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समाचार पत्रों से चयनित अंश
Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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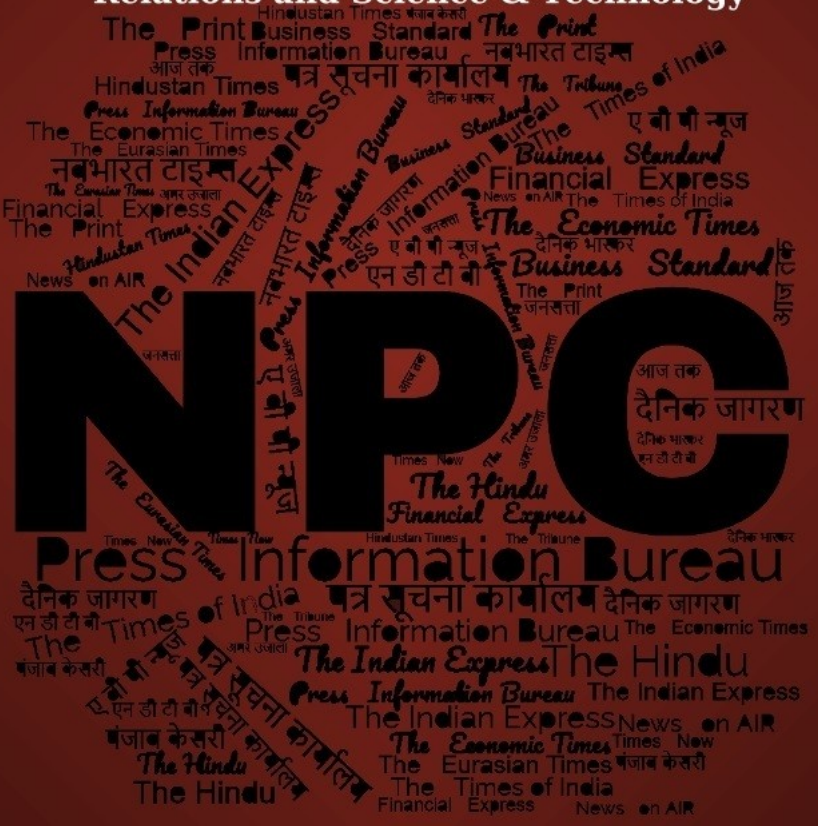

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The Indian EXPRESS

Wed, 31 July 2024

‘Tarang Shakti’, largest multilateral air exercise in India, to be held in 2 phases in Aug-Sept

Air forces from the US, Germany, France and several other countries will take part in ‘Tarang Shakti’, the largest multilateral air exercise in India that will showcase the country’s defence prowess and provide a platform to participating forces to foster interoperability, a top IAF official said on Wednesday.

First phase of ‘Tarang Shakti’ will be held at Sulur in Tamil Nadu from August 6-14, and the second phase from August 29-September 14 at Rajasthan’s Jodhpur. Russia and Israel will not be participating in the exercise, officials said. These two countries are India’s defence partners.

Fifty-one countries were invited to take part in the exercise and nearly 30 of them will be taking part in it, the officials said. Indian Air Force’s LCA Tejas, Mirage 2000, and Rafale to take part in the mega exercise, they added.

Air Marshal A P Singh, Vice Chief of the Air Staff (VCAS), told reporters here after a PPT presentation by an IAF officer that this exercise will also showcase India’s defence prowess and move towards ‘Atmanirbharta’ in defence.

Rafale from France, Typhoon from Germany, F-18 from Australia and F-16 from Greece, among others, will participate in the ‘Tarang Shakti’ exercise. Air Marshal Singh termed it a “landmark event” in Indian military history and the largest international air exercise ever conducted in India with invitation extended to 51 countries.

“And, we have confirmation from 10 countries which will participate with their assets, and 18 countries as observers. One more country likely to join in, so including India it is likely to become a 30-country exercise,” he said.

