Dec
2020

समाचार पत्रों से चयित अंश
Newspapers Clippings

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

खंड : 45 अंक : 281 08 दिसंबर 2020

Vol.: 45 Issue : 281 08 December 2020

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

CONTENTS

DRDO News

DRDO Technology News

THE TIMES OF INDIA

Tue, 08 Dec 2020

Final trial of Arjun Mark 1-A held in Pokhran

Jaisalmer: The final phase of trials of the battle tank Arjun Mark 1 ALFA, the advanced version of the tank, was held on Monday at Pokhran field firing range in Jaisalmer district. The tank will boost army's fire power.

It has been manufactured indigenously by DRDO and combined vehicles research and development establishment, Chennai. In this new advanced version, the firing system has been upgraded with automatic fire control system guided missiles. It also has many other features which will strengthen the firing capacity of the army. Indian army deputy chief staff Lt Gen SS Hasabnis and director general armed Lt Gen MJS Kahlo and other senior officers were present during the trial.

It is to be mentioned that PM Narendra Modi's riding the Arjun tank at Longewala border has increased the possibility of inducting this tank in the army.

According to the information from army official sources, two units of Arjun tank are present in the army, but as per the requirements of the Indian army, DRDO has upgraded 14 features in it. Induction trial has been done and soon it will be inducted in the army. It is planned to induct two more regiments with Mark 2 version which will have the feature of firing anti-tank missiles.

A source said, "The Mark 1-A includes an improved gunner's main sight, integrated with automatic target tracking. This would enable the tank crew to track moving targets automatically, and engage them even when Arjun tank is on the move."

Official sources said, "The Arjun Mark 1-A's gun is controlled by a computerised integrated fire control system, giving the tank has a high first round kill capability. The gun's day-and-night stabilised sights, coupled with automatic target tracker, guarantee accurate engagement even in dynamic conditions."

https://timesofindia.indiatimes.com/city/jaipur/final-trial-of-arjun-mark-1-a-held-in-pokhran/articleshow/79614042.cms

ANI
South Asia's Leading Multimedia News Agency

Tue, 08 Dec 2020

200 Indian howitzers to be ready for induction in 18 months, CDS asks services to handhold local industry

New Delhi: In the backdrop of a choice between an indigenous and foreign option to fulfil Indian Army's requirement for over 400 howitzers, DRDO has said that it would be in a position to offer over 200 Made in India ATAGS howitzers in 18-24 months of placement of orders.

The Defence Research and Development Organisation has developed the gun in partnership with private sector industry.

Chief of Defence Staff Gen Bipin Rawat (File photo). Image Credit: ANI

Officials said the Made in India Advanced Tower Artillery Gun System howitzers would be in a position to meet the requirements of the Indian Army in the quickest possible timeframe as they have their production facilities ready while the Israeli gun on offer would take a long time just to create a production infrastructure.

The Indian Army is on a lookout for advanced howitzers which are to be deployed at the China border at the earliest. The Israeli gun has been cleared after a long tendering process.

Howitzers are in the negative import list and whichever option is exercised has to be produced in India under Make in India. "The Advanced Towed Artillery Gun System (ATAGS) is undergoing trials at Ahmednagar in Maharashtra. We can offer 200 plus of these guns to the Army within 18-24 months of the order," DRDO officials told ANI.

The DRDO-developed ATAGS has shown immense capability as it has fired at the longest striking range in its class of guns but suffered a minor accident during trials in the Jaislamer desert a few months ago.

Asked to comment on the issue, Chief of Defence Staff General Bipin Rawat said: "Failures during trials will happen but these must not dampen the spirit, instead it must lead to timely reviews and encourage the manufacturers to seek ways to overcome the problems."

"Services on their side also need to prepare acceptable and desirable requirements and continue to support the development process for further enhancement of quality," he added. Rawat said defence manufacturing in India was at the cusp of transformation and the success of Prime Minister Narendra Modi's call for Atmanirbhar Bharat would necessitate that the services do the handholding of the local industry.

"Service officers with practical experience must be in integrated into the design and development processes. Navy has set standards that have helped in indigenisation but more needs to be done. Army and Air Force have gradually entered into the fray," the CDS said. The Narendra Modi government has embarked on the ambitious Atmanirbhar Bharat process in the defence sector and the CDS has been tasked to prepare the list of items which have to be produced in India only.

The CDS with the support of the three services and the DRDO has already issued one negative imports list and is soon going to issue another shortly to promote local industry.

Defence Minister Rajnath Singh has also made it clear to the forces that wherever there is an option of acquiring good local products, foreign equipment would not be allowed. (ANI)

https://www.aninews.in/news/national/general-news/200-indian-howitzers-to-be-ready-for-induction-in-18-months-cds-asks-services-to-handhold-local-industry20201207111353/

INDIA TODAY

Tue, 08 Dec 2020

Indian howitzers to be ready for Army induction soon, CDS Rawat asks services to handhold local industry

At a time when the Indian Army is looking for over 400 towed artillery guns, it has emerged that the Made in India ATAGS howitzers, which are still being developed, would be the first option ready to be inducted in large numbers

By Manjeet Singh Negi

New Delhi: At a time when the Indian Army is looking for over 400 towed artillery guns, it has emerged that the Made in India ATAGS howitzers, which are still being developed, would be the first option ready to be inducted in large numbers.

CDS Gen Bipin Rawat with the Army and Navy Chiefs. (File: PTI)

An Israeli gun in competition would take a much longer time to be produced. The DRDO-developed ATAGS howitzer is undergoing trials in Maharashtra and officials working on the project say they would be ready to offer around 200 guns to the Indian Army within 18 months.

According to reports, the Indian Army is looking at the option of the Israeli gun to be made in India that can happen only after a long contract negotiation process and establishment of production facilities which are not there at the moment.

"The ATAGS has been doing well and it has shown that it can fire at the longest range. The production facilities for the gun are complete and we can offer 200 guns for induction within 18-24 months of the order," DRDO sources told India Today TV. The ATAGS had suffered an accident during trials while firing due to ammunition burst in September and is now again undergoing trials, the sources said.

Asked on the issue, Chief of Defence Staff General Bipin Rawat said, "Failures during trials will happen but these must not dampen the spirit, instead it must lead to timely reviews and encourage the manufacturers to seek ways to overcome the problems".

He said the services also need to prepare acceptable and desirable requirements and continue to support the development process for further enhancement of quality.

"Defence manufacturing in India by public and private sectors are on the cusp of transformation. Service officers with practical experience must be in integrated in the design and development processes," Gen Rawat told India Today TV.

He said the Navy has set standards that have helped in indigenisation but more needs to be done. "Army and Air Force have gradually entered the fray. The success of indigenisation based on the call for Atmanirbhar Bharat necessitates hand holding by the services," Genera Rawat has further said. Howitzers are in the negative import list and they can be provided to the services only through the 'Make in India' route.

Having been starved for artillery guns for over 30 years after the Bofors scandal, the Indian Army has a plethora of choices as private players such as Bharat Forge, Tata and many other players like the Ordnance Factory Board have provided robust solutions to it.

Defence Minister Rajnath Singh has also made it clear that indigenous products would be given priority over imports and all efforts would be made to promote 'Make in India'.

https://www.indiatoday.in/india/story/indian-howitzers-for-army-induction-gen-rawat-for-make-in-india-1747374-2020-12-07

Tue, 08 Dec 2020

भारतीय सेना की ताकत में होगा इजाफा, जल्द मिलेंगी मेड इन इंडिया 200 होवित्जर

इजरायल की होवित्जर के उत्पादन में लंबा समय लगेगा। जबकि, सेना की जरूरत को पूरा करने के लिए DRDO की ओर से कहा गया है कि वह 18 महीनों में ही 200 से अधिक Made in India एडवांस टावर आर्टिलरी गन सिस्टम (ATAGS) होवित्जर तैयार कर सकता है।

By Manjeet Negi

स्टोरी हाइलाइट्स

- ***भारतीय सेना को 400 से ज्यादा आर्टिलरी गन की जरूरत***
- ***महाराष्ट्र के अहमदनगर में ट्रायल शुरू***
- ***सेना को जल्द मिलेंगी मेड इन इंडिया 200 होवित्जर***

भारत और चीन के बीच जारी तनाव (India-China Tension) को देखते हुए भारतीय सेना (Indian Army) लगातार अपनी ताकत को और बढ़ा रही है। मौजूदा समय में भारतीय सेना के तोपखाने को 400 से ज्यादा आर्टिलरी गन की जरूरत है। ऐसे में इजरायल से मंगाई जाने वाली होवित्जर (Howitzers) के मुकाबले भारत में बनी गन अच्छा विकल्प साबित हो सकती हैं। क्योंकि इजरायल की होवित्जर के उत्पादन में लंबा समय लगेगा। जबकि, सेना की जरूरत को पूरा करने के लिए DRDO की ओर से कहा गया है कि वह 18 महीनों में ही 200 से अधिक Made in India एडवांस टावर आर्टिलरी गन सिस्टम (ATAGS) होवित्जर तैयार कर सकता है। महाराष्ट्र के अहमदनगर में इनका ट्रायल भी शुरू हो चुका है।

