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Thu, 02 Jun 2022

India Orders Astra Weapon in Move to Break Dependence on Foreign Missiles

India's Defence Ministry on Tuesday awarded a \$424.4 million contract to state-run Bharat Dynamics Limited to supply locally developed Astra MK-I air-to-air missiles, paving the way to end the country's dependence on foreign beyond-visual-range weapons. Under the contract, Bharat Dynamics will supply about 400 Astra MK-I missiles and associated equipment, to be delivered in four years for the Air Force and Navy for use on Su-30MKI, LCA-MK and MiG-29K aircraft. The missile is expected to reduce India's dependency on Russian R-77, French MICA and Israeli Derby beyond-visual-range missiles. "The project essentially embodies the spirit of 'Aatmanirbhar Bharat' ['Self-Reliant India'] and will help facilitate the country's journey towards self-reliance in air-to-air missiles" the ministry said in a statement.

The missile is locally designed and developed by the government's Defence Research and Development Organisation, and it underwent successful tests with Air Force Su-30MKI fighters in different configurations. The ministry noted transfer of technology from the government organization to the company for production of the Astra MK-I and all associated systems is complete, and that production at Bharat Dynamics is already in progress. The single-stage, solid-fuel missile is 3.8 meters (12.47 feet) long and weighs 160 kilograms (352.74 pounds). It also carries multiple conventional warheads that weigh a total of 15 kilograms.

A senior DRDO missile scientist told Defense News that the 100-kilometer-plus range weapon is now equipped with a fully indigenous terminal guidance system based on radio-frequency technology used for tracking targets. The scientist spoke on the condition of anonymity because the individual was not authorized to speak to the media, added that the weapon is capable of engaging and destroying highly maneuverable supersonic aerial targets with high accuracy. The scientist, who spoke on the condition of anonymity over a lack of permission to talk to the media, noted that an earlier version of the Astra missile was developed with Russia's help, and it had carried the Agat 9B-1103M active radar seeker and radio proximity fuze detonation mechanism. However, An Air Force official, speaking on condition of anonymity because he was not authorized to speak to the press, said Astra MK-1 can only achieve an operational range of up to 60 kilometers and is too bulky. The Air Force wants the missile's weight reduced by 50 kilograms, he added.

<https://www.defensenews.com/global/asia-pacific/2022/06/02/india-orders-astra-weapon-in-move-to-break-dependence-on-foreign-missiles/>

India Places First Order for Indigenous Astra MK-1: All you Need to Know about the Next-Gen Missile

India placed its first order of the indigenous next-gen missile Astra Mk-1 earlier this week, in a move to become more self-reliant in the defence sector under the 'Aatmanirbhar' movement and reduce dependence on Russian munitions.

Need for Astra-Mk-1

Indian Su-30s could not hit Pakistani F-16s from our side of the border because of the short range of the Russian missiles equipped on them, while Pakistani jets, armed with American AIM 120 missiles, were easily able to lock-on and target the Indian jets, which could not hit the Su-30s because of the evasive manoeuvres performed by the IAF pilots. However, the need for a better, slightly longer-range missile was felt by the IAF jets. Astra Mk-1, outranging the current set of Russian missiles equipped on the jets, is expected to fulfill that need, felt during the aerial dogfight.

What is Astra Mk1?

Astra has been specifically designed by the Defence Research and Development Organisation (DRDO) of India for suiting the needs of the Indian military aircraft and their activities. The missile is capable of beyond-visual-range combat, which means that it can engage a target at the range of 20 nautical miles or 37 km and beyond. However, it can also prove to be useful in close range combat. Another edition of Astra was successfully tested from Su-30 MKI in 2019, destroying the target at a speed of 5,555 km per hour. It is basically designed to engage and destroy highly manoeuvring fighters, including supersonic jets. It is an all-weather missile, unaffected by strong winds, rains, or thunderstorms and can also work at night.