Asked if LCA Tejas Mk-1A will take part in the exercise, the VCAS said, “Tejas Mk-1A, we all know we have not got our first aircraft delivery, it is running behind schedule. And, it is not expected to be available for this exercise.” Many airlines will have to reschedule their flights a little bit and reroute their flights, he said.

On a query on Agniveers, Air Marshal Singh said that all those Agniveers, who are posted at the bases where the exercise will be taking place, will participate. There is no specific role being given to Agniveers, he said.

Exercise 'Tarang Shakti' aims to strengthen strategic relationship with "our friends from international community", he added.

"Complex missions are planned to enhance our mutual understanding of air operations, air power application and also practising multiple combat scenarios in realistic environment. It is also an excellent opportunity for all of us to share our best practices with each other," he said.

The first part will be conducted in Sulur area in south India, and this phase will see four countries — Germany, France, Spain and the UK — with their assets.

"Phase two will be held at Jodhpur and that will see participation from Australia, Bangladesh, Greece, Singapore, the UAE and the US with their assets. Along with that there will be 18 countries which will be sending observers and not their air assets," the VCAS told reporters.

Given the diverse participation, and also to cater to requirements of certain friendly foreign countries, "we have decided to do it in two parts", he added.

From India, LCA Tejas, Mirage 2000, Rafale, LCH Prachand, Dhruv and Rudra will be taking part in the flying part showcasing India's indigenous products. Indian Navy will be participating in the phase one with an aircraft, Air Marshal Singh said.

"One of the main objectives of this exercise is to showcase the booming indigenous defence ecosystem in India and also to highlight our resolve towards Atmanirbharta," he said.

Asked if Russia was sent an invitation for the exercise, he said, "Russia was there, but, I think, because of their ongoing conflict they have not been able to take part." On a query if Israel was invited, a senior official present during the press conference said, a "communication" had happened with its defence attache, and it was indicated that "it was not the right time".

Air Marshal Singh said it will be a display of "Indian capabilities and capacity" during this exercise, both in flight and in exhibition. "Our endeavour will be to demonstrate our energy and dynamism during this exercise, learn from each other, learn operating procedures, tactics, strategies. We also aim to strengthen our cultural and diplomatic relations with these countries. We look forward to the exercise to foster deeper cooperation and understanding among the participating forces," he added.

CDS and air chiefs of several countries are also slated to participate in it, the officials said. "One day will be dedicated to distinguished visitors in both the phases," Air Marshal Singh said.

"The over-arching aim is to build mutual trust, explore avenues for interoperability and learning new things from each other, and also showcase our indigenous defence prowess," he said.

A defence exposition has also been planned as part of the exercise. There will be participation from the DRDO, defence PSUs, aviation industry, CSR labs, and top-notch startups, the VCAS said.

https://indianexpress.com/article/india/tarang-shakti-largest-multilateral-air-exercise-in-india-to-be-held-in-2-phases-in-aug-sept-9487571/

The Indian EXPRESS

Thu, 01 Aug 2024

75 camps in forests, eye on tunnels, and weapons with village defence committees – Centre's plan to tackle terror in Jammu

Over 75 camps with personnel of the Special Operations Group (SOG) in forest areas; regular training for Village Defence Committees (VDCs) with traditional as well as semi-automatic weapons; and an increased deployment of BSF personnel on the border with a special focus on tunnels – these are some of the key points of a security plan the Centre has prepared for Jammu, The Indian Express has learnt.

In the wake of an uptick in terror attacks in the region, including many that inflicted casualties on security forces, multiple meetings were held by Union Home Minister Amit Shah and senior ministry officials with National Security Advisor Ajit Doval, J&K Lieutenant Governor Manoj Sinha, and senior officials from the Army and CRPF.