आर्टिलरी गन

खबरों के मुताबिक, भारतीय सेना भारत में बनने वाली एक इजरायली बंदूक का विकल्प देख रही है, क्योंकि इजरायल की होवित्जर के उत्पादन में लंबा समय लगेगा। जबकि, DRDO मेड इन इंडिया ATAGS होवित्जर प्रोजेक्ट को भारतीय सेना के लिए जल्द से जल्द पूरा कर सकता है। DRDO के सूत्रों ने आजतक और इंडिया टुडे को बताया कि बंदूक के लिए उत्पादन की सुविधा भी पूरी है और हम 18-24 महीनों के भीतर 200 तोपों की पेशकश कर सकते हैं।

DRDO की ओर से तैयार किए जा रहे ATAGS होवित्जर अपनी श्रेणी की सबसे लंबी दूरी तक मार करने वाली होवित्जर हैं। हालांकि, कुछ महीने पहले जैसलमेर के रेगिस्तान में परीक्षण के दौरान एक छोटी सी दुर्घटना हो गई थी। इसपर बोलते हुए चीफ ऑफ डिफेंस स्टाफ जनरल बिपिन रावत ने कहा कि परीक्षणों के दौरान सामने आई विफलता को देखकर कभी भी मनोबल कम नहीं करना चाहिए बल्कि समस्याओं को दूर करने के तरीकों की तलाश करना चाहिए। इसके अलावा उन्होंने रक्षा क्षेत्र में मेक इन इंडिया पर जोर दिया।

गौरतलब है कि इजरायल से मंगाई जाने वाली Howitzers को एक लंबी खरीद प्रक्रिया से गुजरना पड़ता है, जिसके कारण काफी समय लग जाता है। जबकि, भारतीय सेना चाहती है कि वह जल्द से जल्द इन एडवांस होवित्जर को हासिल करे और सीमा पर तैनात करे।

जाहिर है बोफोर्स कांड के बाद 30 साल से अधिक समय तक आर्टिलरी गन की राह देखने के बाद, भारतीय सेना के पास निजी प्लेयर्स जैसे भारत फोर्ज, टाटा और ऑर्डनेंस फैक्ट्री बोर्ड जैसे कई अन्य विकल्प मौजूद हैं। रक्षा मंत्री राजनाथ सिंह ने यह भी स्पष्ट किया है कि आयात पर स्वदेशी उत्पादों को प्राथमिकता दी जाएगी और मेक इन इंडिया को बढ़ावा देने के लिए सभी प्रयास किए जाएंगे।

https://www.aajtak.in/india/news/story/drdo-indian-howitzers-to-be-ready-for-induction-in-indian-army-shortly-1173300-2020-12-07

NEWS 18 हिंदी

Tue, 08 Dec 2020

चीन सीमा पर भारतीय सेना की बढ़ेगी ताकत, 18 महीनों में मिलेंगी 200 स्वदेशी हॉवित्जर

भारतीय सेना (Indian Army) को इस समय 400 से ज्यादा हॉवित्जर (Howitzers) तोपों की जरूरत है। सेना की इस जरूरत को रक्षा अनुसंधान एवं विकास संगठन (DRDO) पूरा करने को तैयार है

नई दिल्ली: भारत (India) और चीन (China) के बीच पिछले कई महीनों से चले आ रहे तनाव को देखते हुए भारतीय सेना (Indian Army) ने अपनी ताकत को और मजबूत करने का काम शुरू कर दिया है। भारतीय सेना को इस समय 400 से ज्यादा हॉवित्जर (Howitzers) तोपों की जरूरत है। सेना की इस जरूरत को रक्षा अनुसंधान एवं विकास संगठन (DRDO) पूरा करने को तैयार है। डीआरडीओ की ओर से कहा गया है कि वह ऑर्डर मिलने पर 18 से 24 महीनों में 200 से अधिक मेड इन इंडिया एडवांस टावर आर्टिलरी गन सिस्टम (एटीएजीएस) हॉवित्जर तैयार कर सकता है।

डीआरडीओ के अधिकारियों के मुताबिक मेड इन इंडिया एटीएजीएस हॉवित्जर को भारतीय सेना की आवश्यकताओं के लिए जल्द से जल्द और एक संभव समय सीमा में पूरा किया जा सकता है। उन्होंने कहा कि स्वदेशी हॉवित्जर को तैयार करने की सभी सुविधाएं हमारे पास तैयार हैं जबकि इजरायल की हॉवित्जर के उत्पादन में लंबा समय लगेगा। भारतीय सेना चाहती है कि वह जल्द से जल्द इन एडवांस हॉवित्जर को चीन की सीमा पर तैनात करे, जिससे दुश्मन देश के सामने भारतीय सेना मजबूत दिखाई दे।

इजरायल से मंगाई जाने वाली इन हॉवित्जर को एक लंबी निविदा प्रक्रिया से गुजरना पड़ता है, जिसके कारण इन्हें मंगाने में काफी समय लग जाता है। डीआरडीओ के अधिकारियों ने बताया कि एटीएजीएस का महाराष्ट्र के अहमदनगर में परीक्षण चल रहा है। हम ऑर्डर मिलने के 18 से 24 महीनों के भीतर सेना को इसकी 200 से अधिक तोपें दे सकते है।

डीआरडीओ की ओर से तैयार किए जा रहे एटीएजीएस पहले से काफी बेहतर हैं। यह अपनी श्रेणी की सबसे लंबी दूरी तक मार करने वाली हॉवित्जर हैं। हालांकि कुछ महीने पहले जैसलमेर में रेगिस्तान में परीक्षण के दौरान एक मामूली दुर्घटना हो गई थी। इस हादसे पर टिप्पणी करते हुए चीफ ऑफ डिफेंस स्टाफ जनरल बिपिन रावत ने कहा, 'परीक्षणों के दौरान सामने आई विफलता को देखकर कभी भी मनोबल कम नहीं करना चाहिए बल्कि इसकी समीक्षा और निर्माताओं को समस्याओं को दूर करने के तरीकों की तलाश करने के लिए प्रोत्साहित करना चाहिए।'

https://hindi.news18.com/news/nation/drdo-said-200-indian-howitzers-to-be-ready-for-induction-in-18-months-3367461.html

Mon, 07 Dec 2020

Bharat Dynamics spurts 5% after its manufactured missiles test fired successfully

The Indian Air Force, last week, successfully test fired the Akash Missiles designed and developed by the DRDO

Bharat Dynamics Limited informed the exchanges on Saturday that the Indian Air Force, last week, successfully test fired the Akash Missiles. The Akash Missiles were test fired at Suryalanka test firing range in Andhra Pradesh during the Combat Guided Weapons Firing 2020 exercise to practice different engagement scenarios during conflicts to shoot down enemy planes. Several test trials have also been done in the past which were proved to be successful.

Designed and developed by the DRDO, Akash is one of the most successful, indigenously made missiles inducted into the Indian Army and Air Force. Bharat Dynamics Limited (BDL) is the manufacturer of the Missile.

The company stock was bullish in early trade on Friday. At around 9.40 am, Bharat Dynamics Ltd was trading at Rs338.60 per piece up Rs16.15 or 5.01% on the BSE. The scrip opened at Rs330.85 and has touched a high and low of Rs333.70 and Rs328.85 respectively.

Akash Missile has the capability to engage aerial threats upto the maximum range of 25 km and upto an altitude of 18 km., operating at a speed range of 1.8 to 2.5Mach. The Akash Weapon System consisting of Akash Missile along with a complement of Ground Support Equipment is capable of tracking 64 targets in the background and launch 8 missiles against 4 targets simultaneously.

The system is fully automatic with quick response time from target detection to kill. The Open system architecture ensures adaptability to existing and futuristic Air Defence environments. It has high immunity against active and passive jamming and has inbuilt safety features with IFF. The system has a secured mode of communication between combat elements and is self-sufficient in electrical power with in-built power sources.

The missile is used against aerial targets such as helicopters, fighter aircrafts, UAVs etc. The missile has been recently upgraded with a seeker which will facilitate to neutralize targets with less efforts than before. The upgraded version will be capable of engaging with targets at very high altitude locations too.

BDL, along with DRDO is geared up for delivery of Akash Prime to Indian Army with Seeker and high altitude capability. This capability to meet the user requirements has been achieved in a short span of time with the design support of DRDO.

“India’s thrust towards achieving self-reliance in critical technologies in Defence gave birth to the nation’s ambitious Integrated Guided Missile Development Programme (IGMDP) during the late 80s, in which BDL was nominated as the ‘Prime Production Agency’. Akash is one of the missiles under IGMDP being manufactured by BDL,” company said.

It further said that the Akash Weapon System has given a boost to the all-round capability enhancement and operational effectiveness of the Armed Forces to meet all the contemporary and emerging challenges of negating the enemy's air threat. BDL has supplied the missile to Indian Army and Indian Air Force and is expecting further orders from the services.

