July
2022

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 : 47 अंक: 142 27 जुलाई 2022

Vol.: 47 Issue: 142 27 July 2022

रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
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DRDO News

DRDO Technology News

Tue, 26 Jul 2022

Indian Army to Get Light Weight Tanks by 2023

Indian Army is expected to have light weight tanks by 2023 which will be made in India in collaboration with Defence Research and Development Organisation (DRDO) and Larsen & Turbo (L&T). While speaking to media, DRDO Dr G Satheesh Reddy said, "Work on the Light Weight Tank is going on in full swing. By 2023 the tank will be fully ready for production." He further said, "We are involving the Indian industry as Development cum Production Partners (DcPP). A lot of projects are being developed along with the industry."

The need for light weight tanks has been felt more in the wake of the standoff between the armies of India and China along the Line of Actual Control (LAC) in eastern Ladakh. Since the Indian Army does not have light tanks, it has been forced to deploy heavier tanks like the T-72 weighing 45 tons and T-90 which weighs around 46 tons. Moving these tanks in the tough terrain of mountains remains a challenging task. It should be noted that last year, the Army had issued a Request For Information (RFI) for procuring around 350 light tanks with a weight of less than 25 tonnes to be deployed in High Altitude Areas (HAA).

https://www.timesnownews.com/india/indian-army-to-get-light-weight-tanks-by-2023-article-93125231#:~:text=New%20Delhi%3A%20Indian%20Army%20is,going%20on%20in%20full%20swing

बुधवार, ***27 जुलाई 2022***

पिनाका को पहले से भी घातक बनाएगा रक्षा मंत्रालय, DRDO की परियोजनाओं को मिली मंजूरी

भारत सरकार (Government of India) देश को रक्षा के क्षेत्र में आत्मनिर्भर बनाने के लिए तेजी से कदम उठाते नजर आ रही है. रक्षा मंत्री राजनाथ सिंह (Defense Minister Rajnath Singh) की अध्यक्षता में मंगलवार को रक्षा अधिग्रहण परिषद (Defense Acquisition Council) की बैठक का आयोजन किया गया.

इस दौरान रक्षा मंत्रालय ने भारतीय सेना (Indian Army) की मारक क्षमता को बढ़ाने के लिए एक महत्वपूर्ण फैसला लिया है. रक्षा मंत्रालय ने रक्षा अनुसंधान और विकास संगठन (DRDO) की 8,599 करोड़ रुपये की परियोजनाओं को मंजूरी दे दी है.

रक्षा अनुसंधान और विकास संगठन (DRDO) की परियोजनाओं के तहत भारतीय सेना की मारक क्षमता को बढ़ाया जा रहा है. रक्षा मंत्रालय ने जानकारी दी है कि 'रक्षा अधिग्रहण परिषद की ओर से मंजूर किए गए प्रस्तावों में गाइडेड एक्सटेंडेड रेंज रॉकेट एम्युनिशन, एरिया डेनियल मुनिशन टाइप 1 और इन्फैंट्री कॉम्बैट व्हीकल-कमांड सहित भारतीय सेना के तीन प्रस्ताव शामिल किए गए हैं.'

DRDO बनाएगी पिनाका अपग्रेड डिजाइन

फिलहाल बताया जा रहा है कि इन तीनों उत्पादों को DRDO की ओर से डिजाइन और विकसित किया गया है. रक्षा मंत्रालय ने बताया कि इन तीनों प्रस्तावों की कुल कीमत 8,599 करोड़ रुपये है. गाइडेड एक्सटेंडेड रेंज रॉकेट एम्युनिशन की रेंज 75 किमी है और इसकी सटीकता 40 मीटर है.

रक्षा क्षेत्र का होगा विकास

रक्षा मंत्रालय (Defence Ministry) का कहना है कि एरियल डेनियल मुनिशन टाइप 1 रॉकेट एम्युनिशन में दोहरे उद्देश्य वाले सबमिशन शामिल हैं जो टैंक और बख्तरबंद वाहनों से घिरे सैनिकों को बेअसर करने में सक्षम हैं. बता दें कि रक्षा मंत्रालय ने मंगलवार को चार लाख कारबाइन (Carbines), स्वार्म अटैक ड्रोन (Armed Drone Swarms), बुलैटप्रुफ जैकेट (Bulletproof Jacket), रॉकेट (Rocket), आईसीवी-व्हीकल (ICC Wehicle) और 14 फास्ट पैट्रोलिंग बोट्स जैसे हथियारों को खरीदने की भी मंजूरी दी है.

https://www.abplive.com/news/india/drdo-developed-guided-rockets-for-pinaka-weapon-system-for-indian-army-2177427

TIMESNOW

Tue, 26 Jul 2022

Defence Ministry Clears DRDO-Developed Projects in Major Muscle Boost to Army - Details

The Defence Ministry on Tuesday approved various Defence Research and Development Organisation (DRDO) projects which are set to boost the Indian Armed Forces' firepower. Among the projects cleared by the Defence Ministry are Guided Extended Range ammunition along with area denial munition rockets for Pinaka rocket launchers. "Among the proposals approved by DAC in the meeting are three proposals of the Indian Army, viz. Guided Extended Range Rocket Ammunition, Area Denial Munition Type I, and Infantry Combat Vehicle - Command have been designed and developed by DRDO," the Defence Ministry said in a statement. The Defence Ministry further noted that the total value of these 3 proposals is Rs 8,599 crore. "Total value of these 3 proposals is Rs 8,599 crore. Guided Extended Range Rocket

Ammunition has a range of 75 km with an accuracy of 40 meters. Aerial Denial Munition Type I Rocket Ammunition contains dual purpose sub munitions capable of neutralizing both tanks," a statement by the Defence Ministry read.

On the other hand, the Infantry Combat Vehicle – Command is 'equipped with technology to collect, disseminate, share and present real-time information to commanders to facilitate quick decision-making for the execution of tasks,' the Defence Ministry noted. In a Defence Acquisition Council (DAC) meeting headed by Defence Minister Rajnath Singh, a proposal for bulletproof jackets with enhanced protection was also approved. "Defence Acquisition Council meeting headed by Rajnath Singh cleared a proposal for bulletproof jackets with enhanced protection against the threat of enemy snippers to our troops deployed along the LoC & in close combat operations in counter-terrorism ops," the Defence Ministry said.

The DAC also approved the procurement of Autonomous Surveillance and Armed Drone Swarms to 'augment the Indian Army's capability in modern warfare.' "To combat complex paradigm of conventional and hybrid warfare and counter-terrorism at the LAC and Eastern Borders, approval was given for induction of around. 4 lakh Close Quarter Battle Carbines for the Services," Defence Ministry further added in a statement. DAC also cleared a proposal by the Indian Coast Guard to acquire 14 Fast patrol vessels for boosting maritime security along with the Navy's proposal to procure an upgraded 1250KW capacity Marine Gas Turbine Generator.

https://www.timesnownews.com/india/defence-ministry-clears-drdo-developed-projects-in-major-muscle-boost-to-army-details-article-93145069

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

मंगलवार, 26 जुलाई 2022 3:12 अपराह्न

आत्मनिर्भर भारत: सशस्त्र बलों के लिए सॉफ्टवेयर से चलने वाले रेडियो का स्वदेशीकरण रक्षा मंत्रालय की उच्च प्राथमिकता है

सॉफ्टवेयर से चलने वाले रेडियो (एसडीआर) के स्वदेशीकरण के लिए रक्षा मंत्रालय ने प्रक्रिया तेज कर दी है। अब देश का अग्रणी रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) तथा भारतीय प्रौद्योगिकी संस्थान कानपुर, सशस्त्र बलों द्वारा की जाने वाली इन रेडियो की मांगों को पूरा करेंगे। सुरक्षा के लिहाज से संवेदनशील एसडीआर तकनीक और उत्पादों के लिए "समग्र उत्पाद जीवनचक्र प्रबंधन फ्रेमवर्क" की जरूरत है। इसके लिए स्वदेशी; डिज़ाइन, विकास, निर्माण, टेस्टिंग, प्रमाणन और प्रबंधन के परितंत्र की जरूरत होती है। एसडीआर तकनीकी के स्वदेशीकरण को उच्च प्राथमिकता देते हुए रक्षा सचिव डॉ. अजय

कुमार ने कहा कि सुरक्षित रेडियो संचार की दिशा में 'आत्मनिर्भर भारत' के लक्ष्यों को हासिल करने के लिए यह कोशिश महत्वपूर्ण साबित होगी।

स्वदेशी एसडीआर तकनीकी के दो अहम तत्व- मानकीकृत 'ऑपरेटिंग सॉफ्टवेयर एनवॉयरनमेंट (ओई)' और एप्लीकेशन (जिन्हें वेवफॉर्म्स के नाम से भी जाना जाता है) हैं। इन एप्लीकेशन का वेवफॉर्म कोष और परीक्षण सुविधा केंद्रों से जुड़ा होना जरूरी है। मानकीकृत ओई होने से अलग-अलग विक्रेताओं के एसडीआर रेडियो में आपसी संचालन और 'वेवफॉर्म पोर्टेबिलिटी' सुनिश्चित हो पाती है। इस दिशा में रक्षा मंत्रालय ने भारत आधारित ऑपरेटिंग इकोसिस्टम से संबंधित चीजों की व्याख्या करने वाले 'इंडिया सॉफ्टवेयर कम्यूनिकेशन आर्किटेक्चर (एससीए) प्रोफाइल या इंडियन रेडियो सॉफ्टवेयर आर्किटेक्चर" को लाने का फैसला किया है।