According to a source, questioning of those suspected to have provided logistics to terrorists suggests a group of 30-40 persons from Pakistan, belonging to the Jaish-e-Mohammed, have infiltrated into Jammu and are hiding in the forests of Kathua, Doda, Udhampur, Kishtwar and Samba.

"Most of the people approached by them are local cattle traders. They take down their details and give them Rs 500-1,000, and ask for enough food to be packed for seven days," said a source.

The Jammu region shares 485 kilometres of the border with Pakistan, interspersed with dense forests and mountainous terrain.

According to sources, strategic points have been identified to set up SOG camps, where personnel will be deployed from the local police, CRPF and Army. "They will conduct daily patrolling to look for terrorists," a source said.

Significantly, it has also been decided to restart regular training for VDCs in using weapons such as the traditional .303 rifles and semi-automatic SLRs. "It also came to light that terrorists are using the personal hotspot connections of villagers to make VoIP (voice over internet protocol) calls to their handlers in Pakistan. Efforts will be made to spread awareness among villagers not to share their internet hotspot or WiFi password with any stranger. Punitive action will be taken if they do," said a source.

Recently, the Centre also ordered the extraction of two BSF battalions, comprising more than 2,000 personnel, from Odisha to beef up security in the Jammu region.

"The decision was taken to strengthen the deployment in the border areas, specifically around tunnels to prevent infiltration. The troops of these two units are expected to be based in Samba and near the Jammu-Punjab border," a source said.

The BSF guards more than 2,289 kilometres of the International Boundary that runs along Jammu, Punjab, Rajasthan and Gujarat in India's western flank. The Jammu area is vulnerable to cross-

border tunnels and its dense forests and mountainous terrain make it an ideal ground for terrorists to launch attacks against civilians and security forces.

On Tuesday, Union Minister of State for Home Affairs Nityanand Rai told the Lok Sabha that the Centre has a policy of zero tolerance against terrorism. “The approach of the government is to dismantle the terror ecosystem. Security measures are being strengthened to sustain peace and stability in J&K. The strategies adopted and action taken for containing acts of terror incidents in Jammu and Kashmir include effective, continuous and sustained actions against terrorists and support structures; dismantling of terror ecosystem using whole of government approach; crackdown on terror finance such as seizure/attachment of properties belonging to terrorists and their associates under relevant section of the law; and banning of anti-national organisations,” he said.

Rai also said preventive operations involve identifying the strategic supporters of terrorism and initiating investigations to expose their mechanisms of aiding and abetting terrorism. He said that a “multi-pronged strategy to prevent infiltration” is being followed, including “enhancement of counter insurgency grid, special focus on modernisation and strengthening of security equipment, intensified cordon and search operations to effectively deal with challenges posed by terrorist organisations, sharing of intelligence inputs on a real-time basis among all security forces operating in Jammu and Kashmir, and day and night area domination”.

“Fourteen civilians killed, 14 security personnel killed, 24 encounter/counter-terror operations, and 11 terror initiated incidents have been reported this year till July 21,” he said.

https://indianexpress.com/article/india/camps-forests-tunnels-weapons-defence-committees-terror-jammu-9486654/

THE ECONOMIC TIMES

Wed, 31 July 2024

Thales-Garuda alliance seeks to propel India as a global drone hub by 2030

Thales, a global leader in aerospace technology, and Garuda Aerospace have signed a Memorandum of Understanding (MoU) to promote the growth and innovation of the drone sector in India. The partnership aims to develop advanced Unmanned Traffic Management (UTM) systems and foster technological advancements in drone operations, aligning with India's vision of becoming a global drone hub by 2030.

Expertise and Integration

Under the agreement, Thales will leverage its extensive expertise in UTM solutions, UAV detection, and system integration. These technologies are essential for managing drone operations safely and securely, ensuring a controlled airspace. Thales has a proven track record in designing and implementing end-to-end solutions for drone integration, collaborating closely with civil aviation authorities and air navigation service providers. Their capabilities include managing UAV

flight authorizations, providing radar and sensor technology for UAV detection, and developing sophisticated UTM systems.