The company is also exploring to offer Akash for export to foreign countries. BDL has already received export leads from some countries expressing interest in procuring the Missile.

https://www.indiainfoline.com/article/news-top-story/bharat-dynamics-spurts-5-after-its-manufactured-missiles-test-fired-successfully-120120700020_1.html

THE NAVHIND TIMES

Sun, 06 Dec 2020

Safran-HAL JV will soon set up factory in Valpoi: Shripad

Vasco: Union Minister of State for Defence Shripad Naik, on Saturday, informed that defence firms setting up non-polluting factories in Goa will provide 80 per cent job opportunities to the sons of soil.

Naik was speaking to the media after inspecting the 'Hughes Precision' company unit, set up at the IDC Verna, for manufacturing bullets, under the DRDO.

The company has land in Betul for stocking the material required for production.

Speaking further, Naik said that the much-awaited joint venture between Safran Helicopter Engines, a French company, and Hindustan Aeronautics Ltd (HAL), a defence PSU, will soon set up helicopter spare parts production factory in Valpoi.

The process of setting up this unit was delayed in view of COVID-19 crisis, said Naik.

He recalled that the former defence minister and ex-chief minister Manohar Parrikar had announced the project in October 2016, with a total investment of Rs 170 crore.

The engines of advanced light helicopters of various versions, light combat helicopters and future light utility helicopters that are common between HAL and Saffron would be maintained at this facility.

"I recently called up HAL chairman wherein it was disclosed that they are totally prepared to set up the facility in Valpoi. The France-based Safran Helicopter Engines has shifted its office due to the pandemic crisis, but they are now willing to come down to India. The government of India will see that 80 per cent of the jobs in the defence units in Goa are provided to the locals. In case, if qualified or trained persons fail to approach then others will be engaged into the jobs," he said.

He further said that the government is focusing on inviting more and more non-polluting industries to Goa, which would certainly help to reduce unemployment in the state.

He congratulated the 'Hughes Precision' management for setting up a facility in Goa, which he called the need of the hour.

"Bullet factory is set up for the first time in Goa, under the initiative 'Make in India,' wherein ammunition would be made along with any other defence requirements. The Hughes Precision unit based at Verna would soon start production on a large scale after some clearance is given, and a property to stock gun powder has already been purchased in Betul," informed Naik.

He also praised Goa Shipyard Ltd (GSL) which is based in Vasco.

"GSL is executing defence works worth thousands of crores, and it is number one shipbuilding company in India. GSL has constructed numbers of vessels for Indian Navy and Indian Coast Guard. The company has even exported number of ships to foreign countries," added Naik.

https://www.navhindtimes.in/2020/12/06/goanews/safran-hal-jv-will-soon-set-up-factory-in-valpoi-shripad/

CONNECTING WITH EVERY GOAN....
THE GOAN
E|V|E|R|Y|D|A|Y

Sun, 06 Dec 2020

HAL-Saffron JV to set up helicopter spares unit in Valpoi soon: Shripad

Says want such non-polluting companies; 80% jobs to Goans assured

Vasco: Union Minister of Defence for State Shripad Naik on Saturday said the joint venture between an international company Saffron and Defence PSU Hindustan Aeronautics Limited (HAL) would soon resume work on the unit at Valpoi.

Speaking to reporters during an inspection of a bullets manufacturing company "Hughes Precision" at Verna IDC, Naik said all defence related units setting up units in Goa would have to provide 80% jobs to Goans.

"It is a matter of pride that "Hughes Precision" is the first bullet manufacturing plant to be set up in Goa after approvals from Defence Research and Development Organization (DRDO). It will would cater to needs of defence."

"Such units are the need of the hour as the initiative by PM Narendra Modi encourages that productions for the defence should be manufactured in India under 'Make in India' scheme."

"The Hughes Precision company is already functioning and will soon produce bullets on a larger scale as a place to store gunpowder for the bullets has been taken up in Betul."

"We want such non-pollution companies in Goa and they have already assured us that 80% of jobs will be given to Goans. While we welcome them to Goa, we also assure them of our continuous support," said Naik.

Naik said a defence PSU like Goa Shipyard Limited has already been executing defence works worth hundreds of crores of rupees, while another such defence unit would soon open up in Valpoi.

"Former defence minister late Manohar Parrikar had planned a project to make helicopter spares and to set up the unit at Valpoi."

"The unit is a joint collaboration between an international French company Saffron and a Defence PSU Hindustan Aeronautics Limited. Though work had begun initially, it stopped due to the Covid pandemic. We have now taken steps and had meetings so that the unit is set up at Valpoi sometime soon."

"A few days ago, I had called the HAL chairman for a meeting to Goa and he showed readiness. The Saffron company will soon be ready to go ahead with the project and very soon we will have a company making helicopter spares in Valpoi."

"We also appeal to other industries to set up units in Goa so that the problem of unemployment is resolved," said Naik.

https://www.thegoan.net/goa-news/%EF%BB%BFhalsaffron-jv-to-set-up-helicopter-spares-unit-in-valpoi-soon-shripad/62672.html

Defence News

Defence Strategic: National/International

FINANCIAL EXPRESS
Read to Lead

Tue, 08 Dec 2020

Army Chief's Gulf Visit: Caracal CQB Deal and deepening military ties to be the focus

The army chief in his first-ever visit to the Kingdom would address Saudi Arabia's National Defence University too

By Huma Siddiqui

The Indian Army chief Gen MM Naravane on Monday (December 7, 2020) reaches the Gulf Region and the focus of his visit is on deepening of military ties between Saudi Arabia and the UAE. His first stop is Saudi Arabia, where during his two-day visit he will be meeting his counterpart as well as other top military brass as well as other senior officers. From there the Indian Army Chief will leave for the UAE on a two day visit.

As has been reported by Financial Express Online, the army chief in his first-ever visit to the Kingdom would address Saudi Arabia's National Defence University too.

MM Naravane will be meeting his UAE counterpart as well as other top military brass (IE Image)

Deepening Military Engagement

India and Saudi Arabia in 2019 has inked a Memorandum of Understanding for joint collaboration of defence industries. Saudi Arabia is looking to grow its defence industry which is in nascent stages.

The two sides are also seeking deeper engagement in maritime security, and more joint bilateral military exercises.

Both Gulf countries are also keen on buying the Indo-Russian BrahMos Missile, as well as other indigenously developed and designed missiles from India.

In the UAE, besides his meeting with his counterparts and other military brass. Though the official agenda has not been shared, sources have indicated that the UAE based Caracal Company will raise the issue of reconsidering its deal for selling 93,895 Close Quarter Carbines with the Indian Army Chief.

Caracal Deal

During the recently concluded visit of external affairs minister S Jaishankar, the issue was raised by the UAE side.

As has been reported by Financial Express Online earlier, the UAE based company was shortlisted almost two years ago and the CQBs were to be procured through the Fast Track Procurement (FTP) route. However, as reported earlier, the Ministry of Defence (MoD) had taken in-principle decision to cancel the deal and to take the domestic route for procuring the CQB. The UAE Company has been in touch with the Indian Mission as well as the Ministry of Defence (MoD) to reconsider its decision.

Is there a procedure to go back on what has been decided?

"Though no formal announcement has been made, it will probably be an unprecedented procedural novelty to restart a procurement proposal from the stage at which the Request for Proposal is retracted after the final decision is taken to do so," explained a senior officer on condition of anonymity.

Why?

The case goes to square one. But it does not prevent the vendors unless someone is barred by the MoD, to make a pitch for being considered as a potential supplier on a single vendor basis or through an inter-governmental agreement if it's a foreign vendor.

Background

The UAE based company after clearing all trials and procedural requirements was supposed to supply 93,895 carbines to the Indian Army. This deal was in the works since 2018.

The UAE based company has been pitching aggressively through the media and had issued a statement earlier expressing its commitment to the `Make in India' initiative. It had stated that the company has already identified the local partners, land and facility and start the local production immediately.

It had also mentioned in the statement shared with the media that more than 20 per cent of the components fitted on the CAR 816 are already made in India and has offered to transfer of technology for manufacturing them here.

https://www.financialexpress.com/defence/army-chiefs-gulf-visit-caracal-cqb-deal-and-deepening-military-ties-to-be-the-focus/2144662/lite/

FINANCIAL EXPRESS
Read to Lead

Tue, 08 Dec 2020

Adapting with changing times: More restructuring at the Army Headquarters soon

A Government Sanction Letter (GSL) for creating two new posts of Deputy Chief (Strategy) and Director-General Information Warfare has been received which will allow the restructuring to take place

By Huma Siddiqui

In an effort to fully optimize the resource funding and for the transformation of the Indian Army, restructuring of the Headquarters is set to take off. A Government Sanction Letter (GSL) for creating two new posts of Deputy Chief (Strategy) and Director-General Information Warfare has been received which will allow the restructuring to take place.

What changes are expected?