Astra Warhead

The warhead on the missile is equipped with HMX-based high explosive composition. HMX or octogen, is a powerful and relatively insensitive nitroamine high explosive. It belongs to the family of RDX. The in-situ filling technology for Astra warhead of supersonic missile system has also been developed by DRDO. The warhead for the supersonic missile is designed to be a part of the airframe. Astra's filled warheads have also been successfully tested for static and dynamic performance.

<https://www.timesnownews.com/mirror-now/in-focus/india-places-first-order-for-indigenous-astra-mk-1-all-you-need-to-know-about-the-next-gen-missile-article-91962579>

Anantapur: DRDO Food Research Lab to Set Up Groundnut Incubation Centre

Farmers of the twin districts had long been demanding a Groundnut Research Centre for researching on producing quality groundnut quality seeds. Former chief minister N Chandrababu Naidu promised a research centre but he failed to fulfill it. Keeping the export potential of peanuts in view, the DRDO Food Research Laboratory with the initiation of MP Talari Rangaiah has come forward to set up food processing units to ensure value addition to the groundnut produce. A Tomato incubation centre too will be set up soon. Rangaiah told The Hans India that separate incubation centres for groundnut and sweet lemons will become a reality soon. Initially, the tomato incubation centre will produce tomato ketchup, powder, sauce and other biproducts. Squash and juice will be produced with sweet lemons and salted roasted peanuts and peanut butter with groundnuts which are in great demand in Western countries.

The best quality nuts will be identified by the DRDO for producing value added products including peanut butter, juices, chocolate nuts and bars which are consumed by the Western consumers due to their high protein value and taste. The single district is cultivating groundnut in 10 lakh acres with more than 7 lakh farmers and their families depending on the crop for their livelihood.

The groundnut or peanut crop is known in the west and has its roots in Brazil in South America. It is not an Indian plant species and much less of Telugu origin but interestingly the people of Anantapur district have owned the crop linking their destiny with the crop despite all the challenges of erratic monsoon being faced by the local farmers. Yet, a district that is contributing significantly to national and world production does not have agro-industries for producing value added products including peanuts butter which is popular in the Western countries. The farmers are looking forward for the groundnut processing centres to be set up by the DRDO Food Laboratory. The country had exported 15 lakh metric tonnes of groundnuts to the world worth of Rs 10,000 crore in the 2017-19. But after Covid, the exports declined and the latest figures are not available.

<https://www.thehansindia.com/news/cities/visakhapatnam/lpg-cylinder-explosion-destroys-a-house-in-visakhapatnam-incurs-loss-of-rs-2-lakh-746572?infinitescroll=1>

Evaluating the Arsenal

Evaluating the arsenal

The army faces a shortage of the modern battlefield's most lethal killer



ILLUSTRATION: BINAY SINHA

The army's two mechanised strike corps, which are meant to arrow deep into enemy territory during wartime, have over the last five years been equipped with five artillery regiments (100 guns), called the K-9 Vajra. These 155 millimetre/52-calibre, tracked, self-propelled (SP) artillery guns have been built by Larsen & Toubro under licence from Korean firm, Hanwha Techwin. While the influx of guns is welcome, the number acquired is clearly inadequate, given that each strike corps is authorised four medium SP regiments, each with 20 howitzers.

Given this shortfall, the army and the Ministry of Defence (MoD) are weighing whether to procure another 100-200 mobile SP howitzers. The additional 200 guns would equip 10 medium artillery regiments. Three regiments in the second strike corps and seven for the independent armoured brigades that carry out a mobile, offensive role during war.

The army has long been deficient in artillery, the modern battlefield's most lethal killer. Since the American Civil War, artillery has had a simple function: To pulverise enemy positions completely so that attacking or defending them as the case may be, is a cakewalk for the two combat arms — the tanks of the armoured corps and the foot soldiers of the infantry. However, for a variety of reasons, the most obvious being the failure of the army, the Defence Research & Development Organisation (DRDO) and the Ordnance Factory Board to design and manufacture affordable, long-range artillery guns, the army is lacking in firepower. At the same time, the MoD has failed to address this shortfall by acquiring guns from the international market.