रक्षा मंत्रालय द्वारा बनाई गई एससीए समिति के अध्यक्ष और आईआईटी कानपुर के निदेशक डॉ. अभय करनाडिकर ने "भारत एससीए प्रोफाइल" का विचार सामने रखा था। डीईएएल/डीआरडीओ ने एसडीआर के स्वदेशी विकास के लिए रोडमैप और समय-सीमा दर्शाने वाली ड्रॉफ्ट प्रोजेक्ट रिपोर्ट (डीपीआर) बनाई थी। डीआरडीओ, अकादमिक व उद्योग जगत के साथ मिलकर, रक्षा मंत्रालय के तहत आने वाले 'रक्षा उत्पादन में मानकीकरण' के निदेशक (डीओएस) की निगरानी में आईआरएसए को विकसित किया जाएगा। इसके तहत तीन से छः महीने में परिभाषा जारी की जाएगी, जबकि अगले 18 महीने संदर्भ व्याख्याएं, परीक्षण और अनिवार्य प्रमाणन उपकरणों को बनाने में दिए जाएंगे।

आईआरएसए की उपलब्धता से भारतीय सॉफ्टवेयर विक्रेताओं को एसडीआर उत्पादन, उन्हें आपस में क्रियान्वयन युक्त बनाने के साथ-साथ सुरक्षा पैमानों के स्तर योग्य एसडीआर के निर्माण में मदद मिलेगी। रक्षा मंत्रालय आईआरएसए को संसूचित करेगा और इसे औद्योगिक जगत के साथ साझा करेगा, ताकि भारतीय सुरक्षाबलों के उपयोग के लिए मानकीकृत एसडीआर का निर्माण हो पाए और मित्र देशों को इनका निर्यात किया जा सके।

विकास की इस प्रक्रिया में शामिल तीन संस्थान- डीईएएल/डीआरडीओ, आईआईटी-कानपुर और रक्षा मंत्रालय हैं, यह संस्थान डीपीआर के मुताबिक अपना काम शुरू कर चुके हैं। रक्षा सचिव डॉ. अजय पटेल ने सभी संस्थानों पर भरोसा जताया और कहा कि इससे अहम रक्षा उपकरणों के स्वदेशी निर्माण की दिशा में नए प्रतिमान स्थापित होंगे। अब तक इन उपकरणों को विदेश से ही आयात किया जाता रहा है। इससे 'आत्मनिर्भरता' की कोशिशों को बल मिलेगा और आयात का बजट कम होगा, साथ ही सशस्त्र बलों के लिए सुरक्षित रेडियो नेटवर्क का निर्माण भी हो पाएगा। उन्होंने यह भी कहा कि एक निश्चित समयसीमा में इन सभी कोशिशों को पूरा किया जाएगा।

https://pib.gov.in/PressReleasePage.aspx?PRID=1844998

NewsOnAIR

Tue, 26 Jul 2022

Indigenisation of Software Defined Radios for Armed Forces a Priority: MoD

Towards the goal of Atamnirbhar Bharat, the Ministry of Defence has fast-tracked the indigenisation of Software Defined Radios (SDRs) with country's two of the most significant R&D institutions – Defence Research and Development Organisation (DRDO) and Indian Institute of Technology (IIT) Kanpur. The SDRs are expected to fulfil the increasing demand by the Armed Forces across a broad spectrum of operations.

What are SDRs?

A Software Defined Radio (SDR) is a radio communication system that employs reconfigurable software-based components for processing and conversion of digital signals. Unlike traditional radio communication systems, these radio devices are highly flexible and versatile. This is an emerging technology used to connect the ever-increasing wireless world.

Why is MoD fast-tracking SDRs?

The complete product life cycle management framework is necessary for security-sensitive SDR technology and products. It involves indigenous self-sustainable design, development, manufacturing, testing/certification and maintenance ecosystem. "It will be an important milestone towards achieving the goals of 'Aatmanirbhar Bharat' in the field of secured radio communication," Defence Secretary Dr Ajay Kumar said, prioritising the indigenisation of SDR technology. Director, IIT Kanpur Dr Abhay Karandikar, who is the Chairman of the SCA Committee constituted by MoD, also stressed the idea of having an 'India SCA Profile'.

India-specific operations for SDR

Currently, a Draft Project Report (DPR) has been formulated by DEAL/DRDO for the indigenous development of SDR with a roadmap and timelines. There are two key elements of indigenous SDR technology, namely, the standardised operating software environment (OE) and applications (also known as waveforms) with associated waveforms repository and test/certification facility. Here, the standard OE enables waveform portability and interoperability among SDRs of multiple vendors. Therefore to define and develop a reference implementation of an India-specific operating environment, the Ministry of Defence has taken a decision to build an 'India Software Communication Architecture (SCA)' profile or Indian Radio Software Architecture.

ISRA to enable integration and making of SDRs

The Directorate of Standardisation (DoS) in the Department of Defence Production, MoD will steer the development of IRSA with DRDO, academia and industry with definition in three to six months and additional 18 months for the associated reference implementation, testing and compliance certification tools. What is IRSA? Chartered to curate the science products of NASA's infrared and submillimeter missions, ISRA offers access to digital archives through

powerful query engines (including VO-compliant interfaces) and offers unique data analysis and visualization tools. The availability of IRSA through access control will enable the Indian software vendors to integrate and make SDRs interoperable and security gradable. The IRSA will be notified by DoS and shared with the industry towards the development of indigenous SDR for use by Indian defence/security forces and export to friendly foreign nations.

The work has already started (as per DPR) to develop SDRs by the three institutions DEAL/DRDO, IIT-Kanpur and DoS. Defence Secretary Dr Ajay Kumar expressed his confidence in all organisations and said that it will create a new benchmark for the indigenisation of critical equipment which up until this point has been imported. “Efforts will be made to complete it in a time-bound manner,” Kumar confirmed. The development of SDRs will help India realise its goal of ‘Aatmanirbharta’ by reducing the import budget and creating a secured radio network for the Armed Forces.

https://newsonair.com/2022/07/26/indigenisation-of-software-defined-radios-for-armed-forces-a-priority-mod/

Tue, 26 Jul 2022

DRDO Built Indigenous SDRs to Help Achieve Self-Reliance in Field of Secured Radio Communication

The Ministry of Defence (MoD) has accelerated the development of indigenous software defined radios (SDRs) to meet its increasing demand by the armed forces. The software defined radios (SDRs) are being developed with the help of Defence Research and Development Organisation (DRDO) and Indian Institute of Technology (IIT) Kanpur. Defence Secretary Dr Ajay Kumar, stated that the development of SDRs will be an important milestone towards achieving the goals of ‘Aatmanirbhar Bharat’ in the field of secured radio communication. The management framework for SDR involves indigenous self-sustainable design, development, manufacturing, testing/certification and maintenance ecosystem.

Two primary elements of the home-grown SDR technology are the standardised operating software environment (OE) and applications with associated waveforms repository and test/certification facility. To achieve these, the Ministry of Defence has decided to develop reference implementation of India specific operating environment called India Software Communication Architecture (SCA) profile. The Directorate of Standardisation (DoS) in the department of defence production, will steer the development of IRSA with DRDO, academia and industry with definition in three to six months and additional 18 months for associated reference implementation, testing and compliance certification tools. Availability of IRSA through access control will enable the Indian software vendors to integrate and make SDRs interoperable and security gradable.

https://knnindia.co.in/news/newsdetails/sectors/drdo-built-indigenous-sdrs-to-help-achieve-self-reliance-in-field-of-secured-radio-communication

Defence News

Defence Strategic: National/International

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

मंगलवार, 26 जुलाई 2022 4:02 अपराह्न

'आत्मनिर्भर भारत': आईडेक्स-डीआईओ ने रक्षा नवाचार के लिए 100वें अनुबंध पर हस्ताक्षर किए

रक्षा मंत्रालय के रक्षा उत्पादन विभाग की प्रमुख पहल आईडेक्स (रक्षा उत्कृष्टता के लिए नवाचार) ने 26 जुलाई, 2022 को अपने 100वें अनुबंध पर हस्ताक्षर कर एक उपलब्धि हासिल की है। आईडेक्स फ्रेमवर्क 2018 में माननीय प्रधानमंत्री श्री नरेन्द्र मोदी जी ने इस उद्देश्य से शुरू किया था कि यह रक्षा क्षेत्र में सह-निर्माण और सह-विकास का मंच प्रदान करेगा, रक्षा क्षेत्र में योगदान के लिए स्टार्ट-अप को जोड़ेगा तथा देश में रक्षा और एयरोस्पेस सेटअप को विकसित करेगा। आईडेक्स को रक्षा मंत्रालय के रक्षा उत्पादन विभाग के तहत रक्षा नवाचार संगठन (डीआईओ) द्वारा लागू किया जा रहा है।

वर्ष 2021 के लिए नवाचार श्रेणी में पब्लिक पॉलिसी के लिए प्रतिष्ठित प्रधानमंत्री पुरस्कार से सम्मानित आईडेक्स बहुत कम समय में डिफेंस इंडिया स्टार्ट अप चैलेंजेज (डीआईएससी), प्राइम और ओपन चैलेंजेज (ओसी) जैसे अपने प्रमुख कार्यक्रमों के माध्यम से रक्षा पारिस्थितिकी तंत्र में एक गेम चेंजर के रूप में उभरा है। आईडेक्स ने रक्षा क्षेत्र में आवश्यक गति का निर्माण करने के साथ-साथ महत्वपूर्ण स्टार्ट-अप्स खड़े करने में सफलता पाई है।

आज डीआईओ के सीईओ और अतिरिक्त सचिव (रक्षा उत्पादन) श्री संजय जाजू ने पेसिफाई मेडिकल टेक्नोलॉजीज प्राइवेट लिमिटेड के सीईओ श्री साईप्रसाद पोयारेकर के साथ 100वें अनुबंध पर हस्ताक्षर किए। इस अवसर पर रक्षा सचिव डॉ. अजय कुमार और थल सेनाध्यक्ष लेफ्टिनेंट जनरल बी.एस. राजू भी उपस्थित थे। इस अवसर पर डॉ. अजय कुमार ने कहा, "हमें विश्वास है कि आईडेक्स भारत को दुनिया में सबसे बड़ा रक्षा नवाचार पारिस्थितिकी तंत्र बना देगा। इसके लिए मैं सेवाओं, स्टार्ट-अप्स, पार्टनर इन्क्यूबेटरों और आईडेक्स टीम सहित सभी हितधारकों के अथक और निरंतर प्रयासों एवं समर्थन को धन्यवाद देना चाहता हूं।"