Based on the findings of one of the studies, a new post of Deputy Chief Strategy (DCS) has been carved out – he will be responsible for all operational issues. This will be under one vertical to be headed by him. Now, the General Rashtriya Rifles has been re-named as the Deputy Chief Strategy.

Restructuring of the Headquarters is set to take off.

Area of his responsibilities

Lt General Paramjit Singh will be the new Deputy Chief Strategy. He will now replace the Director General Military Operations (DGMO) as one the Principal Staff Officers of the Army Chief.

Besides strategy planning, intelligence gathering, his office will be responsible for many tasks including operational logistics movement of fuel, equipment and vehicles.

Who all will report to the DCS office?

In an effort to make decision making easier, now, the DGMO and Military Intelligence; Operational Logistics (DGOL) and Director General (Information Warfare).

Additional expense?

No! According to sources, this is not an additional post; therefore there is no financial outgo. And this has been carved out of an already existing post of Director. The model is already operational and the GSL was awaited for the creation of new posts.

More about the DGIW

He will have the media outreach wing under him. This means he will be handling the misinformation on social media, timely release of images, information and videos to the media which includes electronic, newspapers and web-portals.

In the current structure each DG has been reporting to the Vice Chief of the Indian Army, who is already dealing with multiple issues. Though each DG was reporting separately to the Vice Chief, it was creating communication gaps and impacting the smooth functioning.

The operations of the Indian Army on a daily basis and the coordination with the Ministry of Defence is managed by the office of the Vice chief.

Other studies

They include the formation of the Integrated Battle Groups (IBG)

Cadre Review of officers

And, the review of terms and conditions of Junior Commissioned Officers (JCO) and Other Ranks (OR).

View of an Indian Army Veteran

"The Indian Army has been evolving over the years and has been structuring and restructuring itself keeping in mind its operational commitments and responsibilities. Warfare is getting complex and needs to be addressed appropriately. We have China who has activated the Line of Actual Control and uses it as a prick point to push its agenda in as per its policy enunciated by the CCP.

The Indian Defence Services and the Indian Army in particular has to gear up to counter the three Warfare's strategy," Lt Col Manoj K Channan (Retd), tells Financial Express Online.

What is the 3W strategy?

It's a study by itself.

"For the past decade, China is known to have actively used 'three warfares' (3Ws) strategy—media, psychological and legal warfare—to weaken its adversaries in regions constituting what it perceives to be its 'core interests'. While a wide range of tools have been deployed, the attacks have remained mostly confined to Taiwan and South-East Asian states involved in the territorial disputes in the South China Sea. But with Beijing's influence in South Asia and the Indian Ocean Region (IOR) growing, there is evidence emerging of the 3Ws strategy being put to use against India. The evolving Chinese 3Ws strategy goes beyond mere propaganda wars and misinformation campaigns. Expanding conventional war dynamics into the political domain, the 3Ws appear aimed at undermining India's organizational foundations and target military morale. More disquietingly, the strategy appears designed to subdue India without even needing to fight," the Indian Army veteran explains.

According to him, "The focus of the Senior Military leadership has to be to train the next generation of officers at the Army War College Mhow to review the course content and redesign its training methodology.

In an era of Cyber Attacks, Artificial Intelligence, Internet of things, Machine Learning and drone warfare with precision attacks is something we need to focus on."

"ADG Vigilance & Human Rights, has also got formal clearance, and as per reports is going to be headed by an IPS officer. This is something which has not been understood as the Indian Army Human Rights record and Discipline and Vigilance branch had been working well and efficiently. This is a retrograde step and may lead to functional inefficiencies. The office of the CDS should have reposed more faith in the organisation he heads. Hopefully better sense will prevail and this post is done away with," Lt Col Channan concludes.

https://www.financialexpress.com/defence/adapting-with-changing-times-more-restructuring-at-the-army-headquarters-soon/2144652/

THE AVENUE MAIL

Tue, 08 Dec 2020

NML Jamshedpur signs MoU with Indian Air Force

Jamshedpur: National Metallurgical Laboratory (CSIR-NML) and Indian Air Force (IAF) on Monday signed a MoU in the field of Research and Development (R&D). A top level IAF delegation led by Air Marshal Vibhas Pande VSM, Air Officer in charge Maintenance along with senior officials of NML signed the agreement.

"During the visit, discussions were held on the areas of prime national interest in the field of materials, metals, corrosion science and other allied engineering domains with an aim to decide on aspects of collaborations between IAF and CSIR-NML," said an official of NML.

The IAF delegation stressed upon the requirement of improving the reliability and serviceability of their legacy assets, with emphasis on material informatics, substitution, life extension and indigenisation. The importance of refurbishment, reclamation, simulation of material behaviour and increasing the envelope of operations were brought out. The need for HR development through training, workshops and knowledge exchange were highlighted.

During the visit, the IAF team visited the R&D facilities of CSIR-NML, discussions and deliberations were held on various issues, and interactive technical presentations were made by both organizations. The visit culminated in the signing of MOU for cooperation in activities of interest to IAF and within the domain expertise of CSIR-NML.

The National Metallurgical Laboratory, Jamshedpur is the third in the Council of Scientific and Industrial Research (CSIR) family of 38 laboratories. The laboratory was formally inaugurated and dedicated to the nation on the November 26, 1950 by Pandit Jawaharlal Nehru.

https://avenuemail.in/nml-jamshedpur-signs-mou-with-indian-air-force/

Live हिन्दुस्तान .com

Tue, 08 Dec 2020

भारतीय वायु सेना के हथियारों की उम्र बढ़ायेगा NLM, समझौते पर हस्ताक्षर

जमशेदपुर के लिए सोमवार का दिन ऐतिहासिक रहा। भारतीय वायु सेना ने बर्मामाइंस स्थित सीएसआईआर-एनएमएल के साथ एक एमओयू पर हस्ताक्षर किया। करार के तहत वायु सेना के उपकरणों व हथियारों की उम्र बढ़ाने में एनएमएल मदद करेगा।

एसआईआर-एनएमएल भारतीय वायु सेना के साथ अपने मैटेरियल्स को लेकर किये जा रहे अविष्कारों को साझा करेगा। सोमवार को भारतीय वायु सेना के मेंटेनेंस विभाग के ऑफिसर इंचार्ज सह विशिष्ट सेवा मेडल प्राप्त एयर मार्शल विभास पांडे अपने दल के साथ बर्मामाइंस स्थित सीएसआईआर-एनएमएल पहुंचे।

उन्होंने एमओयू पर हस्ताक्षर किये। मौके पर सीएसआईआर-एनएमएल के निदेशक डॉ. इंद्रनील चट्टोराज भी मौजूद थे। एमओयू पर हस्ताक्षर के बाद वायु सेना की टीम ने एनएमएल के रिसर्च एंड डेवलपमेंट विभाग को देखा। इस दौरान विभिन्न मुद्दों पर एनएमएल के वैज्ञानिकों की टीम के साथ परिचर्चा भी की।

डॉ. इंद्रनील चट्टोराज ने बताया कि इस एमओयू के माध्यम से मटेरियल्स, मेटल्स, युद्ध विज्ञान व अन्य इंजीनियरिंग के रिसर्च को वायु सेना से साझा किया जाएगा। एमओयू, भारतीय सेना के हथियारों व उपकरणों को बेहतर और व उनकी उपयोगिता व आयु बढ़ाने में मदद करेगा।

https://www.livehindustan.com/jharkhand/story-nlm-will-increase-the-lifespan-of-indian-air-force-s-weapons-sign-the-agreement-3671475.html

HT Hindustan Times

Tue, 08 Dec 2020

Britain to send largest warship, carrier strike group to Indian Ocean next year

The deployment comes against the backdrop of growing interest in the Indo-Pacific in Europe amid concerns over China's increased assertiveness

By Rezaul H Laskar

New Delhi: The UK is sending its largest warship, aircraft carrier HMS Queen Elizabeth, and its strike task group to the Indian Ocean early next year for its maiden voyage, with London describing the move as the country's "most ambitious deployment for two decades".

The deployment comes against the backdrop of growing interest in the Indo-Pacific in Europe amid concerns over China's increased assertiveness, and the UK's own concerns over Chinese

actions in its former colony of Hong Kong, which London says have undermined the agreement on leaving the region unchanged until 2047.

"Next year, HMS Queen Elizabeth will lead a British and allied task group on the UK's most ambitious deployment for two decades, its route will encompass the Mediterranean, the Indian Ocean and East Asia," a British high commission spokesperson said.

"It is a natural choice for the inaugural deployment of the carrier strike task group to include a visit to the Indian Ocean and East Asia. The deployment is a sign of the UK's commitment to regional security," the spokesperson added.

HMS Queen Elizabeth. The 65,000-tonne HMS Queen Elizabeth, which can carry up to 40 aircraft, was commissioned in late 2017 but next year's deployment will mark its maiden voyage in international waters.(Reuters)

France, Germany and the Netherlands have unveiled their strategies for the Indo-Pacific, which dovetail with India's commitment to freedom of navigation and a rules-based order, and some experts see the deployment of Britain's carrier task group as an effort to reinforce its relevance amid Brexit.