Garuda Aerospace's Role

Established in 2015, Garuda Aerospace is a key player in the Indian drone sector, specializing in high-tech drone solutions for various industries, including the armed forces. With a market presence spanning over 400 districts and a fleet of more than 2,500 drones, Garuda Aerospace is wellpositioned to integrate Thales' advanced UTM technology into its operations, enhancing service offerings and operational efficiency.

Transforming India's Drone Landscape

The collaboration aims to revolutionize India's drone landscape by promoting technological advancements and innovation in drone-based applications. The MoU, set to come into effect in August 2024, will see both companies working together to develop UTM systems tailored to India's unique requirements. This partnership aligns with the Indian government's vision of Aatmanirbhar Bharat (Self-Reliant India) and seeks to position India as a significant player in the global drone industry.

Ashish Saraf, Vice President and Country Director of Thales in India, emphasized the government's support for the drone ecosystem, stating, "We are proud to partner with Garuda Aerospace in paving the way for the development of advanced UTM systems in India by leveraging our extensive global experience and expertise in aeronautical solutions. This collaboration aligns well with the Aatmanirbhar Bharat vision and seeks to support India in realizing its ambition to become a major global hub for drones by 2030."

Agnishwar Jayaprakash, Founder and CEO of Garuda Aerospace, highlightedthe potential impact of the partnership on the Indian drone sector. "We are thrilled to partner with Thales in driving technological innovations for the development of drones and drone-based applications in India. Equipped with the largest fleet in India coupled with Thales' UTM technology and their worldwide experience, Garuda Aerospace will aim to revolutionize the drone sector and play a key role in the transformation of India into a global drone powerhouse," he said.

Thales, headquartered in France, is a global leader in advanced technologies specializing in defense, aeronautics, space, and cybersecurity. The company invests heavily in research and development, focusing on innovations such as AI, cybersecurity, quantum technologies, cloud technologies, and 6G. With over 81,000 employees in 68 countries, Thales generated sales of €18.4 billion in 2023.

In India, Thales has been present since 1953, with operational offices in Noida, Delhi, Bengaluru, and Mumbai. The company employs over 2,200 people in India, contributing significantly to the country's growth in defense, aerospace, and cybersecurity sectors.

Garuda Aerospace, founded in 2015, is India's leading drone tech start-up, focused on disrupting the precision agri-tech and Industry 4.0 sectors.

The company boasts the largest drone fleet in India, with over 2,500 drones and 4,000 pilots. Garuda Aerospace offers 50 types of services and manufactures 30 types of drones, serving clients

such as TATA, Godrej, Adani, and Reliance. The company aims to positively impact one billion lives using affordable precision drone technology.

https://economictimes.indiatimes.com/news/defence/thales-garuda-alliance-seeks-to-propel-india-as-a-global-drone-hub-by-2030/articleshow/112169084.cms

THE ECONOMIC TIMES

Thu, 01 Aug 2024

India, China hold talks over Ladakh standoff, review LAC situation

The 30th meeting of the Working Mechanism for Consultation & Coordination on India-China Border Affairs (WMCC) was held on Wednesday where the two sides held in-depth dialogue on addressing the remaining irritants along the Line of Actual Control (LAC) at the earliest. This came following two meetings between the foreign affairs ministers of India and China recently in Astana and Vientiane.

The two sides reviewed the current situation along the LAC with a view to finding an early resolution of the outstanding issues, according to officials.

Restoration of peace and tranquillity, and respect for the LAC are an essential basis for restoration of normalcy in bilateral relations, an official said, adding, the two sides agreed on the need to jointly uphold peace and tranquillity on the ground in the border areas in accordance with relevant bilateral agreements, protocols and understandings reached between the two governments.

The discussion at the meeting was in-depth, constructive and forward-looking, an official said. Both sides agreed to maintain the momentum through the established diplomatic and military channels.