अब तक आईडेक्स ने आईडेक्स प्राइम, डीआईएससी के सात राउंड (डीआईएससी स्प्रिंट सहित) और ओसी के पांच राउंड लॉन्च किए हैं, जिसमें 4,000 से अधिक व्यक्तिगत नवोन्मेषकों, एमएसएमईज और स्टार्ट-अप से आवेदन प्राप्त हुए हैं। 250 करोड़ रुपये से ज्यादा की परियोजनाओं का आवंटन किया गया है और 400 करोड़ रुपये से अधिक की 14 वस्तुओं की खरीद को मंजूरी दी गई है। आईडेक्स हजारों नौकरियां पैदा करने और भारत की प्रतिभा को वापस देश में आकर्षित करने में सफल रहा है।

पिछले चार वर्षों में मार्च 2022 में परीक्षण और खरीद के लिए रक्षा अधिग्रहण परिषद (डीएसी) ने 14 परियोजनाओं में 17 स्टार्ट-अप्स को पहले ही आवश्यकता की स्वीकृति (एओएन) प्रदान की है। डीआईएससी 1 और 2 की बची कुछ परियोजनाओं के साथ ही डीआईएससी 3 की कुछ परियोजनाएं पूरी होने वाली हैं और चालू वित्तीय वर्ष के अंत तक डीएसी द्वारा इन्हें एओएन प्रदान किया जा सकता है। आईडेक्स यह सुनिश्चित करने के लिए तीव्र गति से काम कर रहा है कि स्टार्ट-अप्स और इनोवेटर्स के साथ इसके समझौते समय पर तार्किक निष्कर्ष पर पहुंचें, क्योंकि इससे न सिर्फ नए स्टार्ट अप्स के लिए असंख्य विकल्प खुलते हैं, बल्कि ये सेवाओं की आवश्यकता को भी पूरा करते हैं।

https://pib.gov.in/PressReleasePage.aspx?PRID=1845038

Business Standard

Tue, 26 Jul 2022

Ministry of Defence's iDEX-DIO Signs its 100th Innovation Contract

By Ajai Shukla

In April 2018, Prime Minister Narendra Modi launched a project named iDEX (Innovations for Defence Excellence), billed as the Ministry of Defence's (MoD's) flagship for technological innovation. iDEX was to encourage start-ups and provide them a platform for co-creation and co-development in defence and aerospace technology. On Tuesday, iDEX signed its 100th contract in New Delhi with a firm called Pacify Medical Technologies Pvt Ltd. Speaking on the occasion, Defence Secretary Ajay Kumar said, "We are confident that iDEX will make India the biggest defence innovation ecosystem in the world."

On its website, iDEX is defined as "an ecosystem to foster innovation and technology development in defence and aerospace by engaging innovators and entrepreneurs to deliver technologically advanced solutions for modernising the Indian military". iDEX is funded and managed by the "Defence Innovation Organization" (DIO), which is a 'not for profit' company as per Section 8 of the Companies Act 2013. Its founder members are the two biggest defence public sector undertakings (DPSUs): Hindustan Aeronautics Ltd (HAL) and Bharat Electronics Ltd (BEL). "iDEX will function as the executive arm of DIO, carrying out all the required activities while DIO will provide high level policy guidance to iDEX," stated the iDEX website.

"With these actions of the Government, the expenditure on defence procurement from foreign sources which used to be 46 per cent of the overall expenditure has reduced to 36 per cent in the last four years i.e. 2018-19 to 2021-22," the MoD stated in Parliament on Monday. Defence start-ups and micro, small and medium enterprises (MSMEs) are encouraged to present technological solutions to functional problems that the military periodically raises as "challenges". Innovations judged to be technologically viable are considered for funding and for being accorded an "acceptance of necessity" (AoN), which is the entry into the military's potentially lucrative procurement pipeline. In a little over four years iDEX, has sought to be a game changer in the defence acquisition eco-system through highly publicised programmes such as the Defence India Start-up Challenges (DISC), and Prime and Open Challenges.

"DISCs are launched with problem statements (PS) from armed forces and Ordnance Factory Board/Defence Public Sector Undertakings (OFB/DPSUs) for resolution by innovators," says the iDEX website. Open Challenges are directed at India's "next generation of engineers, capable of developing technologies in autonomous systems, intelligent machines, advanced materials, predictive algorithms, or even rocket engines, for the most sophisticated applications in defence and aerospace domains." The iDEX Open Challenge seeks out their technology capabilities. "If you think you have an idea, technology or a product that has use in defence and aerospace, then iDEX Open Challenge is the right opportunity for you to grab," states the iDEX website. Innovators, startups and MSMEs are encouraged to engage directly with the military through the iDEX Open Challenge and to showcase what they have to offer. Selected applicants are offered a chance to pitch to the iDEX grand jury and qualify for grants and investments.

Similarly iDEX Prime (Sprint) provides an opportunity for innovators to design and develop specified military equipments, such as boats for Special Forces, with the MoD paying half the development cost, up to a ceiling of Rs 10 crore. The "technology development" head in the defence budget has traditionally been allocated single-digit, or double-digit, amounts for these high-tech development projects. This year, however, in the 2022-23 capital budget, a substantial Rs 1,365 crore has been allocated. "Till date, iDEX has launched iDEX Prime, seven rounds of DISC (including DISC SPRINT) and five rounds of OC, receiving more than 4,000 applications from individual innovators, MSMEs and start-ups. More than Rs 250 crore worth of projects have been allocated and procurement of 14 items worth over Rs 400 crore have been cleared. iDEX has also been able to generate thousands of jobs and attract India's talent back to the country," said the MoD in a statement on Monday.

In the last four years, 17 start-ups in 14 projects have already been accorded the Acceptance of Necessity (AoN) by Defence Acquisition Council (DAC) for trial and procurement. Projects from balance of DISC 1 & 2 and some from DISC 3 are nearing completion and may be accorded AoN by DAC by end of current Financial Year.

Defence ministry approves arms procurement proposals worth Rs 28,732 cr

- Bullet-proof Jackets with level BS VI protection
- 400,000 Close Quarter Battle (CQB) carbines
- AoN accorded for surveillance and armed swarm drones
- 14 Fast Patrol Vessels (FPVs) for the coast guard with 60 per cent Indian content.
- Upgraded 1,250 KW capacity marine gas turbine for Kolkata-class destroyers

https://wap.business-standard.com/article-amp/economy-policy/ministry-of-defence-s-idex-dio-signs-its-100th-innovation-contract-122072601303_1.html

The Indian EXPRESS

Wed, 27 Jul 2022

HAL to Start Making Airframes for TAPAS Combat Drones

Hindustan Aeronautics Limited (HAL) will start working on producing six airframes to conduct evaluation trials of the TAPAS BH-201 drone, which will be used for missions by the armed forces. The airframe is the basic structure of the drone or unmanned aerial vehicle (UAV) and includes its wings, tail and main body. TAPAS BH-201 or Tactical Advanced Platform for Aerial Surveillance Beyond Horizon-201 is a Medium Altitude Long Endurance (MALE) drone. It will be India's first MALE UAV which will be used in day and night aerial surveillance missions by the Indian Army, Air Force and Navy, officials said. The Aeronautical Development Agency (ADA) under the Defence Research and Development Organisation (DRDO) is said to have almost completed the final design of the UAV, which will be handed over to HAL. Confirming the development to The Indian Express, chairman and managing director of HAL, R Madhavan said, "We are now going to make some more airframes for TAPAS. Six airframes will be made for the user evaluation trials. This is a joint project by HAL and DRDO. TAPAS has to reach 30,000 feet which it has almost reached and has proven the endurance (hours spent in the sky) of more than 16 hours. Once the airframes are put to user trials, the production will start."

In March this year, DRDO chairman G Satheesh Reddy said TAPAS had reached a flying altitude of 28,000 feet. "Once the airframes are ready, all these will be fitted on the UAV. TAPAS will have an operating altitude of 30,000 feet. It has a range of 250 km and is capable of day and night missions. It can carry payloads up to 350 kg. It is designed to perform intelligence, surveillance, reconnaissance missions for the Indian Armed Forces. Its mission requirements are to provide continuous wide area coverage and be able to identify small targets. TAPAS BH-201 is India's first MALE UAV," sources in the DRDO said. Last year, the DRDO's lab developed the 'Tricycle Nose Wheel Type Retractable Landing Gear System' for the UAV. "It is designed for high touchdown speeds and sink velocity during landing," officials said. Sources in the HAL said 76 TAPAS drones will be inducted into the armed forces – Army (60), Air Force (12) and Navy (4). The project, conceptualised in 2016, is slated to get over in 2023.

https://indianexpress.com/article/cities/bangalore/bengaluru-hal-to-start-making-airframes-for-tapas-combat-drones-8053297/

The Tribune

Tue, 26 Jul 2022

Tejas' Upgraded Variant on Trial; 83 Indigenous Jets by '30

Ajay Banerjee

Crossing an important milestone in the development of indigenous fighter jets, Hindustan Aeronautics Limited (HAL) has commenced flight trials of the next version of Tejas Mark 1A jets.

Sources say the flight-test has started as per schedule.