The British mission's spokesperson described the Indo-Pacific as "increasingly important for the UK, as it is at the centre of global economic growth and a region of increasing geostrategic importance". The UK has a "range of enduring security interests in the region", the spokesperson said. The spokesperson also described the UK and India as "natural partners in defence" that "already have high levels of interoperability", as is evident from bi-annual exercises involving all three services and their joint work on the UN peacekeeping mission in South Sudan.

The 65,000-tonne HMS Queen Elizabeth, which can carry up to 40 aircraft, was commissioned in late 2017 but next year's deployment will mark its maiden voyage in international waters. The carrier task group is expected to conduct joint exercises with the US Navy and Japan's Self-Defense Forces, though it couldn't immediately be confirmed if there are plans for similar drills with the Indian Navy.

The British mission's spokesperson said the Royal Navy and the Indian Navy have "strong bilateral ties" and training together under the Konkan Exercise, a bilateral drill held biennially.

"The strong maritime relationship with India and other regional partners, regular deployments and a permanent naval presence provides the ability for the UK government to react quickly to a variety of emerging security and humanitarian situations with partners, as well as upholding international maritime law in support of the rules-based international system," the spokesperson said.

The UK has a long-standing presence in the Gulf and Indian Ocean through Operation Kipion, which now involves the permanent presence of seven warships at any time, typically one frigate or destroyer supported by a tanker and a four-strong squadron of mine-hunters with a support ship.

The British side also pointed to the Royal Navy's increasing presence in the Indian Ocean, where HMS Dragon warship seized drugs with a street value of more than £200 million during operations last year. These operations are backed by maritime information exchanges such as a white shipping agreement with India covering the whole Indian Ocean.

Sameer Patil, fellow for international security studies at Gateway House, said the British naval deployment should be seen in light of two factors – the UK's efforts to remain relevant amid its exit from the European Union, and Britain's concerns over China's crackdown on Hong Kong.

"The UK has a key presence in the Indian Ocean through the Diego Garcia base that is leased to the US. The British naval deployment shows the importance of the region, especially when other European countries are taking the lead in this area," he said.

https://www.hindustantimes.com/world-news/britain-to-send-largest-warship-carrier-strike-group-to-indian-ocean-next-year/story-l6IfMKhGDGBgbG7U0EM3mL.html

TIMESNOWNEWS.COM

Tue, 08 Dec 2020

Amid border tensions, Chinese soldiers hyperactive in other sectors including Arunachal and Uttarakhand

There have been a series of Chinese Army patrols in the sensitive Lipulekh area, the India-Nepal-China tri-junction

By Srinjoy Chowdhury

New Delhi: Indian and Chinese troops remain face-to-face in East Ladakh and have been so since May. But Chinese soldiers remain hyperactive in other sectors as well, including Arunachal Pradesh and Uttarakhand.

The Arunachal Scouts were involved in a face-off in the Zekhinla Pass and Iphi Lake areas of Arunachal Pradesh with a patrol of about 100 People's Liberation Army soldiers on September 21. While this is a disputed area, it is well inside what India considers to be Indian Territory.

There have been a series of Chinese Army patrols in the sensitive Lipulekh area, the India-Nepal-China tri-junction. This is in Uttarakhand. They have come in about half a dozen times beginning mid-October, sometimes on foot, sometimes in vehicles. The numbers have also varied, from just three or four to over a dozen. What has come as a surprise is the number of patrols-- four -- in just two days, October 23 and 24.

Infrastructure development is also continuing in the area. There are reports of a road opposite Tamza in East Sikkim, a control tower opposite nearby Yakla and new communication infrastructure opposite North Sikkim.

The Chinese have begun work on a number of major projects. They include:

1. The Xining-Chengdu rail link
2. The Lhasa-Linzi railway line and
3. Roads near the Hadigra Pass.

https://www.timesnownews.com/india/article/amid-border-tensions-chinese-soldiers-hyperactive-in-other-sectors-including-arunachal-and-uttarakhand/691465

Tue, 08 Dec 2020

India in Space this month: first private Indian space shuttle, ISRO Gaganyaan delayed

Under the government's new space sector regulator, IN-SPACe, private startup has signed an agreement with ISRO for its first small satellite launch vehicle, Agnikul; ISRO, meanwhile, announced a delayed in its Gaganyaan manned space mission

India is one of the major members of space missions around the world, with the Indian Space Research Organisation (ISRO) leading the nation to the pioneering Mangalyaan and Chandrayaan space missions already. Naturally, there is significant interest in this sector, and this month, two major updates have come from the space sector in India. The first pertains to India's first private space startup agreement with ISRO, while the second affirms the impact that the coronavirus pandemic has had across industries as ISRO announced a delay in its trial missions for Gaganyaan – India's first human spaceflight project.

Agnikul and ISRO's agreement

Earlier this month, on December 3, Chennai-based startup Agnikul Cosmos announced that it has signed a non-disclosure agreement with India's premier space organisation, ISRO, to help develop the nation's first privately developed and operated small satellite launch vehicle. The latter, which the startup calls Agnibaan, will gain a considerable edge by drawing technical expertise from ISRO, along with ISRO's facilities, in its endeavours.

The announcement is the first of its kind after the Indian government opened up the space sector for private players and set up IN-SPACe, a regulatory body that will oversee private company participation in India's space sector. The Agnibaan launch vehicle will operate only for small satellite launches, and uses a semi-cryogenic engine at its core. Its satellite payloads can extend to a maximum of 100kg, and it can deploy these satellites in low-Earth orbits between 160km and 1,000km above Earth.

A Bloomberg-Quint report states that Agnikul has already raised $4 million, or close to Rs 30 crore, from various investors across two funding rounds. It also states that ISRO, along with the startup, will collaboratively work towards developing the Agnibaan launch vehicle and ready it for launch by as early as 2022.

ISRO Gaganyaan delay

While Agnibaan's 2022 launch timeline came as a boost for the startup, ISRO itself has announced that the Covid-19 pandemic has caused a delay in its Gaganyaan mission's initially targeted launch timeline. ISRO Chief K. Sivan stated to the PTI that Gaganyaan is among one of its key missions that are being delayed due to Covid-19. Among other ISRO projects that are facing a delay due to Covid-19 is Aditya-L1, India's first mission to the sun.

Sivan has stated that while the first of the two uncrewed trial missions for Gaganyaan were scheduled for December 2020, that is now being rescheduled to "some time next year-end, or the subsequent year." This essentially means that the first trial mission for Gaganyaan may now be undertaken only some time in 2022. The initial timeline laid out for Gaganyaan targeted the first trial launch in December 2020, followed by the second trial mission in June 2021.

The first human spaceflight mission under Gaganyaan was expected to create history and take off by the end of 2021. That timeline now looks set to be delayed until at least the end of 2022, or

even beyond. Such delays, though, are not unnatural in the space sector. Given the sensitivity of these projects, coupled with the need for ultra high precision engineering, space missions often see certain delays that extend well beyond just one year.

All things considered, 2022 appears to be a potentially vital year for India in space, where both its first human spaceflight and its first private spaceflight may take place.

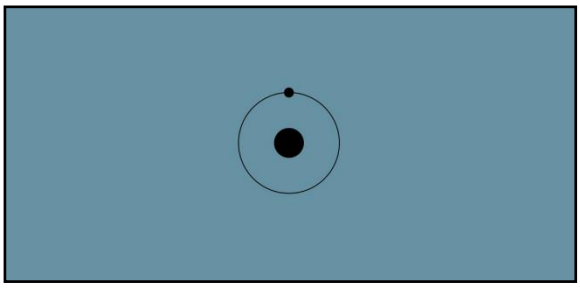
https://www.news18.com/news/tech/india-in-space-this-month-first-private-indian-space-shuttle-isro-gaganyaan-delayed-3154019.html

Tue, 08 Dec 2020

Photocatalytic nanofibers developed for use in efficient hydrogen production

By Bob Yirka

A team of researchers from the U.K., Canada and Hong Kong has developed photocatalytic nanofibers that can be used for the efficient production of hydrogen. In their paper published in the journal *Nature Chemistry*, the group describes how their efficient nanofibers were made. Gregory Peterson, Sanghee Yang and Tae-Lim Choi with Seoul National University have published a News and Views piece in the same journal issue outlining the work done by the team.



Credit: CC0 Public Domain

As scientists around the world continue to grapple with climate change, new ideas on ways to handle the challenge have emerged. One idea involves using hydrogen rather than gasoline to power vehicles and machines. Hydrogen is currently used in a wide variety of applications but its use has not become widespread due to issues such as cost of production and storage issues. In this new effort, the researchers focused on overcoming the problem of cost—their approach mimics nature by creating an artificial photosynthesis system capable of generating hydrogen from water with sunlight serving as the energy source.

