, including the US, the UK, Germany, Italy, Israel and Singapore.

The researchers screened de-identified electronic health records on the TriNetX research database for more than 70 million patients to identify two groups of 37,377 patients.

Members of the first study group had received the flu vaccine two weeks and six months prior to being diagnosed with COVID-19.

Those in the second group also had a positive COVID-19 diagnosis but were not vaccinated against the flu.



The influenza vaccine may reduce severe effects in patients with COVID-19, a study shows

The incidence of 15 adverse outcomes, including sepsis, strokes, deep vein thrombosis (DVT), emergency department visits and death, within 30, 60, 90 and 120 days of testing positive for COVID-19 were then compared between the two groups.

The analysis revealed that those who had not had the flu shot were significantly more likely (up to 20 per cent) to have been admitted to the ICU.

They were also significantly more likely to visit the emergency department (up to 58 per cent), to develop sepsis (up to 45 per cent), to have a stroke (up to 58 per cent) and a DVT (up to 40 per cent).

The risk of death among patients immunised with the flu vaccine was not reduced, the researchers said.

They were also able to calculate how many COVID-19-positive patients would need to receive an influenza vaccine to avoid one adverse outcome.

The team found that only 176 patients needed to have received a flu vaccine to prevent one ED visit within 120 days of testing positive for COVID-19.

Also, only 286 patients needed to have received their flu vaccine to prevent one case of sepsis.

For every 440 patients who were up to date on their flu shot, one ICU admission was prevented, according to the researchers.

Although it is not exactly known yet how the influenza vaccine provides protection against COVID-19, the researchers said, most theories speculate that the flu shot may boost the innate immune system -- general defences we are born with that do not protect against any one specific illness.

The results, they said, strongly suggest that the flu vaccine may protect against several severe effects of COVID-19.

However, the researchers strongly recommend that people receive COVID-19 vaccines as well their annual influenza vaccine.

The researchers added that more studies, in the form of randomised control trials, are needed to prove and better understand the possible link.

However, they said the flu shot could be used to help provide increased protection in countries where the COVID-19 vaccine is in short supply or even aid in the ongoing struggle against breakthrough cases in those individuals already vaccinated against COVID-19.

"Continued promotion of the influenza vaccine also has the potential help the global population avoid a possible "twindemic" - a simultaneous outbreak of both influenza and coronavirus," Taghioff added.

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

<https://www.ndtv.com/world-news/influenza-vaccine-may-protect-against-severe-effects-of-covid-19-study-2503759>