'Mark 1A' version

- It will have mid-air refuelling capacity, extending the arc of operations
- It will be equipped with an India-made Active Electronically Scanned Array radar
- An electronic warfare suite will be incorporated
- The plane will fire Beyond Visual Range missiles; the indigenous 'Aastra' missile will be integrated

In February last year, the Ministry of Defence had signed a contract with the HAL for the supply of 83 jets at a cost of Rs 45,696 crore. Tejas MK 1A will have 43 improvements over the existing version. Most of the changes are related to avionics, weapons and maintenance. In all, 40 Tejas jets of this variant have already been manufactured. The Indian Air Force (IAF) will receive Tejas Mark 1A jets by February 2024. The Ministry of Defence has set a target of making 83 planes by February 2030.

The jets will be in two variants — 73 of these will be the 'Tejas MK 1A' configuration, while 10 jets will be twin-seater and used as a 'trainer aircraft'. The government has set stiff targets on the indigenisation of the jets. It has asked the HAL to use technologies, which have not been attempted in India before. At of now, only 50 per cent of Tejas jets are made in India, while the engine and the latest radar — called Active Electronically Scanned Array — are imported from the US and Israel, respectively. At present, the aircraft is equipped with 344 systems — 210 are indigenous and 134 are imported, says a functionary. By the time the HAL manufactures the first MK 1A jet, the imported systems will be reduced to about 80.

https://www.tribuneindia.com/news/nation/tejas-upgraded-variant-on-trial-83-indigenous-jets-by-30-416010

Hindustan Times

Tue, 26 Jul 2022

‘Atmanirbhar Bharat’: India Clears Defence Purchases Worth Rs. 29,000 Crores

The procurement of autonomous surveillance and armed drone swarms was cleared to boost the army’s capability in modern warfare in the backdrop of drone technology proving to be a force multiplier in military operations. In a significant boost to Prime Minister Narendra Modi’s vision for self-reliance in the defence manufacturing sector, India has cleared weapon purchases worth Rs. 28,732 crore, including armed drone swarms, carbines and bullet-proof jackets that will be designed and developed in the country, the Union ministry of defence said on Tuesday. The close-quarter carbines will be for front-line soldiers deployed along India’s borders, including the Line of Actual Control (LAC) with China where the two countries have been locked in a tense standoff since May 2020, officials familiar with the matter said on conditions of anonymity.

The defence acquisition council (DAC), India’s apex weapons procurement body, accorded its acceptance of necessity (AoN) for the capital acquisition proposals at a meeting chaired by defence minister Rajnath Singh. Under India’s defence procurement rules, AoN by the council is the first step towards buying military hardware. The procurement of autonomous surveillance and armed drone swarms was cleared to boost the army’s capability in modern warfare in the backdrop of drone technology proving to be a force multiplier in military operations and recent conflicts around the world, the defence ministry said in a statement. Last year, the Defence Research and Development Organisation (DRDO) showcased indigenous capability to carry out offensive missions in enemy territory with scores of drones working in assorted formations to identify, encircle and strike targets, with loitering munitions being developed to meet a key military requirement of our soldiers.

Surveillance and armed drone swarms feature on a new list of ‘Make in India’ projects that the army is pursuing in partnership with the defence industry, the officials said. Drones within a swarm can carry out a wide range of missions, including strikes against tanks, infantry combat vehicles, ammunition holding areas, fuel dumps and terror launch pads. The DAC also approved the purchase of around 400,000 close-quarter carbines “to combat the current complex paradigm” of conventional warfare, hybrid warfare and counter-terrorism at the borders, the defence ministry statement said. “This is set to provide a major impetus to the small arms manufacturing industry in India and enhance aatmanirbharta (self-reliance),” the ministry said.

India has taken a raft of measures to boost self-reliance in the defence manufacturing sector over the past two to three years, including curbing imports and allocating funds for domestic procurement. “India is making planned, steady and focused progress to achieve aatmanirbharta in the defence sector and several projects have been sanctioned for the local industry. Frontline soldiers urgently need carbines,” said former director general of military operations Lieutenant General Vinod Bhatia (retd). The bullet-proof jackets will offer enhanced protection to soldiers deployed along the Line of Control (LoC) with Pakistan.

"Considering the demand of enhanced protection against the threat of enemy snipers to our troops deployed along the LoC, and in close combat operations in counter-terrorism scenario, the DAC accorded AoN for bullet-proof jackets with Indian Standard BIS VI level of protection," the ministry said. The defence ministry earmarked 64% of the capital acquisition budget for the domestic industry in 2021-22, but it was able to "overachieve this target" and local military purchases accounted for 65.5% of the capital budget, as previously reported. For 2022-23, India has earmarked Rs. 84,598 crore – 68% of the military's capital acquisition budget – for the purchase of locally produced weapons and systems, besides setting aside 25% of the defence research and development (R&D) budget for private industry, start-ups and academia.

The DAC also approved a navy proposal to procure an indigenously-upgraded 1250KW-capacity marine gas turbine generator for power generation on board the Kolkata-class of warships, and 14 fast patrol vessels for the Indian Coast Guard with 60% indigenous content. The government has imposed a phased ban on the import of 310 different types of weapons and systems. These include light weight tanks, naval utility helicopters, artillery guns, missiles, destroyers, ship-borne cruise missiles, light combat aircraft, light transport aircraft, long-range land-attack cruise missiles, basic trainer aircraft, multi-barrel rocket launchers, assault rifles, sniper rifles, specified types of helicopters, next-generation corvettes and airborne early warning and control (AEW&C) systems.

https://www.hindustantimes.com/india-news/atmanirbhar-bharat-india-clears-defence-purchases-worth-29-000-crores-101658846416588.html

Press Information Bureau
Government of India

Ministry of Defence

Tue, 26 Jul 2022 6:17 PM

Defence Acquisition Council, Headed by Raksha Mantri Shri Rajnath Singh, Approves Arms Procurement Proposals Worth Rs 28,732 Crore;

They Include Swarm Drones, Bulletproof Jackets, and Carbines

The Defence Acquisition Council (DAC) meeting under the chairmanship of Raksha Mantri Shri Rajnath Singh, was held on July 26, 2022. Acceptance of Necessity (AoN) for Capital Acquisition Proposals of the Armed Forces amounting to Rs 28,732 crore were accorded by the DAC in this meeting under Buy (Indian IDDM) and Buy (Indian) categories giving a further boost to 'Aatmanirbharta' in Defence. Among the proposals approved by DAC in the meeting are three proposals of the Indian Army, viz. Guided Extended Range Rocket Ammunition, Area Denial Munition Type I and Infantry Combat Vehicle – Command have been designed and developed by DRDO. The total value of these three proposals is Rs 8,599 crore. Guided Extended Range Rocket Ammunition has the range of 75 kms with accuracy of 40 meters. The Aerial Denial Munition Type I Rocket Ammunition contains dual purpose sub munitions capable

of neutralizing both tanks and armoured personnel carriers as well as B vehicle entrenched troops. The Infantry Combat Vehicle – Command is equipped with technology to collect, disseminate, share and present real time information to commanders to facilitate quick decision making for execution of tasks.

Considering the demand of enhanced protection against the threat of enemy snipers to our troops deployed along the Line of Control and in close combat operations in counter terrorism scenario, DAC accorded AoN for Bullet Proof Jackets with Indian Standard BIS VI level of protection. To combat the current complex paradigm of conventional and hybrid warfare and counter terrorism at the borders, AoN for induction of approx. four lakh of Close Quarter Battle Carbines for the Services has also been accorded by the DAC. This is set to provide major impetus to the small arms manufacturing industry in India and enhancing 'Aatmanirbharta' in small arms. In the recent conflicts across the world, drone technology proved to be a force multiplier in military operations. Accordingly, to augment Indian Army's capability in modern warfare, AoN for procurement of Autonomous Surveillance and Armed Drone Swarms has been accorded by the DAC under Buy (Indian-IDDM) category.

The DAC also approved Navy's proposal to procure upgraded 1250KW capacity Marine Gas Turbine Generator for power generation application onboard Kolkata class of ships through Indian Industry. This will give a major boost to indigenous manufacturing of gas turbine generators. In order to enhance the security in the coastal region of the country, the DAC also approved the proposal of procurement of 14 Fast Patrol Vessels (FPVs) for Indian Coast Guard under the Buy (Indian-IDDM) with 60% IC.

https://pib.gov.in/PressReleasePage.aspx?PRID=1845058

the pioneer

Tue, 26 Jul 2022

India Speeds up Airfield Construction along LAC

In addition, India has also stepped up the pace of building infrastructure, including all weather roads along the border and the Line of Control (LOC) with Pakistan Approximately 3,000 km of roads have been constructed in border areas in the last five years and the expenditure incurred is over `20,700 crore. The Border Roads Organisation (BRO) has constructed 2,088.57 km of roads in the last five years along the China front. This effort incurred an expenditure of `15,477 crore, Minister of State for Defence Ajay Bhatt informed the Rajya Sabha on Monday. He also said the BRO built 1,336.09 km of roads along the Pakistan front at a cost of `4,242.38 crore. Similarly, 151.55 km of road was built along the India-Myanmar border at a cost of `882.52crore.

The BRO also constructed a 19.25 km road along the India-Bangladesh border costing `165.45 crore. The total amounted to `20,767 crore for all these projects, the minister said in a written reply. The construction of airfields and helipads along the LAC has added muscle to India's preparedness to deal with any threat from China. These airfields are able to handle fighter jet flying besides landing and takeoff of giant transport aircraft thereby ensuring uninterrupted logistical support to the troops deployed at the front at the LAC, sources said. India can now rush

additional troops, light and heavy weapons and food and clothing at a short notice to the troops there in case of any emergency, they added.

As regards roads, 73 roads were identified as strategic with most of them linking the mainland with the LAC. Some of the important already completed projects include the Darbuk-Shayok-Daulat Beg Oldie Road (DS-DBO) and Atal Tunnel under Rohtang Pass. Construction is in full swing for the tunnel at the Zojila pass linking the entire country with Ladakh. At present, Ladakh is cut off from the rest of the country for four to five months in the winter due to snow. Once completed, Ladakh will have two road links, including one through Kashmir and the other through Manali via Rohtang pass.

https://www.dailypioneer.com/2022/pioneer-exclusive/india-speeds-up-airfield-construction-along-lac.html#:~:text=As%20stand%2Doffs%20persist%20at,Arunachal%20Pradesh%20in%20the%20east.