In their work, the researchers began by noting that producing hydrogen using water could be made easier by carrying out just the conducting part of the reductive half-reaction for splitting water using a sacrificial reductant. They also noted that other attempts to make such systems have suffered from low quantum yield, poor stability and low catalyst turnover numbers. To get around these problems, the team developed a self-assembling nanofiber system.

The system uses block copolymers and a crystallizable core-forming block along with a shell-forming block containing either a photosensitizer or a cobalt catalyst. This resulted in the creation of a self-assembly system where the materials grew into stable nanofibers with catalyst moieties and a photosensitizer in close proximity to one another. By distributing the components in gradient fashion, the nanofibers could be made into structures (with lengths from 95 to 3528 nm) that resembled bottle brushes without the internal wire. The resulting structure could then be used to convert water to hydrogen using sunlight.

More information: Jia Tian et al. Tailored self-assembled photocatalytic nanofibres for visible-light-driven hydrogen production, *Nature Chemistry* (2020). DOI: 10.1038/s41557-020-00580-3

Gregory I. Peterson et al. Polymers producing hydrogen, *Nature Chemistry* (2020). DOI: 10.1038/s41557-020-00582-1

Journal information: *Nature Chemistry*

https://phys.org/news/2020-12-photocatalytic-nanofibers-efficient-hydrogen-production.html

PHYS.ORG

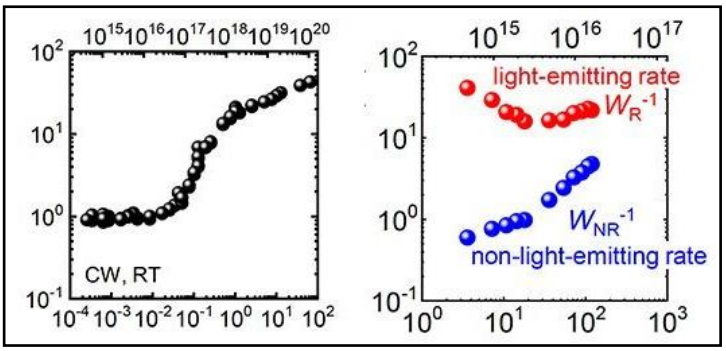
Tue, 08 Dec 2020

To accelerate or decelerate in the light-emitting process of zinc-oxide crystals

By Kazunobu Kojima

Highly efficient electronic and optical devices are essential for reducing energy consumption and for the realization of an eco-friendly society.

ZnO is an attractive material among direct-bandgap semiconductors. They possess light-emitting properties as well as toughness to sustain large electric field that enables them to power electronic devices because of their large bandgap energy and large exciton binding energy. This also makes them suitable in radiation-resistant thin-film-transistors and heterostructure field-effect-transistors.



The IQE curve obtained by the ODPL spectroscopy (left). The Y axis represents the IQE percentage, the lower X axis represents the excitation light power density Pcw (W cm-2) whilst the upper X axis represents the excitation rate G (sec^{-1} cm^{-2}). The separated light-emitting rate (WR) and non-light-emitting rate (WNR) (right). The Y axis represents the inverse of rate (ns), the lower X axis represents the excitation light power density Ppulse (nJ/cm2) whilst the upper X axis represents the excited carrier concentration nini (cm^{-2}). Credit: Tohoku University

In high-quality ZnO crystals, nonradiative recombination centers (NRCs) are important for the near-band-edge (NBE) emission. These centers act as undesired energy dissipation channels and reduce the IQE of the NBE emission.

To understand whether the light-emitting process or the non-light-emitting process was more important in determining the behavior of IQE, Kojima and his colleagues measured the IQE values of ZnO crystal grown by the hydrothermal method. To do so, they employed a technique created by Kojima and fellow researchers known as omnidirectional photoluminescence (ODP) spectroscopy—a nondestructive method for probing semiconducting crystals with light to detect defects and impurities.

The IQE characteristics in ZnO crystals were examined under photo pumping conditions. IQE values indicated a constant behavior for weak photo pumping conditions and a monotonic increase for strong excitation. Because a significant decrease was observed for the non-light-emitting process with photo pumping, the origin of the IQE increase was revealed to be dominated by the deceleration of the non-light-emitting process due to the saturation of NRCs.

"Obtaining a quantitative breakdown of IQE from both processes allows us to better design semiconductors to improve IQE," said Professor Kazunobu Kojima, lead author of the study.

More information: Kazunobu Kojima et al. Correlation between the internal quantum efficiency and photoluminescence lifetime of the near-band-edge emission in a ZnO single crystal grown by the hydrothermal method, *Applied Physics Express* (2020). DOI: 10.35848/1882-0786/abcd73

https://phys.org/news/2020-12-decelerate-light-emitting-zinc-oxide-crystals.html

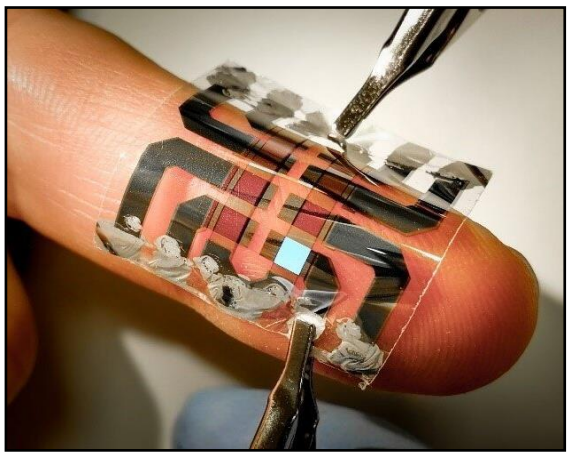
PHYS.ORG

Tue, 08 Dec 2020

The lightest light – the future of digital displays and brain science

A team of scientists from the University of St Andrews has developed a new way of making the most durable, lightweight and thinnest light source available so far, which could revolutionize the future of mobile technologies and pave the way for new advances in brain science.

Writing in two separate papers and published in *Nature Communications* today (Monday 7 December), the new research into the development of organic LEDs, led by the School of Physics and Astronomy at the University of St Andrews, has implications not only for the future designs of mobile phones and tablets but could also play a key role in neuroscience research and clinical technologies used to help patients who suffer from neurological diseases.



Flexible, ultra-lightweight and highly durable organic LEDs promise new forms of wearable displays. Credit: University of St Andrews

Using a combination of organic electroluminescent molecules, metal oxide and biocompatible polymer protection layers, the scientists created organic LEDs that are as thin and flexible as the everyday cling film we use at home. The new light sources developed will have future implications for digital displays and can be used to make lighter and thinner displays for phones and tablets; displays that are big when we look at them, but that can be folded or rolled up when not in use.

In the longer term, these new LEDs could also see use in treatments for neurological diseases in which light-gated proteins are deployed to modulate brain activity in patients.

Earlier attempts to develop ultra-thin organic LEDs found they struggled with poor stability in air and moist environments. However, the new LEDs were found to be extremely robust with tests showing they can survive under water for weeks and withstand exposure to solvents and gas plasmas. The LEDs can also be bent around the edge of a razor blade thousands of times and still function perfectly—a simple experiment that highlights their extreme durability.

The robustness, extreme form factor and mechanical flexibility of the new light sources opens several possibilities for future use and applications beyond mobile technologies. For instance, they might be integrated into work surfaces, packaging and clothing as self-emissive indicators without adding weight and volume to the product. Furthermore, their stability under high humidity and in water makes them ideally suited for wearable applications requiring skin-contact and for use as implants in biomedical research.

Lead scientist for both studies, Professor Malte Gather from the School of Physics and Astronomy, said: "Our organic LEDs are very well suited to become new tools in biomedical and neuroscience research and may well find their way into the clinic in the future."

Working with Dr. Stefan Pulver from the School of Psychology and Neuroscience in a separate study, the scientists used light from an array of miniature organic LEDs and a neuroscience method called optogenetics to direct the locomotion of fly larvae in a highly controlled fashion.

Delivering light to specific body segments of crawling fly larvae allowed the researchers to stimulate and silence sensory neurons in a reliable manner. Depending on when and where light was delivered, larvae started to crawl forward or backward, with the dynamics of light stimulation controlling the speed of crawling and other aspects of animal movement.

"While the precise neuronal mechanism behind the animal response remains unknown, we are now in a much better position to test a range of hypotheses related to the locomotion of these organisms," explains Dr. Caroline Murawski, from the School of Physics and Astronomy and the first author of the second study.

The researchers are currently combining their breakthrough in making light, flexible and robust organic LEDs with what they have learned about controlling neural activity in flies to make light sources that can be implanted into the brain of vertebrate organisms. This will allow researchers to study brain function in a less invasive and more versatile manner than existing techniques.

In addition to contributing to future development of mobile displays, and opening new avenues for basic research, the technologies developed in these studies could ultimately be used to improve clinical treatments by creating optical interfaces that send information directly to the brain of human patients who suffer from a loss of vision, hearing or sense of touch.