Gourangalal Das, Joint Secretary (East Asia), from the Ministry of External Affairs led the Indian delegation. The Chinese delegation was led by Hong Liang, Director General of the Boundary & Oceanic Department of the Chinese Ministry of Foreign Affairs.

The leader of the Chinese delegation also called on the foreign secretary.

External Affairs Minister S Jaishankar met a Member of the Communist Party of China (CPC) Political Bureau and Foreign Minister Wang Yi in Laos last week on the sidelines of the Asean-related Foreign Ministers' Meetings. The meeting gave the two ministers an opportunity to review the situation since their last meeting in Astana on July 4.

https://economictimes.indiatimes.com/news/defence/india-china-hold-talks-over-ladakh-standoff-review-lac-situation/articleshow/112176608.cms

Hindustan Times

Wed, 31 July 2024

Question mark hangs over new Tejas fighter jet's delivery timeline

A question mark hangs over State-run plane maker Hindustan Aeronautics Limited (HAL)'s ability to meet the delivery timeline of the new Tejas light combat aircraft (LCA Mk-1A) for the current financial year, and even beyond, as it becomes clear that the Indian Air Force will have to wait longer for the first aircraft that was supposed to be delivered by March 31, 2024, senior IAF officers aware of the matter said.

"The first LCA Mk-1A is likely to be delivered to the air force in November 2024," said one of the officers who asked not to be named.

After missing the March 31 deadline, HAL hoped to deliver the first aircraft in July but again revised it to a later date in August.

IAF is unhappy with the current pace of the Tejas LCA Mk-1A programme because of the possible risks the delay in the induction of new fighter planes could pose to the air force's combat effectiveness, and has flagged the hot-button issue to HAL, calling for timely execution of the ₹48,000-crore contract for 83 jets, as first reported by Hindustan Times on July 12.

HAL had then said it will deliver 16 of these fighters to IAF in FY 2024-25 as per schedule. It also said it hoped to deliver all the 83 aircraft on order by 2028-29. The LCA Mk-1A made its maiden sortie from an HAL facility in Bengaluru on March 28.

"Going by the current pace of the programme, there's a fat chance of IAF getting the 16 fighters in FY 2024-25. We will be happy if we can get even half the number," said a second officer.

Many in the air force are sceptical about the LCA Mk-1A deadlines being met, and one of the main reasons for that is the lingering delay in the supply of the F404 engines to HAL by US firm GE Aerospace. The delivery of the engines is delayed by around 10 months. Also, the certification of new systems in the aircraft is still pending.

The single-engine Mk-1A will be a replacement for the IAF's Mikoyan-Gurevich MiG-21 fighter. LCA Mk-1A is an advanced variant of the LCA Mk-1, which has already been inducted by IAF.

US engine maker GE Aerospace had earlier told HT that it is working with HAL to fix issues related to the delay in the supply of its F4O4 engines for the LCA Mk-1A programme, attributing it to supply chain bottlenecks in the aerospace industry.

The aerospace industry continues to experience unprecedented supply chain pressures, a GE Aerospace spokesperson said on July 12. "GE Aerospace is working with our partner HAL and suppliers to resolve constraints and deliver F404-IN20 engines for the LCA Mk1 (A) program." The statement was in response to HT queries on the reasons for the delay and steps being taken to fix the problem, as the programme is crucial for IAF, which is grappling with a shortage of fighter squadrons.

Even as doubts shroud the delivery schedule of the LCA Mk-1A jets, more are likely to be ordered soon. In April, the defence ministry issued a tender to HAL for the proposed acquisition of 97 more LCA Mk-1As to strengthen the air force's capabilities. The new fighter planes are expected to cost around ₹67,000 crore.

HAL has set up a new production line in Nashik for LCA Mk-1As to meet IAF's growing needs. HAL says it can build 16 LCA Mk-1As every year in Bengaluru, and the Nashik line will help it ramp up production to 24 jets.