This has been a historical weakness in India. In 1526, the invading Mughal warlord, Zahir-ud-din Muhammad Babar, won the First Battle of Panipat simply by deploying and employing artillery skilfully. The troop ratio in that battle dramatically favoured the Sultan of Delhi, Ibrahim Lodhi, but he had no field artillery, Babar's three-to-four gun batteries, and the knowledge and experience of how to use them, caused the Sultanate's army to panic. Meanwhile, the Lodhi army's war elephants, unused to the roar of cannons,

ran helter-skelter and trampled large numbers of their own soldiers.

India's modern military inherited the philosophy of artillery usage from World War II and from combat experience in the 1965 and 1971 wars. In the 1947-48 Kashmir campaign and the 1962 Sino-Indian war, we had hardly any artillery and lacked firepower across the entire frontier. Nor did we have roads to move our artillery guns into better positions for giving fire support.

Consequently, in all the Indian Army's battles since Independence, there have just been a handful of cases where the artillery did well. One example where the artillery demonstrated its utility was in the use of the 155 mm, 52 calibre Bofors FH-77 gun during the 1999 Kargil War. With directed artillery fire destroying or degrading much of the enemy's combat potential, our soldiers could stage uphill assaults on Pakistani positions on dominating heights without taking too many casualties.

Artillery numbers

India has about 226 artillery regiments today and is looking to increase that to 270. With about 18 artillery guns in each regiment, plus two reserve guns, the arsenal amounts to 5,400 artillery pieces. In the wake of Kargil, a decision was taken for "mediumisation" of all the army's artillery regiments. This involves replacing 105 mm and 130 mm field guns with 155 mm medium guns. In addition, there is a growing number of units of multi-barrelled rocket launchers, including six units of the indigenous Pinaka, three Russian SMERCH regiments and five Russian GRAD BM-21 regiments. Rockets are meant to saturate large area targets with firepower. In addition, there are three units of BrahMos cruise missiles, and a fourth under raising.

Besides guns, the corps of artillery operates sophisticated surveillance and target acquisition (SATA) systems that pick up and locate enemy guns and radars that can then be destroyed by counter-fire. These include the indigenous Swati weapon locating radar, which is in service in SATA batteries at the division

and corps level. Enemy guns and battery locations are also detected by LOROS (long-range recon and observation system) systems, imported from Israel. These can pick up vehicles at ranges of 20-25 km.

Increasing gun performance

The simplest way of increasing the range and capability of guns is to increase their chamber size. The bigger a gun's chamber, the more charge can be exploded in it and, therefore, the longer the range it can hurl a projectile to. The common chamber sizes in artillery guns are: 19, 23 and 25 litres chambers. The 155 mm/52 calibre FH-77B Bofors gun has a 19-litre chamber, while the domestic Advanced Towed Artillery Gun System (ATAGS), which the DRDO is developing, has a 25-litre chamber. A gun's chamber size does not alter its effect on the target, since the same projectile is fired from all three chamber sizes. All that changes as the chamber size increases is that more propellant burns in it, creating greater pressure on the projectile, propelling it further. That increases the range of the ammunition.

A higher calibre means a longer barrel. The Bofors gun's 155 mm/39-calibre barrel is 39 x 155 mm long, which amounts to 6.05 metres. This gun is outranged by the M777 ultralight howitzer, whose 155 mm/45-calibre barrel is 45 x 155 mm long, or 6.96 metres. BAE Systems is developing a 58-calibre barrel to increase the range of its M777 155 mm ultralight howitzer. However, these guns are outranged by most contemporary guns, whose 155 mm/52-calibre barrel is 52 x 155 mm long, or 8.06 metres.