THE HINDU BusinessLine

Mon, 25 Jul 2022

Army issues RFI to install 4G or 5G network close to LAC

The defence ministry has moved in to fill the absence of phone connectivity in areas close to China border by issuing a request for information (RFI) to procure 4G or 5G based mobile cellular communication network in high altitudes. The Army intends to install the network in a year's time from the day contract is awarded to a company. The 4G or 5G based mobile cellular communication is needed for field formations of the army deployed in mountainous, semi mountainous and high altitude region up to range of 18,000 feet, said the RFI which is a prerequisite to actual tendering of the project. "The network is envisaged to provide reliable and secure voice, messaging and data services in intended area of coverage to support operational requirements of field formation," said the Army

The RFI clearly specifies that the communication between user equipment or handset would be based on ”commercial AES 256-bit encryption or better”. Also, the army’s demand is that the handset should be friendly to port application for layer of secrecy. The solution must ensure that the network is inaccessible to any unauthorised and illegitimate user or through any other radio access technology network, insists the RFI. The response to the RFI should include plans to meet guidelines as per DAP 2020, and specify the availability of network system as well as equipment in domestic market. The last villages, including Phobrang, in East Ladakh, has no mobile network, local politician Konchok Stanzin tweeted on Sunday. “How much time should we wait to get basic facilities like 4G and 24x7 light in remote and border areas of Chushul constituency?” he asked. This is despite the fact that China’s mobile connectivity is available on the Indian side of LAC.

https://www.thehindubusinessline.com/news/national/army-issues-rfi-to-install-4g-or-5g-network-close-to-lac/article65681648.ece

FINANCIAL EXPRESS
Read to Lead

Tue, 26 Jul 2022

Operation Vijay: How the Indian Armed Forces have overcome the challenges since 1999

Today, India is celebrating the 23rd anniversary of the victory of the operations that started in May 1999 and was declared over by the then Prime Minister Atal Bihari Vajpayee. Soon after the 1999 Kargil War, there was a serious thinking on introducing reforms and modernisation of the armed forces. And reforming the control and command structures. In 2020, because of the Galwan Valley incident between the forces of India and China, importance of new-age technologies like cyber warfare, drones, Artificial Intelligence, Disruptive Technologies were highlighted. The incident in 2020 and the recent war between Russia and Ukraine has turned all attention of the government towards self reliance in the defence sector. The quote by the then Indian Army chief, Gen VP Malik was "we will fight with what we have".

Speaking with Financial Express Online, Lt Col Manoj Channan (retd) says, "In 1999, during the winter months, the posts at high altitudes were vacated as logistical support was an arduous task. To maintain a check, winter surveillance sorties were undertaken by the Indian Army Aviation as well as the Indian Air Force. These were further supported by long-range patrols." "The troops in Siachen were well equipped and occupied the oxygen-starved heights after pre-induction training and acclimatisation," he says. In 1999, 121 (Independent) Infantry Brigade, was holding a frontage of approximately 160 km and had a more significant complement of units.

Nevertheless, "this only augmented the boots on the ground, ISR resources were negligible and the peaks could be seen as well as the activities around them from the line of sight," the Indian Army veteran shares. These shortcomings were known and well exploited by Gen Pervez Musharaff, who inducted the Northern Light Infantry with the support of Mujahedeen. The ambush of the 4 JAT long-range patrols under late Capt Saurabh Kalia, was captured and tortured with eyes gouged out and cigarette burn marks. The operation by the Indian Defence Forces after prolonged battles captured the peaks back. Bofors which had been under clout delivered by its devastating fire assaults.

Fast Forward

According to Lt Col Channan "Since then, this day the Indian Army has not only taken a forward posture by deploying troops at key heights, duly augmented by Battle Field Surveillance Radars and UAVs." "The Indian Air Force and the Indian Navy too have better capabilities for ISR including the Boeing P8I with its on board electronic surveillance suites." Also, "satellite imagery and the resolutions are an added bonus as ISRO has the indigenous capacity to monitor the areas of interest 24×7. Personal weapons, habitats, clothing, and equipment have ensured that the troops are equipped to face the enemy and the inclement weather."

Infrastructure & Drones

Adding, "The border roads have done a wonderful job of building roads as well as making tunnels at the base of the high passes to cut down on travel time as well as ensure logistical support even during the winter months. The aero bridge remains the lifeline." "Trials have been

carried out to use drones to supply war-like stores at high altitudes as well as logistics to ensure sustenance." In his opinion, "The Chinese intrusions along the Line of Actual Control (LAC) have ensured that the Indian Government and the Indian Army in particular remain poised to meet the challenge and will never be short of resources to fight a coordinated defensive / offensive battle."

https://www.financialexpress.com/defence/operation-vijay-how-the-indian-armed-forces-have-overcome-the-challenges-since-1999/2607299/lite/

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Wed, 27 Jul 2022

How the Indian Navy Silently Contributed to Kargil Win Under Operation Talwar

By Idrees Lone

We remember the 1999 Kargil war as a skirmish that began with tales of perfidy and back-stabbing from the enemies as they kidnapped, tortured and killed Lieutenant Saurabh Kaila, Sepoys Arjunram Baswana, Mula Ram Bidiasar, Naresh Singh Sinsinwar, Bhanwar Lal Bagaria and Bhika Ram Mudh of 4 Jat Regiment of Indian Army at Bajrang Post in Kaksar Langpa Area of Kargil Region in the erstwhile state of Jammu & Kashmir. During the subsequent three months of Kargil war, Soldiers from the Indian Army fought tooth and nail to evacuate the enemies entrenched on the treacherous heights all along the Kargil Range to our side; their gallant action is known as 'Operation Vijay.' The Indian Air Force dominated the fourth dimension of time through 'Operation Safed Sagar as they mounted attacks on the Pakistani infiltrators from Air.

As the ships from Indian Navy's Western and Eastern Fleet were deployed at sea, we would hear the news about the Kargil Conflict on All India Radio bulletins which were played live exclusively for the ship's company on the Ship's EMR, twice a day: in the morning and the Evening. As soldiers, irrespective of service or rank, you wish to fight a war. You want to show the enemy its true place. We believed, operation Talwar was the moment for all of us at the IN.

Role of the Indian Navy In The Kargil War

It has been 22 years since the Kargil War but memories of those days are still fresh in my mind. Even today as I write this, I can feel the sense of positivity and excitement also the sensation of the sea breeze off the coast of Saurashtra. As the clouds of war thickened over the treacherous heights around Kargil in the month of May, the Indian Navy took pre-emptive steps and shifted the location of its yearly war exercise – Summer-ex from the Bay of Bengal to the Arabian Sea. Every year during the months of May, June and July Navy's Eastern Fleet and Western Fleet warships conduct Summer-ex in the Bay of Bengal. All along the Coast of Saurashtra and in the vast Arabian Sea that covers the western sea borders of the country, the Indian Navy had positioned its underwater, oceanic, air and land assets to counter the enemy. Ships and

submarines were loaded with real wartime ammunition that included missiles, torpedoes, rockets, shells etc.

I was posted onboard a Leander Class Frigate called INS Udaygiri which specialized in Anti Submarine Warfare. The IN inventory had five Leander class frigates at that time. One of them was immediately dispatched for barrier patrol on May 20, 1999. Two missile boats were deployed at Okha port. Out of them, one patrolled the sea while the other one was placed as duty ready ship as was equipped to be cast-off at an hour's notice. The Navy's Electronic Warfare aircraft operated extensively along the Line of Control in support of land operations. Navy's Survey Sailors were deployed with the army's artillery batteries to act as Arty-OP to mark enemy's gun locations. The Pakistani generals had started resorting to threats of nuclear retaliation; the famous nuclear bogey had begun to play out. By the end of June 1999, it seemed imminent that full-scale hostilities would break out between two warring neighbours.

Navy was Fully Armed and Ready for the Battle

At that time, India's naval strength was seven times greater than that of Pakistan's. It was unlikely that Pakistan would be able to withstand the strikes from Western Fleet alone while the Indian Navy was openly positioning the battleships from both its fleets nearer to Karachi. Indian Naval assets were laying a siege around Karachi, Pakistan's largest port at that time. This forward deployment was having the desired effect on the enemy. Pushed to a corner with almost negligible resources, Pakistan Navy went into defensive approach. They moved their oil tankers and major warships from the port of Karachi to Makaran to protect them from any sudden attack by the Indian Navy. The remaining Pakistani warships in Karachi were also ordered not to leave the port to avoid direct confrontation with Indian ships. Pakistani PM Nawaz Sharif had later on said on record that as the Indian Navy blockaded Karachi, Pakistan was left with fuel supplies that could just last six days of war.

Did The Enemy Know of Our Weakness?

At the peak of Indian Navy's blockade operations, Pakistan's Navy Chief had said: "it is not within our reach to withstand the immense strength of the Indian Navy." The Indian Air Force and the Indian Army were ordered not to cross the LOC while the Navy has always conducted its operations in international waters. Warships from Navy's Eastern and Western Fleet were ready for battle. In mid-June 1999, operational orders for Battle (ORBAT) were issued by the Government of India. The ORBAT had clearly mentioned Rules of Engagement for the Naval Commanders and the Operation was code named Operation Talwar. As the Braves of Indian Army were fighting against all odds versus the infiltrators lodged on the heights around peaks of Kargil; braving the treacherous terrain and the inclement weather; in the Arabian sea near Saurashtra, just 12 nautical miles from the port of Karachi; thirty ships of the Indian Navy were conducting intensive war exercise that had sent chills down the spine of the enemy.