IAF should have started phasing out the last of its MiG-21s and raising the first LCA Mk-1A squadron by now. "The conversion to new aircraft for pilots, and the training of technicians and maintenance crews will take time. If we don't get the new aircraft on time, the capability drawdown will be drastic. IAF doesn't have a Plan B for the MiG-21 replacement," an IAF officer earlier said.

LCA is set to emerge as the cornerstone of IAF's combat power in the coming decade and beyond as it is expected to operate around 350 LCAs (a mix of Mk-1s, Mk-1As and the future Mk-2). The LCA project was sanctioned in 1983 as a replacement for MiG-21s.

To be sure, IAF's leadership has firmly backed the LCA programme. In a review last year, IAF chief Air Chief Marshal VR Chaudhari described the fighter aircraft as the flag-bearer of the air force's efforts towards the indigenisation of its combat fleet.

IAF recently relocated its last MiG-21 fighters from their home base at Suratgarh in Rajasthan to the sprawling Nal desert fighter base near Bikaner, where the only other remaining Indian MiG-21s are based, as the world's fourth largest air force prepares the ground to pull these iconic planes out of service and begins raising its new LCA-Mk-1A fleet.

https://www.hindustantimes.com/india-news/question-mark-hangs-over-new-tejas-fighter-jet-s-delivery-timeline-101722433538721.html

THE ECONOMIC TIMES

Wed, 31 July 2024

HFCL: Advancing Indigenous Defence Technologies

HFCL, a prominent technology company specializing in telecom equipment, optical fibre, and communication network solutions, is making significant strides in the defence sector. The company has indigenously developed advanced defence technologies, including electronic fuzes, thermal weapon sights, and ground surveillance radars. These innovations are aimed at bolstering India's defence capabilities and aligning with the Atmanirbhar Bharat initiative.

One of HFCL's key achievements is the development of electronic fuzes for artillery ammunition, which have undergone extensive testing. The company owns the intellectual property rights for these products, underscoring its commitment to self-reliance. HFCL is in discussions to export these indigenously developed fuzes, showcasing their potential on a global scale.

In the realm of thermal imaging, HFCL has developed 12-micron Ti-core based thermal weapon sights for defence forces, a capability achieved by only a few global companies. These sights, designed for light machine guns and rocket launchers, are currently in various stages of trials. This technology enhances the operational efficiency and precision of the armed forces.

HFCL's subsidiary, Raddef Private Limited, focuses on cutting-edge radar technologies. The company has developed ground and coastal surveillance radars using Frequency Modulated Continuous Wave (FMCW) technology. These radars offer high accuracy, low power consumption, and resistance to interference, making them ideal for diverse operational needs.

HFCL is also part of the Indian Army's Make-II program, shortlisted for upgrading BMP 2/2K armaments. The company's R&D investments over the past five years have resulted in a robust defence product portfolio, with a market size exceeding USD 10 billion.

Mahendra Nahata, Managing Director of HFCL, emphasized the company's strategic alliances and innovative products, which are expected to boost revenue and profitability. As HFCL continues to develop new-generation defence products, it aims to play a pivotal role in India's defence sector and expand its presence in international markets.

https://www.financialexpress.com/business/defence-hfcl-advancing-indigenous-defence-technologies-3570017/

अमर उजाला

Wed, 31 July 2024

ले. जनरल साधना सक्सेना नायर बनेंगी सेना में चिकित्सा सेवा महानिदेशक, महिला अफसर को पहली बार मिलेगा ये पद

चिकित्सा सेवा (सेना) के महानिदेशक का पदभार लेफ्टिनेंट जनरल साधना सक्सेना नायर कल संभालेंगी। इस प्रतिष्ठित पद पर नियुक्त होने वाली वह पहली महिला होंगी। इससे पहले, उन्होंने एयर मार्शल के पद पर पदोन्नति के बाद अस्पताल सेवा (सशस्त्र बल) के महानिदेशक का पद संभाला था। तब भी वह यह पद संभालने वाली पहली महिला थीं।