The papers, "A substrateless, flexible, and water-resistant organic light-emitting diode," by C. Keum et al, and "Segment-specific optogenetic stimulation in Drosophila melanogaster with linear arrays of organic light-emitting diodes," by C. Murawski et al, are published in *Nature Communications*.

More information: Caroline Murawski et al. Segment-specific optogenetic stimulation in Drosophila melanogaster with linear arrays of organic light-emitting diodes, *Nature Communications* (2020). DOI: 10.1038/s41467-020-20013-6

Changmin Keum et al. A substrateless, flexible, and water-resistant organic light-emitting diode, *Nature Communications* (2020). DOI: 10.1038/s41467-020-20016-3

Journal information: *Nature Communications*

https://phys.org/news/2020-12-lightest-future-digital-brain-science.html

PHYS.ORG

Tue, 08 Dec 2020

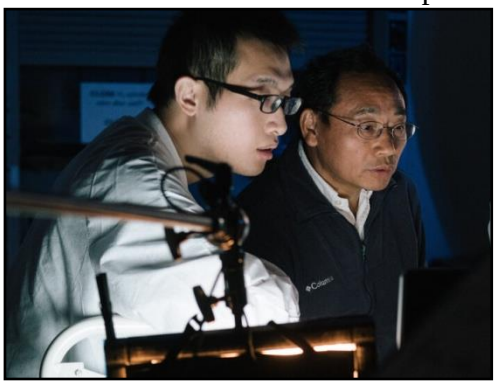
Researchers call for renewed focus on thermoelectric cooling

By Jeannie Kever

Almost 200 years after French physicist Jean Peltier discovered that electric current flowing through the junction of two different metals could be used to produce a heating or cooling effect, scientists continue to search for new thermoelectric materials that can be used for power generation.

Researchers writing in *Nature Materials*, however, say it is time to step up efforts to find new materials for thermoelectric cooling.

Bismuth tellurium compounds have been used for thermoelectric cooling for more than 60 years, and the researchers say the fact that there is already a commercial demand for the technology suggests better materials can expand the market.



Zhifeng Ren, right, director of the Texas Center for Superconductivity at UH, and researcher Jun Mao have called for an increased emphasis on new materials for thermoelectric cooling. Credit: University of Houston

"Most work is focused on high temperature materials for power generation, but there's no market there yet," said Zhifeng Ren, director of the Texas Center for Superconductivity at the University of Houston and corresponding author for the paper. "Cooling is an existing market, a billion dollar market, and there has not been

much progress on materials."

He and co-authors Jun Mao, a researcher at TcSUH, and Gang Chen, a mechanical engineer and nanotechnologist at the Massachusetts Institute of Technology, call for increased focus on the development of new advanced materials that work at or near room temperature.

The three were part of a group that in 2019 reported in the journal *Science* a new material that works efficiently at room temperature while requiring almost no costly tellurium, a major component of the current state-of-the-art material.

The material, comprised of magnesium and bismuth, was almost as efficient as the traditional bismuth-tellurium material. Work to improve the material is ongoing, Ren said.

Thermoelectric materials work by exploiting the flow of heat current from a warmer area to a cooler area, providing an emission-free source of energy. The materials can be used to turn waste heat—from power plants, automobile tailpipes and other sources—into electricity, and a number of new materials have been reported for that application, which requires materials to perform at higher temperatures.

Thermoelectric cooling modules have posed a greater challenge because they have to work near room temperature, making it more difficult to achieve a high thermoelectric figure-of-merit, a metric used to determine how efficiently a material works. Thermoelectric materials used for power generation more easily achieve a high figure-of-merit because they operate at higher temperatures—often around 500 Centigrade, or about 930 Fahrenheit.

But there are also advantages to thermoelectric cooling devices: they are compact, operate silently and can almost instantaneously switch between heating and cooling, allowing precise temperature control. They also operate without generating ozone-damaging greenhouse gases.

They are used mainly for small applications, including the transport of medical supplies and cooling laser diodes.

"For large-scale cooling devices, a compressor is still more efficient," said Ren, who is also M.D. Anderson Chair Professor of Physics. "For smaller systems or for any cooling application requiring very precise temperature control, regular compressor-driven cooling is not as good."

But the discovery of new and better materials could expand the market.

"If you can find materials with a higher figure-of-merit, you can have a very competitive performance for refrigerators or even air conditioning," Ren said. "It's not there yet, but I don't see why it cannot be in the future."

More information: *Jun Mao et al. Thermoelectric cooling materials, Nature Materials (2020).* *DOI: 10.1038/s41563-020-00852-w*

Journal information: *Nature Materials* , *Science*

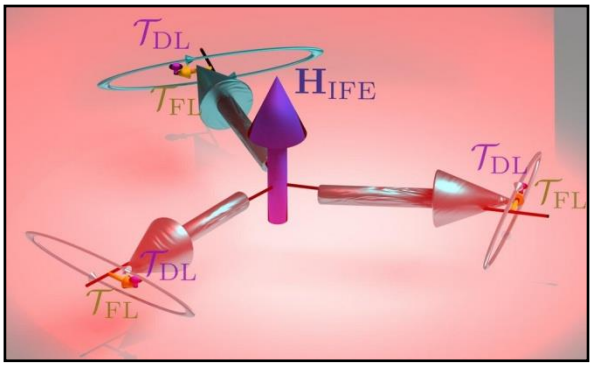
https://phys.org/news/2020-12-renewed-focus-thermoelectric-cooling.html

Tue, 08 Dec 2020

A neglected mechanism in antiferromagnets may be key to spintronics

Enormous efforts are being made worldwide in a technological field that could far surpass the capabilities of conventional electronics: Spintronics. Instead of operating based on the collective movement of charged particles (electrons), spintronic devices could perform memory storage and data transmission by manipulating spin, an intrinsic property of elementary particles related to angular momentum and from which many magnetic characteristics in materials arise. Unfortunately, controlling spin has proven to be a challenging endeavor, leading physicists and engineers to look for efficient materials and techniques to do so.

In this regard, antiferromagnetic materials (AFMs) are good candidates for spintronics because they are resistant to external magnetic fields and allow for switching spin values in timescales of picoseconds. One promising strategy to manipulate spin orientation in AFMs is using an optical laser to create extremely short-lived magnetic field pulses, a phenomenon known as the inverse Faraday effect (IFE). Although the IFE in AFMs generates two very distinct types of torque (rotational force) on their magnetization, it now seems the most important of the two has somehow been neglected in research.



Optical laser pulses generate two types of torque, field-like (?FL) and damping-like (?DL), that affect the three magnetizations of YMnO3. The damping-like torque has a pronounced effect on the inherent elliptically oscillating magnetizations, producing a large instantaneous change in antiferromagnetic ordering. Credit: Tokyo Tech

In a recent study published in *Nature Communications*, a trio of scientists, including Professor Takuya Satoh from the Tokyo Tech, Japan, delved deep into this issue. Spin dynamics in AFMs are described by a sum of two terms: field-like torque and damping-like torque. The latter, as the word 'damping' implies, is related to the gradual decay (or dying off) of the spin oscillations triggered by the optical pulses on the material.

Until now, scientists studied the damping-like torque only from the perspective of spin relaxation after excitation, believing its amplitude to be small during the ultrashort spin excitation process. In this study, however, Prof Satoh and colleagues found it to be, in some cases, the main player in terms of spin reorientation due to the IFE. Through theoretical analyses and experimental verification in both YMnO3 and HoMnO3, they clarified the conditions under which the damping effect becomes the dominant spin excitation mechanism.

A simplified interpretation of the findings can be as follows. Imagine a hanging pendulum (magnetization direction) oscillating in wide arcs, drawing a very pronounced ellipse. The damping-like torque produces a large instantaneous perturbation in the direction of the small diameter, 'tipping it off' and causing it to lean like a spinning top that is about to fall. "The otherwise small damping-related magnetization causes a large spin canting because of the extreme ellipticity inherent to AFMs," explains Prof Satoh. "Considering that it is possible to adjust the strength of the damping by strategically selecting the ions in the AFM, we might have found a way to tune material properties for specific spintronic applications," he adds.

The trio of scientists also tested how spin dynamics are influenced by temperature, which affects and even destroys antiferromagnetic order past certain thresholds. By putting the materials close to the critical transition points, they managed to produce a more pronounced effect from damping-type torque. Excited about the results, Prof Satoh remarks: "Our results indicate that optically generated torques might provide the long sought-after tool enabling the efficient realization of ultrafast spin switching in AFMs."

Although much more research will certainly be needed before applied spintronics becomes a reality, uncovering efficient mechanisms for spin manipulation is obviously among the first steps. This study proves that such mechanisms might be hidden in phenomena we know and neglect!