As I mentioned earlier, two Veer class Corvettes (Missile Boats) of the Killer Squadron – Nipat and Prahar were patrolling along the coast of Saurashtra with Port Okha as its headquarters. The small size of the gas turbine-powered missile boats along with enormous lethality and strike capability made them invincible in naval warfare. Both missile boats could operate at a maximum speed of 42 nautical miles per hour at sea. They were equipped with four P-21 missiles each. INS Udayagiri, Our ship was part of Indian Navy's Suicide Squad so the ship's company remained at action stations for almost twenty hours a day. The enemy was most afraid of India's Russian make Kilo (Sindhu) Class submarines. Adversaries had nicknamed them as

"Black holes." With a maximum speed of 18 knots, the Kilo - submarines have the capacity to stay up to 300 meters below sea level. A kilo submarine with 53 member crew can stay at sea without any help for a maximum of 45 days. A special oxygen regeneration system gives them uninterrupted underwater endurance for two consecutive weeks without external oxygen intake. They can operate even in shallow waters.

Known as the Silent Killer for their camouflage or stealth capability, some of these diesel-electric submarines armed with deadly torpedoes and missiles; remained hidden under the enemy's nose for several days. All the machineries were shut down for several days to keep the vessel from getting pinged by enemy Sonar. Even the mess gossips between the onboard crew were limited to whispers because even a slight noise would reveal their presence to the enemy sonar and could probably result in torpedo strike from the enemy. The submarines had left Mumbai harbour with fresh rations for just ten days and their covet under-water operation lasted for forty seven days. Both Pakistan and its old and trusted friend the US are aware of the aggressive nature of the Indian Navy. Although there has been no official confirmation of the incident, America's love for Pakistan is an open secret.

A surrounded Pakistan looked toward China begging for help. Chinese premier gave audience to PM Nawaz Sharif in the last week of June 1999 but refused to help him directly. In the meantime, the Indian Navy intercepted a North Korean cargo ship carrying missile spare parts for Pakistan. There were speculations that China was delivering those weapons through North Korean route instead of directly helping Pakistan to evade international sanctions.

Operation Talwar

No official declaration of Kargil war was made by the Government of India. However, warships from India's eastern and western fleets were manoeuvring aggressively in the Arabian Sea. The deployment of the Indian fleets near horizon was discouraging for the enemies. The Indian Navy, which had laid a solid seize around the Pakis, was also vigilant for the security of Indian soil. A joint maritime patrol of the Navy, police and customs called ‘Operation Swan’ was immediately launched for maritime security and to prevent covert attacks or terrorist incidents across Gujarat and Maharashtra. We had a keen eye on every move of the Pakistan Navy north of the Arabian Sea. Efforts were also made to double the speed of Refit of the Navy's warships, so that most warships would be ready to fight in the event of an all out war. During Operation Talwar, the Navy did not receive orders to attack till the end, and finally on July 14th, 1999 the then Prime Minister of India Atal Bihari Vajpayee, declared the Operation Talwar a success, bringing an end to one of Indian Navy’s silent and understated but significant campaigns.

http://www.indiandefensenews.in/2022/07/how-indian-navy-silently-contributed-to.html?m=1

Tue, 26 Jul 2022

India Primed To Respond To China's Breach of 'No Fly Zone' On LAC in Ladakh: Sources

The Indian Air Force (IAF) will initiate retaliatory measures against the Chinese Air Force's breach of the 10-km "No Fly Zone" along the Line of Actual Control (LAC) in eastern Ladakh and increase air patrolling by IAF fighter jets, sources have said. China has been provoking India for the past month by flying its aircrafts too close to the LAC and intruding into the "No Fly Zone", they said. "No Fly Zone" is a confidence-building measure that was agreed upon by India and China after the Galwan Valley standoff in May 2020.

As part of its measures against Chinese aggression, India has deployed its navy's Boeing P8-I and the Rafale fighter jets, sources said. The Indian Navy has deployed Boeing P8-I, which provides real-time pictures and information to the army on the ground through military satellite Rukmini, for reconnaissance and surveillance along the LAC, they said. The IAF has deployed the Rafale fighter jets at the Leh airbase with its complete weapon package, including the beyond visual range missiles, they added. The second battery of the S-400 air defence system is also to be deployed near LAC in a couple of months, which will cover a further 800 km of air defence.

Meanwhile, India and China failed to make any breakthrough in resolving outstanding issues on the remaining friction points in eastern Ladakh at the 16th round of military talks last week. India continues to press for early disengagement of troops from all the remaining friction points in the region and demanded the restoration of the status quo ante as of April 2020 -- before the start of the military standoff. The eastern Ladakh border standoff erupted on May 5, 2020, following a violent clash in the Pangong lake areas. Both sides gradually enhanced their deployment by rushing in tens of thousands of soldiers as well as heavy weaponry. As a result of a series of military and diplomatic talks, the two sides completed the disengagement process last year on the north and south banks of the Pangong lake and in the Gogra area. Each side currently has around 50,000 to 60,000 troops along the Line of Actual Control (LAC) in the sensitive sector.

http://www.indiandefensenews.in/2022/07/the-indian-air-force-iaf-will-initiate.html

Tue, 26 Jul 2022

Endureair Systems Secures Investment Worth USD 1.7 Million

Indian unmanned aerial systems (UAS) developer EndureAir Systems has secured funding worth INR135 million (USD1.7 million) from private investors. Rama Krishna, the company's CEO, told Janes that the funding will support Noida-based EndureAir's efforts to develop UAS systems

and expand manufacturing capability. He added that the funding saw a focus on establishing EndureAir as a UAS supplier to organisations including Hindustan Aeronautics Limited (HAL), the Defence Research and Development Organisation (DRDO), and the National Disaster Response Force (NDRF). The gasoline version of the company's Vibhram UAS was previously supplied to the DRDO and the NDRF. EndureAir's Hawk nano UAV has also been supplied to the Indian Special Forces. An electric version of the Vibhram, recently unveiled by the company, has also completed Indian Army trials. EndureAir was also recently shortlisted under an Indian government investment initiative – named the Production-Linked Incentive – to encourage UAS manufacturing in the country.

http://www.indiandefensenews.in/2022/07/endureair-systems-secures-investment.html?m=1

FINANCIAL EXPRESS
Read to Lead

Tue, 26 Jul 2022

Submarine Warfare & Artificial Intelligence

By Amit Das

April 2016, Sea Hunter was launched by the American Navy mentored by DARPA (Defence Advance Research Project Agency) a 40-meter unmanned and completely autonomous warship designed for the anti-submarine warfare. The entire manoeuvre and navigation of Sea Hunter was controlled by the artificial intelligence with zero-crew size onboard. After five years in April 2021 another technological miracle was designed by the MSubs for the British Naval Power. It was debuted as UUVs (Unmanned Underwater Vehicles), which is the exclusive research prototype for XLUUV (Extra Large Unmanned Underwater Vehicle). The fabrication motivation is to control XLUUV up to 3000 miles from the command centre for three-month duration. The global powers are trying to introduce XLUUV due to capability for handle the various underwater challenges with more efficient and accurate approach.

Early in 20th century, the incarnation of submarines in deep waters of seas were recognised as the major threat for the surface ships. In WWII the submarine warfare had presented their importance in Pacific-Asian and European theatre specifically the German U-Boats revealed the lethal power of underwater boats. In present scenario the power of submarine is not unknown by the world navy. Submarines are accepted as an offensive weapon system by the naval powers and it is also considered as useful underwater vessel by the civilian world for marine research, deep sea exploration and recovery of salvages. Last few decades, more attack submarines had been deployed in oceans, powered with advanced nuclear reactors, guided missiles with accurate torpedoes. The U.S. Navy's Ohio class submarine and Russian Navy's Akula class submarine may be the best example of advanced submarines.

Navy always decides the dynamics of geo-politics and the strategic analysis of the world history is showing that the priority to the naval power always channelize the power of state towards the expansion mode. Maritime strength is fundamental to the balance of the power in geopolitics today. Due to the quick changes in the global politics, the naval powers are facing fusion kind of naval warfare which is amalgamation of conventional, non-traditional and advanced digital warfare. The nature of hybrid naval warfare is totally non-symmetric and impacted by various emerging actors. It is demanding the agile naval warfare strategy with the intelligent next generation technologies to retain the war superiority. The Artificial Intelligence is providing the

modern approach to handle the complex-next-generation-warfare and the adaptation level of AI will decide move of wars. Navies are integrating AI into its ship systems, weapons, networks, and command and control as advanced algorithms are shaping the entire matrix.

The basis of AI is Big Data. “The question is how we convert the massive data bytes and turn it into information without getting overloaded, this will be a key part of AI, then we’re talking about handling decentralized systems,” said Nathan Husted of the Naval Surface Warfare Center, Carderock addressing at the 2022 Sea Air Space Symposium. The global powers are intentionally exploring the application of AI for the future weapon system. The in-depth growths of AI technologies are encouraging the arms industries to develop more accurate, lethal and autonomous weapons. The extensive applications of AI are attracting the naval strategist to evolve the AI each layer of the naval warfare from ASW (Anti-Submarine Warfare) to fleet tactics. The high risk and unforeseeable situation of oceans are the most favourable situation to enclose the AI with the regular operation of naval exercises and naval battles. The deployment of those intelligent technologies could upgrade exponentially the operation capabilities of naval commanders, warships and submarines and it is fit for the naval battles. The marine circumstances are very complex and lot of parameters have been aligned to execute naval operations successfully with the specialized intelligences. The involvement of AI increases the human intelligence with more efficient and the accurate capacity.

The naval warfare is enclosed by three different warfare. They are underwater warfare, surface warfare and aerial warfare. The entire US Defence strategy is mostly influenced by its underwater warfare strategy and same is with Russian and Chinese Navy. The global naval powers are preparing the strong road map for the future underwater warfare. The silent submarines are authentic source of surveillance and data gathering practiced by the countries. Submarines are required to construct a strong defence strategy with the deterrent power to stop any adverse naval situations in the favour of national security. Countries are strengthening the undersea warfare by the deploying the modern submarines and highly engineered underwater systems. The developments of undersea competitions are increasing the intersection of technologies in undersea operations.