Precision

Another capability improvement the artillery is bringing in is precision. A gun with greater precision needs to fire less ammunition for achieving the desired effect on a target. There are two technologies for achieving precision: In the Excalibur ammunition, the projectile is guided precisely to the target with the help of on-board inertial and GPS guidance. For that, the target's precise coordinates must be known. The Excalibur is not in service with us. Precision is achieved through another type of guided ammunition called Krasnopol, which is guided onto the target with a laser designator. India's stocks of Krasnopol, which are now outdated, have been destroyed.

Other methods

A third way to increase projectile range without increasing chamber capacity or the length of the barrel is to put a ramjet on the rear of the projectile, which propels it further. BAE Systems is already doing that, while the DRDO is pursuing research at academic institutions.

Lethality can also be improved by using higher performance explosives in projectiles. This is the field of the DRDO's High Energy Materials Research Laboratory, which is working on the bi-modular charge systems. This involves using propellants in a graded system, categorised as Charge 1 to Charge 7, which only ATAGS uses.



BROADSWORD

AJAI SHUKLA

Fri, 03 Jun 2022

Indian Naval Air Squadron Commissioned into Indian Navy Comprising Dhruv MK-III Choppers

An Indian Naval Air Squadron (INAS) operating the indigenously-built Advanced Light Helicopter MK-III has been commissioned into the Indian Navy, in a boost to its combat capability. The INAS 325 squadron was commissioned into the navy by Lieutenant General Ajai Singh, the Commander-in-Chief of the Andaman and Nicobar Command, at a ceremony held at the INS Utkrosh naval air station in Port Blair on Tuesday, officials said. The newly-inducted helicopters flew for the first time over the Andaman Islands earlier this year and were officially inducted on January 28, they said. The unit is the second DHRUV MK-III squadron that has been commissioned into the Indian Navy.

In his address, Lieutenant General Ajai Singh commended the efforts of the naval air station. The addition of DHRUV MK-III into the air naval station is expected to augment its surveillance capabilities in the region. This aircraft would not only strengthen the military capabilities in the region, but also be able to provide assistance to the local administration in any need of the hour, the officials said. The state-of-the-art multi-role helicopter has been developed and manufactured by Hindustan Aeronautical Limited (HAL), Bangalore. The squadron is commanded by Commander Avinash Kumar Sharma, who is an experienced pilot.

<http://www.indiandefensenews.in/2022/06/indian-naval-air-squadron-commissioned.html?m=1>

Fri, 03 Jun 2022

Indian Defence Firms Announce Submarine-Launched UAV Project

Two private-sector Indian defence firms have announced that they will co-operate in the research and development of a submarine-launched unmanned aerial system (UAS). According to an industry source, the UAS will comprise the unmanned aerial vehicle (UAV) plus a specialised underwater launch canister. The project was unveiled during Bharat Drone Mahotsav 2022 in New Delhi on 27 May by the Bangalore-based UAS developer NewSpace Research and Technologies (NRT) and Larsen & Toubro (L&T) Defence. The companies have signed a memorandum of understanding (MOU) to co-develop the platform.

“Research for the project is starting immediately. The initial goal is to develop an underwater-launched UAV for the Indian Navy and for the global market,” the source told Janes. “This is the first private-sector undertaking of this important realm of submarine military technologies in India, and therefore, there are challenges. We are starting with one specific UAS [development] in the days ahead,” the source added.

<http://www.indiandefensenews.in/2022/06/indian-defence-firms-announce-submarine.html?m=1>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 02 Jun 2022 3:04 PM

रक्षा मंत्री श्री राजनाथ सिंह और इजरायल के रक्षा मंत्री श्री बेंजामिन गेंट्ज ने नई दिल्ली में द्विपक्षीय वार्ता की

दोनों नेताओं ने भविष्य की प्रौद्योगिकियों तथा रक्षा सह-उत्पादन में अनुसंधान एवं विकास पर ध्यान देने के साथ-साथ रक्षा से संबंधित सभी क्षेत्रों में सहयोग बढ़ाने के तरीकों पर चर्चा की