जब नायर ने पिछले साल अस्पताल सेवा (सशस्त्र बल) के महानिदेशक का पद संभाला था, तब वायुसेना के अधिकारियों ने कहा था, 'भारतीय वायुसेना की अधिकारी एयर मार्शल साधना सक्सेना नायर प्रभावी रूप से केवल दूसरी महिला अधिकारी हैं, जिन्होंने पूरे सेवाकाल में वायुसेना में अलग-अलग पदों पर सेवाएं देने के बाद एयर मार्शल के पद तक पहुंची। पदभार ग्रहण करते समय वायुसेना प्रमुख वीआर चौधरी भी मौजूद रहे।'

लड़ाकू पायलटों की पत्नी और मां होने का अनूठा गौरव

उन्हें भारतीय वायुसेना के डॉक्टरों की बेटी और बहन होने के साथ-साथ भारतीय वायुसेना के लड़ाकू पायलटों की पत्नी और मां होने का अनूठा गौरव प्राप्त है। उनके परिवार की तीन पीढ़ियों ने पिछले सात दशकों में भारतीय वायुसेना में सेवा की है।

1985 में वायुसेना में शामिल हुईं एयर मार्शल साधना

साधना ने सशस्त्र बल मेडिकल कॉलेज, पुणे से स्नातक की उपाधि प्राप्त की है। दिसंबर, 1985 में भारतीय वायुसेना में शामिल हुईं। साधना के पास फैमिली मेडिसिन में स्नातकोत्तर की डिग्री है। उन्होंने एम्स, नई दिल्ली में मेडिकल इंफॉर्मेटिक्स में दो साल का प्रशिक्षण कार्यक्रम भी पूरा किया है।

वायुसेना की सम्मानित अधिकारी हैं साधना

साधना ने विदेश में सीबीआरएन (रासायनिक, जैविक, रेडियोलॉजिकल और परमाणु) युद्ध और सैन्य चिकित्सा नैतिकता में प्रशिक्षण लिया। वह पश्चिमी वायु कमान और प्रशिक्षण कमान की पहली और एकमात्र महिला प्रधान चिकित्सा अधिकारी थीं। साधना को विशिष्ट सेवा पदक से भी सम्मानित किया जा चुका है। उन्हें वायु सेना प्रमुख और एयर ऑफिसर कमांडिंग-इन-चीफ से भी सराहना मिली है।

https://www.amarujala.com/india-news/lt-gen-sadhna-saxena-nair-will-assume-the-appointment-of-director-general-medical-services-army-tomorrow-2024-07-31

Science & Technology News

Press Information Bureau
Government of India

Ministry of Science & Technology

Wed, 31 July 2024

Durable efficient battery for energy solutions in remote sub-zero conditions

A device that combines an efficient durable cathode catalyst and anti-freezing electrolyte fabricated for Zn-air batteries can be used as an energy source in remote areas like the Himalaya where conventional batteries may struggle due to extreme cold conditions. In an era of escalating energy demands, efficient energy storage systems are pivotal for harnessing clean, renewable resources. Researchers are trying to develop devices with heightened energy density and reduced weight. Lithium-ion (Li-ion) batteries face constraints due to heavy cathode materials like lithium cobalt oxide and lithium iron phosphate with limiting energy density.

Metal-air batteries are emerging as promising alternatives, substituting heavy cathode materials with metals such as Li, Na, K, Mg, Al, Zn, and Fe, utilizing O2 at the air electrode to potentially enhance energy density significantly. Addressing the global demand for sustainable energy solutions, electrocatalytic techniques like overall water splitting, fuel cells, and metal-air batteries offer low carbon footprint alternatives. However, challenges persist, including low rate of energy generation and high overpotentials at complex multi-phase interfaces.