The naval war strategists are including AI in different approach for the underwater warfare: –

- Use of AI in Submarine Operations
- Use of AI for the UUV (Unmanned Underwater Vehicle)

Use of AI in Submarine Operations

The sank of Indonesian Submarine KRI Nanggala in the coast of Bali is the most recent example showcasing the complexity of the submarine operations despite of the high risk in ocean the submarine force is one of the most priorities by the countries due to its offensive stealth power. They have quality to attack silently and to impose strong obstacles against the aggressive naval fleets. The complex and unseen environment of deep undersea creates tough challenges for the submarine commander. During the submarine navigation the limitation of human intelligences or other technical issues are the major causes of submarine accidents. To improve the capacity of the submarine crew the AI technologies are deployed by the most of the advanced naval powers. AI applications are increasing the potential thinking power of the commanding officer.

China is working for next generation nuclear submarine to control the ocean. It is considered that those Type 96 class submarine could be AI enabled to support and upgrade the decision-making capabilities of the commander.

The inclusion of AI techniques may be major reason of naval supremacy in underwater battle in near future. The long deep-water dives and restricted inner environment of submarine always a major reason of the stressed mental statues of the crew members. The AI augmented control system could help to take the optimised decisions within the limited time frame. The machine learning algorithm may helpful to identify the non-visible threats for the submarine without any human-error based on available data or real-time data. The human brain has limited capabilities to identify the deep-sea risks simultaneously. In traditional submarines human skills are used to decode sonar waves, due to noise sometimes it is tough to interpret the real statues of the activities. The AI enabled sonar system could easily trace and recognise accurately the surrounding activities of the submarine. The intelligent technologies are helping to submarine commanders to take the best and optimised decision with the very low probability of error. The success of submarine operations is always the game of decisions which is based on commander's intuition and the use of machine intelligence could easily exponentially upgrade the quality of decision making.

As per the US Congressional Report the cost of one Virginia Class nuclear powered submarine is approximately $3.6 billion similarly the cost of next generation nuclear missile submarine of Colombia class is also in billions. The modern costly submarines are equipped with the advanced sensors could be controlled by the AI technologies to protect the submarine from the trace of the enemy country. Modern submarines are stealth, but still, they produce noises of very low frequency during their silent running. The low frequencies could be surveillance by the series of sensors installed on sea bed by the enemy states. The game of hide and seek going to be more interesting due to increase in the disappear capacity of submarines and surveillance capacity of sensors. The installation of AI, Machine Learning and Deep learning technologies are upgrading the submarine weapon system up to the next level of accuracy. By the support of machine intelligence, the lethal weapon system could easily engage the undersea targets with error less efficiency. It would be easier for the submarine commanders to extract the hidden information from the available large data sets for the strategic intelligence.

The use of different AI technologies (Deep learning, Machine Learning, Reinforcement Learning) and data analytics tools support to the submarine crew to defend their boats from the various attacks or undersea challenges. SQUIDs (Super Quantum Interface Devices) are next generation sensor devices, which may create more sensitive digital underwater environments to detect the submarines in near future. Now submarine designers should be cautious about to create more defensive and offensive kind of underwater boats.

Use of AI and UUV (Unmanned Underwater Vehicle)

Dive-Dive-Dive……Alarm……those command words of submarine commanders may be part of naval history in future due to paradigm shift in submarine technology. The exponential development of autonomous machines and its constructive application in marine could easily change the naval operations globally. America, China, Russia, India, Australia many more countries are investing huge amount of research hours to develop the sophisticated UUVs (Unmanned Underwater Vehicles), underwater drones and ROVs (Remotely Operated Underwater Vehicles). The story of zero-crew size under water technology was initiated by the

US Navy in the 1960, the funded project was “Cable-Controlled-Underwater-Recovery-Vehicle”. It was first kind of ROV technology, conceptualized to execute the deep ocean operations and controlled by the operators through the cables from the vessels. UUVs and AUVs (Autonomous Underwater Vehicles) are the advanced level ROVs and encapsulated with the feature of autonomy.

Those UUVs and AUVs conducts their underwater operations without the help or intervention of operators. Due to not requirement of real time inputs from the operator, it performed all the functions autonomously. The AUV conducts various underwater survey missions under the hostile situations without the human interventions. It collects the data from the mapped area and returned to the programmed location. Many types of AUVs have been developed and deployed as per the requirement of the projects. The AUVs are capable to grab the best quality of data from the sea beds. The design of AUVs influence its drift, glide and propel quality. The AI uses artificial intelligent agents to operate AUVs autonomously without the human involvement. Intelligent Agents are the autonomous entities which reacts according to the external environment. Beijing is claiming the AI System that could design the hypersonic weapons autonomously.

https://www.financialexpress.com/defence/submarine-warfare-and-artificial-intelligence/2606457/lite/

Business Standard

Tue, 26 Jul 2022

First German air Defence Systems Arrive in Ukraine Amid Russian War

Ukrainian Defence Minister Oleksii Reznikov announced that the first Gepard air defence systems from Germany have arrived in the war-torn nation. "Today, the first three Gepards officially arrived. These are anti-aircraft systems, for which we have received tens of thousands of rounds of ammunition," Ukrayinska Pravda quoted the Minister as saying on Monday. "We are waiting for the first 15 Gepards. Three arrived in Ukraine today. They are already at the disposal of the Armed Forces of Ukraine," he added. Earlier this month, Germany had announced an official list of weapons it planned to send to Ukraine, including 30 Gepard air defence systems. The supply of ammunition for Gepard was previously considered a problem, as only slightly fewer than 60,000 35 mm shells were available. After several weeks, the German government and the Norwegian Ministry of Defence.

https://www.business-standard.com/article/international/first-german-air-defence-systems-arrive-in-ukraine-amid-russian-war-122072600201_1.html

Tue, 26 Jul 2022

German Air Force Halts Use of Eurofighter Jets Over Faulty Component

The German military has restricted the use of its Eurofighter jets after their manufacturer said a component used in the ejector seats was faulty, a spokesperson said on Friday. An investigation is now under way to test the component, the spokesperson added. According to industry sources, the faulty component is in cartridges used as propellants in the ejector seats. The sources added that the defect had also been found in other combat aircraft.

The problem came to light after an air force squadron in Neuburg an der Donau refrained from conducting a demonstration flight on Friday during a visit by Defence Minister Christine Lambrecht. The Eurofighter jets made headlines several years ago after a report showed that only a small proportion of those owned by the Bundeswehr were combat-ready.

http://www.indiandefensenews.in/2022/07/german-air-force-halts-use-of.html

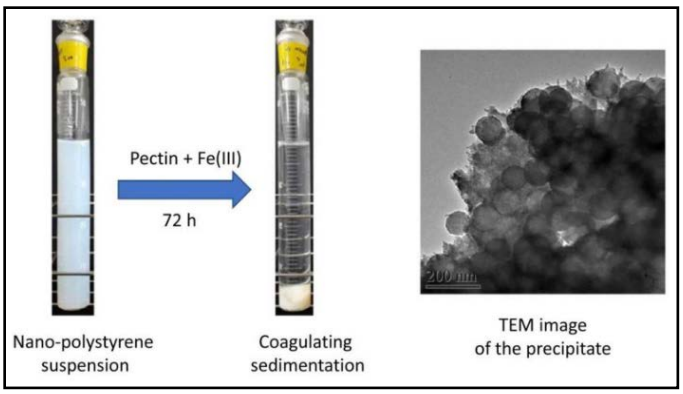
Science & Technology News

Tue, 26 Jul 2022

New Method Allows Scientists to Remove 95% of Nanoplastics

Ecosystems are known to accumulate microplastics, and the breakdown of microplastics produces nanoplastics. Nanoplastics are plastic particles that are smaller than 100 nm that disperse in water in a colloidal state. Although nanoplastics may be more common than microplastics, their small size makes them difficult to thoroughly investigate and evaluate. However, nanoplastics have been discovered in zebrafish in a number of organs, including the brain, which may be a sign that they can pass the blood-brain barrier.

Ninety percent of microplastics in urban areas are removed during the sewage treatment process. Microplastics are known to bond to biopolymers in the ocean and sink to the bottom. Therefore, the research team at Shinshu University under the direction of Professor Hiroshi Moriwaki of the Department of Applied Biology, Faculty of Textile Science and Technology, proposed employing pectin, a biopolymer to attach to nanoplastics with the aid of iron or aluminum. They discovered that by employing coagulating sedimentation with pectin and iron with filter paper, they were able to remove 95% of the nanoplastics within the first 24 hours.



Left image: The picture of a nano-polystyrene suspension (500 mg L−1, pH 7) (left) and the nano-polystyrene suspension after adding pectin (15 mg L−1) and Fe(III) (0.10 mM) after storage for 72 h (right). Right image: TEM image of the precipitat

The use of pectin was inspired by the abundance of apples in the prefecture of Nagano where Shinshu University is based. More information can be found by reading the paper which was published in the Journal of Environmental Chemical Engineering.

https://scitechdaily.com/new-method-allows-scientists-to-remove-95-of-nanoplastics/amp/

Tue, 26 Jul 2022

Enhancing the Safety of Autonomous Vehicles in Critical Scenarios

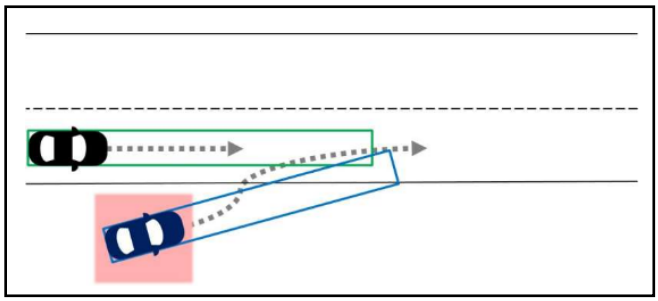
By Ingrid Fadelli

Researchers at Ulm University in Germany have recently developed a new framework that could help to make self-driving cars safer in urban and highly dynamic environments. This framework, presented in a paper pre-published on arXiv, is designed to identify potential threats around the vehicle in real-time. The team's paper builds on one of their previous studies, featured in IEEE Transactions on Intelligent Vehicles earlier this year. This previous work was aimed at providing autonomous vehicles with situation-aware environment perception capabilities, thus making them more responsive in complex and dynamic unknown environments.