रक्षा सहयोग के मौजूदा ढांचे को और अधिक मजबूत करने के लिए रक्षा सहयोग से संबंधित भारत-इजरायल विजन को अपनाया गया

रक्षा मंत्री श्री राजनाथ सिंह ने 02 जून, 2022 को नई दिल्ली में इजरायल के रक्षा मंत्री श्री बेंजामिन गेंट्ज के साथ द्विपक्षीय बैठक की। इस बैठक के दौरान द्विपक्षीय, क्षेत्रीय और रक्षा औद्योगिक सहयोग से संबंधित विभिन्न मुद्दों पर चर्चा की गई। दोनों मंत्रियों ने दोनों देशों के बीच मौजूदा सैन्य गतिविधियों की समीक्षा की, जोकि कोविड - 19 महामारी की चुनौतियों के बावजूद बढ़ी हैं। उन्होंने भविष्य की प्रौद्योगिकियों तथा रक्षा सह-उत्पादन में अनुसंधान एवं विकास पर ध्यान देने के साथ-साथ रक्षा से संबंधित सभी क्षेत्रों में सहयोग बढ़ाने के तरीकों पर चर्चा की।

दोनों मंत्रियों ने पारस्परिक सुरक्षा संबंधी चुनौतियों और सामरिक एवं रक्षा से जुड़े कई मुद्दों पर आपसी तालमेल को रेखांकित किया। उन्होंने सभी मंचों पर सहयोग बढ़ाने के लिए मिलकर काम करने की प्रतिबद्धता व्यक्त की। भारत-इजरायल रक्षा सहयोग के मौजूदा ढांचे को और अधिक मजबूत करने के इरादे से, दोनों पक्षों ने रक्षा सहयोग से संबंधित भारत-इजरायल विजन को अपनाया। दोनों मंत्रियों के बीच भविष्य की रक्षा प्रौद्योगिकियों के क्षेत्र में सहयोग बढ़ाने के संबंध में एक आशय पत्र का आदान-प्रदान भी किया गया।

इससे पहले दिन में, इजराइल के रक्षा मंत्री ने राष्ट्रीय युद्ध स्मारक का दौरा किया और स्मारक पर माल्यार्पण कर शहीदों को श्रद्धांजलि दी। रक्षा मंत्री श्री राजनाथ सिंह के साथ द्विपक्षीय बैठक से पहले उन्हें पारंपरिक रूप से गार्ड ऑफ ऑनर दिया गया।

इजराइल के रक्षा मंत्री 02 जून, 2022 की सुबह भारत की आधिकारिक यात्रा पर नई दिल्ली पहुंचे। दोनों देशों के बीच रक्षा संबंधों को मजबूत करने के उद्देश्य से यह उनकी पहली भारत यात्रा है। रक्षा सहयोग

द्विपक्षीय सहयोग के महत्वपूर्ण स्तंभों में से एक रहा है। इस वर्ष भारत और इज़राइल के बीच आधिकारिक राजनयिक संबंधों की स्थापना की 30वीं वर्षगांठ है।

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1830563>



Press Information Bureau
Government of India

Ministry of Defence

Thu, 02 Jun 2022 3:04 PM

**Raksha Mantri Shri Rajnath Singh & his Israeli counterpart
Mr Benjamin Gantz hold bilateral talks in New Delhi**
**Discuss ways to enhance cooperation in all domains with focus on R&D in
future technologies & defence co-production**
**India-Israel Vision on Defence Cooperation adopted to further strengthen
existing framework**

Raksha Mantri Shri Rajnath Singh held a bilateral meeting with Defence Minister of Israel Mr Benjamin Gantz in New Delhi on June 02, 2022. A wide range of issues concerning bilateral, regional and defence industrial cooperation were discussed during the meeting. The two Ministers reviewed the existing military-to-military activities which have increased despite the challenges due to COVID-19 pandemic. They discussed ways to increase cooperation in all domains with a focus on Research & Development in future technologies and defence co-production. Both the Ministers acknowledged mutual security challenges and their convergences on a number of strategic and defence issues. They expressed commitment to work together to enhance cooperation in all forums. With the intention to further strengthen the existing framework of the Indo-Israeli defence cooperation architecture, both sides adopted the India-Israel Vision on Defence Cooperation. A Letter of Intent on enhancing cooperation in the field of Futuristic Defence Technologies was also exchanged between the two Ministers.