More information: Christian Tzschaschel et al, Efficient spin excitation via ultrafast damping-like torques in antiferromagnets, *Nature Communications* (2020). DOI: 10.1038/s41467-020-19749-y

Journal information: *Nature Communications*

https://phys.org/news/2020-12-neglected-mechanism-antiferromagnets-key-spintronics.html

PHYS.ORG

Tue, 08 Dec 2020

SARS-CoV-2 in wastewater solids could help monitor COVID-19 spread

Accurately identifying changes in community COVID-19 infections through wastewater surveillance is moving closer to reality. A new study, published in *Environmental Science & Technology*, identifies a method that not only detects the virus in wastewater samples but also tracks whether the infection rates are trending up or down.

Testing wastewater—a robust source of COVID-19 as those infected shed the virus in their stool—could be used for more responsive tracking and supplementing information public health officials rely on when evaluating efforts to contain the virus, such as enhanced public health measures and even vaccines when they become available.

City of San José Environmental Services Department's environmental inspectors Isaac Tam and Laila Mufty deploy an autosampler into a manhole at the San José - Santa Clara Regional Wastewater Facility. Credit: City of San José Environmental Services Department

The test works by identifying and measuring genetic material in the form of RNA from SARS-COV-2, the virus that causes COVID-19. "This work confirms that trends in concentrations of SARS-CoV-2 RNA in wastewater tracks with trends of new COVID-19 infections in the community. Wastewater data complements the data from clinical testing and may provide additional insight into COVID-19 infections within communities," said co-senior author Alexandria Boehm, a Stanford professor of civil and environmental engineering.

As the U.S. grapples with record-breaking daily transmission rates, obtaining more information to track surges and inform public health policies in local communities remains key to managing the deadly virus. COVID-19 can be particularly hard to track, with many asymptomatic or mild cases going undetected. Those who do get tested can still spread the infection before they receive test results, inhibiting quick identification, treatment and isolation to slow the spread. Faster identification of case spikes could allow local officials to act more quickly before the disease reaches a crucial tipping point where transmission becomes difficult to contain and hospitalizations overwhelm the local health system.

Tracking COVID-19 through wastewater surveillance of RNA is gaining steam across the country and could alert decision-makers about potential outbreaks days before individuals recognize symptoms of the virus. The viral RNA can be isolated from sewage in wastewater treatment facilities and identified through a complicated and highly technical recovery process, with the relative amounts in wastewater correlating to the number of cases. Anyone with a toilet connected to a sewer system could be depositing these biological samples on a regular basis, making wastewater sampling an inclusive source of information about COVID-19 in a community.

With this in mind, the researchers sought to advance the effectiveness and accuracy of wastewater surveillance for COVID-19 by comparing the ability to detect the virus in two forms of wastewater—a mostly liquid influent or a settled solid (sediment settled in a tank). Most current research focuses on influent samples; however, the team notes many viruses have an affinity for

solids and expected higher concentrations of the virus in these samples, which could improve detection and consistency.

The researchers found the settled solid samples had higher concentrations and better detection of SARS-CoV-2 compared to the liquid versions. "These results confirmed our early thinking that targeting the solids in wastewater would lead to sensitive and reproducible measurements of COVID-19 in a community. This means that we can track upward trends when cases are still relatively low," said co-senior author Krista Wigginton, an associate professor in civil & environmental engineering from the University of Michigan. Wigginton and Boehm co-lead the research.

The researchers then tested about 100 settled solid samples from the San Jose-Santa Clara Regional Wastewater Facility from mid-March to mid-July 2020, tallying daily concentration numbers. Using statistical modeling they compared these concentrations with COVID-19 confirmed cases provided by the county. Their results tracked the trend of the county's cases, decreasing in both May and June and peaking in July.

The research presents a possible way to identify new outbreaks, find hotspots, confirm the decrease of cases and inform public health interventions. As schools reopen, the technology could be implemented by districts to identify whether community virus circulation is decreasing. It also has the potential to be used in areas lacking the resources for robust individual clinical testing, such as testing sites in Illinois that reportedly closed early after running out of tests.

There are still pieces of information needed to better understand the limitations of wastewater testing and improve what can be gleaned, the researchers note. The virus's rate of decay in wastewater, the extent and timeline of viral RNA shedding when sick and varying operations of different wastewater plants all have the potential to impact results. Future studies on these factors could lead to better insights about case trends.

The team is launching a new pilot this month to sample up to eight wastewater treatment plants within California daily, with a 24-hour turnaround time. The pilot aims to better understand what types of almost real-time data are useful to public health officials. Implementing the methods and framework developed by the team and pilot study could also be used in the future to monitor wastewater for pathogens beyond COVID-19 circulating within communities.

More information: "SARS-CoV-2 RNA in Wastewater Settled Solids Is Associated with COVID-19 Cases in a Large Urban Sewershed" *Environmental Science & Technology* (2020). pubs.acs.org/doi/abs/10.1021/acs.est.0c06191

Journal information: *Environmental Science & Technology*

https://phys.org/news/2020-12-sars-cov-wastewater-solids-covid-.html

Medical Dialogues
.....Daily Dose of Health & Medical News

Tue, 08 Dec 2020

COVID-19: Antiviral drug Molnupiravir blocks virus transmission within 24 hours, claims Study

"This is the first demonstration of an orally available drug to rapidly block SARS-CoV-2 transmission. MK-4482/EIDD-2801 could be game-changing," said study author Richard Plemper from GSU

By Ruchika

New York: Researchers have discovered that the treatment of SARS-CoV-2 infection (Covid-19) with a new antiviral drug, MK-4482/EIDD-2801 or Molnupiravir, completely suppresses the virus transmission within 24 hours.

According to the study, published in the journal Nature Microbiology, the research team from Georgia State University (GSU) originally discovered that the drug is potent against influenza viruses.

"This is the first demonstration of an orally available drug to rapidly block SARS-CoV-2 transmission. MK-4482/EIDD-2801 could be game-changing," said study author Richard Plemper from GSU. Because the drug can be taken by mouth, treatment can be started early for a potentially three-fold benefit: inhibit patients' progress to severe disease, shorten the infectious phase to ease the emotional and socio-economic toll of prolonged patient isolation and rapidly silence local outbreaks.

"We noted early on that MK-4482/EIDD-2801 has broad-spectrum activity against respiratory RNA viruses and that treating infected animals by mouth with the drug lowers the amount of shed viral particles by several orders of magnitude, dramatically reducing transmission," said Plemper. "These properties made MK-4482/EIDD/2801 a powerful candidate for pharmacologic control of Covid-19," Plemper added. In the study, the research team repurposed MK-4482/EIDD-2801 against SARS-CoV-2 and used a ferret model to test the effect of the drug on halting virus spread.

The team believe ferrets are a relevant transmission model because they readily spread SARS-CoV-2, but mostly do not develop severe disease, which closely resembles SARS-CoV-2 spread in young adults. The researchers infected ferrets with SARS-CoV-2 and initiated treatment with MK-4482/EIDD-2801 when the animals started to shed virus from the nose. "When we co-housed those infected and then treated source animals with untreated contact ferrets in the same cage, none of the contacts became infected," said study co-author Josef Wolf.

If these ferret-based data translate to humans, Covid-19 patients treated with the drug could become non-infectious within 24 hours after the beginning of treatment. "MK-4482/EIDD-2801 is in advanced phase II/III clinical trials against SARS-CoV-2 infection," the authors wrote.

https://medicaldialogues.in/news/industry/pharma/covid-19-antiviral-drug-molnupiravir-blocks-virus-transmission-within-24-hours-claims-study-72181

livemint

Tue, 08 Dec 2020

India spearheading covid fight, 30 vaccines in developmental stage: Health min

- ***The minister informed that two of the vaccines are in the most advanced stage of development***
- ***Dr Reddy's Laboratories will distribute the Russian vaccine in the country after conducting final-stage human trials and receiving regulatory approval***

India is at the forefront of developing covid-19 vaccines with around 30 of them being in different stages of development, said Union Health Minister Dr Harsh Vardhan on Monday.

Speaking at the DST-CII India Portugal Technology Summit 2020, Vardhan informed that two of the vaccines are in the most advanced stage of development.

"Covaxin developed through ICMR-Bharat Biotech collaboration and Covishield from the Serum Institute of India are in phase 3 of clinical trials. Our premier institution - the Indian Council of Medical Research - is involved in their trial executions," said the minister.

Dr Harsh Vardhan at the DST-CII India Portugal Technology Summit 2020 (PIB)

"India is also hosting clinical trials for all the major vaccine contenders. Serum Institute of India, the world's largest vaccine manufacturer, is conducting trials for the vaccine developed by Oxford University. ZydusCadila is also conducting Ph2 trial of an indigenous DNA Vaccine," he added.

He further informed that Dr Reddy's Laboratories, one of India's pharma giants, will distribute the Russian vaccine in the country after conducting final-stage human trials and receiving regulatory approval. He disclosed that India is among the top ten countries in the world with respect to number of patents filed.

Highlighting India's efforts to fight the covid-19 battle, he said: "More than 100 start-ups supported by the central government have provided innovative products and solutions to overcome challenges posed by covid-19."

https://www.livemint.com/news/india/india-spearheading-covid-fight-30-vaccines-in-developmental-stage-health-min-11607349751047.html