"The core idea behind our work is to allocate perception resources only to areas around an automated vehicle that are relevant in its current situation (e.g., its current driving task) instead of the naive 360° perception field," Matti Henning, one of the researchers who carried out the study, told TechXplore. "In this way, computational resources can be saved to increase the efficiency of automated vehicles."

When the perceptive field of automated vehicles is limited, their safety can decline considerably. For instance, if a vehicle only considers specific regions in its surroundings to be "relevant," it might fail to detect potentially threatening objects in other regions. This could happen if the algorithms underpinning the vehicle's functioning are programmed to only consider and process a specific area of the road. "This is where our threat region identification approach comes into

play: regions that might correspond to potential threats are marked as relevant in an early stage of the perception so that objects within these regions can be reliably perceived and assessed with their actual collision/threat risk," Henning explained. "Consequently, our work aimed to design a method solely based on online information, i.e., without a-priori information, e.g., in the form of a map, to identify regions that potentially correspond to threats, so they can be forwarded as a requirement to be perceived."



Scenario with a risk-imposing traffic participant (dark-blue) merging into the road from an unmapped area.

To be applied on a large-scale, the researchers' framework should be as lightweight as possible. In other words, it should not need extensive computational resources to continuously scan the environment for threats. The method proposed by Henning and his colleagues is very straightforward, as it only needs to perform a limited number of computations. In addition, it is highly adaptable, thus it could be tailored for specific use-cases or vehicles. Essentially, the framework captures model-free representations of the environment, which include velocity estimates for all moving objects in the vehicle's surroundings. This means that, in contrast with other approaches, it does not rely on a limited, previously delineated map of relevant areas.

"Specifically, we leverage a Cartesian Dynamic Occupancy Grid Map (DOGMa), which provides a velocity estimate for each cell of the rasterized environment," Henning said. "From this, we use a standard clustering algorithm to identify sufficiently large clusters of cells of similar velocity (an approach adapted from a study by Gies et al.) and then evaluate if, assuming a constant velocity for identified clusters, these clusters would intersect with the movement of the automated vehicle within a set prediction horizon." If the moving clusters of cells identified by the team's clustering algorithm intersect with the vehicle's motion, a possible collision with the corresponding object could occur. To avoid this, the team's model marks the clusters' position as a relevant region that should be processed, so that the vehicle can perceive objects within it and adapt its velocity or direction to avoid accidents.

The key difference between the framework created by Henning and his colleagues and other threat identification approaches introduced in the past is that it tries to identify threats as early as possible. Their approach first identifies regions that contain moving objects and then allocates computational resources to these regions, using a technique introduced in their previous work. This allows the vehicle to detect where moving objects and potential threats are before they are in its immediate vicinity. Once these are identified, a threat assessment module would assess the risk of collisions with these objects and a planner would delineate actions to avoid these collisions. The team's paper only focuses on the treat identification model, as the threat assessment system and planner are beyond the scope of their paper.

"Our work is to be seen in the context of regional allocation of resources to parts of the perception data instead of the full 360° field of view," Henning said. "We outlined the (quite obvious) importance of retaining the capability of reacting to the environment without being restricted to a-priori knowledge. In this context, we have shown that already straightforward and lightweight implementations can significantly improve possible reaction time on potential collision threats." Henning and his colleagues evaluated their framework in a series of simulations and found that it could improve the operation of self-driving vehicles in different critical scenarios. These include scenarios in which another traffic participant approaches the vehicles' lane in different ways. "The implication that we derive is that safety is not necessarily tied to an all-time, 360° multimodal perception system," Henning said. "Instead, safety can also be achieved by an efficient perception system that adapts in smart ways and based on context knowledge as well as online information (and possibly even other sources of information) to an automated agent's situation."

The new framework could eventually be implemented and tested in real-world settings, to enhance the safety of self-driving vehicles navigating dynamic environments. In the meantime, Henning and his colleagues plan to continue working on their approach, while also devising new models to enhance autonomous and semi-autonomous driving. "In the future, we aim to follow the path to both efficient and safe perception using introduced methods for situation-awareness," Henning added. "Early-stage threat region identification is only one of the components required for such a system, and several challenges are still to be handled."

https://techxplore.com/news/2022-07-safety-autonomous-vehicles-critical-scenarios.html

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Tue, 26 Jul 2022

Roboticists Discover Alternative Physics

Energy, mass, velocity. These three variables make up Einstein's iconic equation $E=MC^2$. But how did Einstein know about these concepts in the first place? A precursor step to understanding physics is identifying relevant variables. Without the concept of energy, mass, and velocity, not even Einstein could discover relativity. But can such variables be discovered automatically? Doing so could greatly accelerate scientific discovery. This is the question that researchers at Columbia Engineering posed to a new AI program. The program was designed to observe physical phenomena through a video camera, then try to search for the minimal set of fundamental variables that fully describe the observed dynamics. The study was published on July 25 in Nature Computational Science.

The researchers began by feeding the system raw video footage of phenomena for which they already knew the answer. For example, they fed a video of a swinging double pendulum known to have exactly four "state variables"—the angle and angular velocity of each of the two arms. After a few hours of analysis, the AI produced the answer: 4.7. "We thought this answer was close enough," said Hod Lipson, director of the Creative Machines Lab in the Department of Mechanical Engineering, where the work was primarily done. "Especially since all the AI had access to was raw video footage, without any knowledge of physics or geometry. But we wanted to know what the variables actually were, not just their number."

The researchers then proceeded to visualize the actual variables that the program identified. Extracting the variables themselves was not easy, since the program cannot describe them in any intuitive way that would be understandable to humans. After some probing, it appeared that two of the variables the program chose loosely corresponded to the angles of the arms, but the other two remain a mystery. "We tried correlating the other variables with anything and everything we could think of: angular and linear velocities, kinetic and potential energy, and various combinations of known quantities," explained Boyuan Chen Ph.D., now an assistant professor at Duke University, who led the work. "But nothing seemed to match perfectly." The team was confident that the AI had found a valid set of four variables, since it was making good predictions, "but we don't yet understand the mathematical language it is speaking," he explained.

After validating a number of other physical systems with known solutions, the researchers fed videos of systems for which they did not know the explicit answer. The first videos featured an "air dancer" undulating in front of a local used car lot. After a few hours of analysis, the program returned eight variables. A video of a lava lamp also produced eight variables. They then fed a video clip of flames from a holiday fireplace loop, and the program returned 24 variables. A particularly interesting question was whether the set of variable was unique for every system, or whether a different set was produced each time the program was restarted. "I always wondered, if we ever met an intelligent alien race, would they have discovered the same physics laws as we have, or might they describe the universe in a different way?" said Lipson. "Perhaps some phenomena seem enigmatically complex because we are trying to understand them using the wrong set of variables. In the experiments, the number of variables was the same each time the AI restarted, but the specific variables were different each time. So yes, there are alternative ways to describe the universe and it is quite possible that our choices aren't perfect."

The researchers believe that this sort of AI can help scientists uncover complex phenomena for which theoretical understanding is not keeping pace with the deluge of data—areas ranging from biology to cosmology. "While we used video data in this work, any kind of array data source could be used—radar arrays, or DNA arrays, for example," explained Kuang Huang, Ph.D., who co-authored the paper. The work is part of Lipson and Fu Foundation Professor of Mathematics Qiang Du's decades-long interest in creating algorithms that can distill data into scientific laws. Past software systems, such as Lipson and Michael Schmidt's Eureqa software, could distill freeform physical laws from experimental data, but only if the variables were identified in advance. But what if the variables are yet unknown?

Lipson, who is also the James and Sally Scapa Professor of Innovation, argues that scientists may be misinterpreting or failing to understand many phenomena simply because they don't have a good set of variables to describe the phenomena. "For millennia, people knew about objects moving quickly or slowly, but it was only when the notion of velocity and acceleration was formally quantified that Newton could discover his famous law of motion F=MA," Lipson noted. Variables describing temperature and pressure needed to be identified before laws of thermodynamics could be formalized, and so on for every corner of the scientific world. The variables are a precursor to any theory. "What other laws are we missing simply because we don't have the variables?" asked Du, who co-led the work. The paper was also co-authored by Sunand Raghupathi and Ishaan Chandratreya, who helped collect the data for the experiments.

https://phys.org/news/2022-07-roboticists-alternative-physics.html

General News

The Tribune

Wed, 27 Jul 2022

E-Libraries to be Started in Hospitals Soon: Anil Vij

E-library will soon be started in every hospital of Haryana and medical colleges will also be associated with this so that students pursuing the DNB course get the latest and world-class information. Haryana Health and Family Welfare Minister Anil Vij stated this while addressing the gathering at the DNB Orientation Programme held at Indradhanush Auditorium in Panchkula today. He said the world was moving towards digitisation and the state of Haryana was also progressing faster towards e-treatment. He said they wanted every PHC and hospital to be connected with e-treatment. Vij said mapping would be done soon in Haryana regarding health infrastructure facilities for which tenders had been invited. He said health facilities were being provided on the basis of demand, but after mapping.

https://www.tribuneindia.com/news/haryana/e-libraries-to-be-started-in-hospitals-soon-vij-416053