To overcome these challenges there is a need to develop high-efficiency heterogeneous catalysts. Multifunctional catalysts capable of accelerating the ORR (oxygen reduction reaction), OER

(oxygen evolution reaction), HER (hydrogen evolution reaction) simultaneously are particularly promising as they promise reduced material usage, simplified designs, enhanced energy utilization, and improved device integration. M/NC catalysts featuring atomically dispersed transition metals (M = Fe, Co, Ni) within nitrogen-doped carbon hosts have garnered significant interest. Renowned for their excellent electrical conductivity, abundant 3d electron configuration, and versatile M-Nx catalytic sites, these catalysts demonstrate enhanced intrinsic activity through electron density redistribution to nearby defective carbon atoms.

A DST Inspire Faculty Fellow Dr. Aniruddha Kundu and his team from CSIR-CMERI, Durgapur synthesised a cathode material by integrating CoFe alloy and Fe3C nanoparticles using an in-situ growth technique. The result is a simple integrated heterostructure of biphasic Co0.7Fe0.3/Fe3C (CoFe alloy/iron carbide) embedded on in situ grown N-doped carbon sheets. The CoFe/Fe3C alloy/carbide hybrid structure enhances the durability and showed catalytic performance as a cathode. The material demonstrates remarkable efficacy in both liquid and solid-state zinc-air batteries, even under sub-zero temperatures, thereby showcasing its potential for practical electrochemical applications.

A liquid-state ZAB was fabricated using as-designed Co0.7Fe0.3/Fe3C as air-electrode, which is capable of simultaneously catalyzing ORR and OER; Zn foil as anode and 6 M KOH as an electrolyte. A transparent, flexible, and stable PVA-CMC based gel electrolyte was designed. The gel film was submerged in a concentrated 10 M KOH+0.2 M Zn(OAc)2 solution for 24 hours at room temperature before assembling in solid-state Zn-air battery (ZAB). For flexible ZAB except PVA-CMC gel electrolyte all conditions were like the liquid ZAB.

In their work published in the journal Advanced Functional Materials, the researchers have created a devise by integrating the innovations, opening up significant possibilities for practical applications. The portable, flexible, and lightweight nature of our device makes it an excellent choice for a wide range of users. It can provide reliable energy solutions not only to everyday consumers but also to military and defense personnel operating in remote and challenging environments. By enabling energy independence in harsh climates and remote locations, the technology represents a promising advancement towards sustainable and resilient energy solutions accessible to all.

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India’s groundbreaking nuclear reactor gets AERB nod to start operations; Read to know more

India’s most advanced Nuclear Reactor, 500 MWe sodium-cooled prototype fast breeder reactor (PFBR), located at Kalpakkam near Chennai in Tamil Nadu has approached the finish line as it has

finally got approval from the Atomic regulator Atomic Energy Regulatory Board (AERB) to start operationalizing the reactor by loading nuclear fuel and then initiating the chain reaction. This development marks the use of plutonium as nuclear fuel and the first step in using thorium. AERB granting permission to this marks a significant step. Kalpakkamnuclear power plant functioning for 39 years.

“Through this, India will not have to depend on any country for nuclear power generation for the next 300 years, Dinesh Kumar Shukla,” Chairman of the Atomic Energy Regulatory Board said. It may be recalled that in March this year, Prime Minster Narendra Modi witnessed the commencement of ‘core loading’ at India’s First Indigenous Fast Breeder Reactor at Kalpakkam, Tamil Nadu.

According to officials, Uranium is used as raw material to produce nuclear power at the Kalpakkam nuclear power plant. The amount of electricity generated from the plant is less. While uranium is available in very limited quantities in the country, research was carried out on to use of nuclear energy called thorium, as an alternative. Thorium is abundantly available in our country. With the approval, plutonium will be used as a nuclear fuel and thorium as an atomic energy source in the Fast Breeder Reactor (FBR).

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