Earlier in the day, the Defence Minister of Israel visited the National War Memorial and paid homage to the fallen heroes by laying wreath at the monument. He was accorded a Ceremonial Guard of Honour before his bilateral meeting with Raksha Mantri Shri Rajnath Singh.

The visiting dignitary reached New Delhi in the morning of June 02, 2022 an official visit to India. It was his first visit to India with an aim to strengthen the defence ties between the two countries. Defence cooperation has been one of the significant pillars of the bilateral cooperation. This year marks the 30th anniversary of the formation of the official diplomatic ties between India and Israel.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1830445>

India, Israel Adopt Vision Statement to Further Defence Cooperation

India and Israel on Thursday signed a ‘vision Statement’ to further deepen the long-standing defence cooperation. This was adopted at a meeting between Defence Minister Rajnath Singh and his visiting Israeli counterpart Benny Gantz. “During his meeting with Prime Minister Modi, Minister Gantz emphasized the opportunity to invest further in defence cooperation between the two countries, while building on shared values in order to contribute to global stability,” the Israeli Embassy said in a statement. India is an industrial superpower and Israel is a technological superpower – cooperation between our countries will expand the capabilities of both countries to contend with developing challenges, Mr. Gantz said.

“The two Ministers presented a joint declaration marking 30 years of Israel-India relations and reiterated their commitment to deepening defence ties,” a statement from Mr. Gantz’s office said. “India and Israel share similar and common challenges, including border security and fighting terrorism. By working together, we may increase our capabilities and ensure the security and economic interests of both countries,” Mr. Gantz said. A Letter of Intent on enhancing cooperation in the field of futuristic defence technologies was also exchanged between the two Ministers, a Defence Ministry statement said.

The discussion covered topics including strategic global challenges, military cooperation, defence industrial cooperation and joint Research and Development (R&D). They also discussed a cooperation agreement signed between the Indian Defence Research and Development Organisation (DRDO) and Israel’s Directorate for Defence R&D, which will enable the expansion of technological collaboration and development between the countries. The Ministers declared their intention to further develop defence cooperation in a manner that harnesses Israel’s “technological advance and operational experience”, together with India’s “extraordinary development and production capabilities”, the statement said. “Cooperation between the countries would be in line with Prime Minister Modi’s ‘Make in India’ vision.”

In addition, the Ministers discussed partnerships within the government-to-government framework, military training, and technological cooperation with a focus on Unmanned Aerial Vehicles (UAV) and defensive capabilities, the statement added. Before the bilateral meeting, Mr. Gantz paid homage at the National War Memorial and reviewed a Guard of Honour on the lawns of Vigyan Bhavan. He also met National Security Advisor Ajit Doval. “Discussed key issues pertaining to defence cooperation and global and regional scenarios during the bilateral meeting. We place great value on our strategic partnership with Israel,” Mr. Singh said on Twitter after the meeting. “There is a broad consensus between both the countries on further strengthening the bilateral strategic and defence cooperation.”

Mr. Gantz’s scheduled visit to India in the end of March was postponed due to “some unavoidable reasons” while the visit of Israeli Prime Minister Naftali Bennett scheduled for early April was postponed after he tested positive for COVID-19. The two countries are close to finalising a bilateral Free Trade Agreement (FTA) which officials indicated could be signed during the visit of Mr. Bennett for which both sides are discussing mutually convenient dates. Mr. Gantz is accompanied by his Chief of Staff Maayan Israeli, Military Secretary Brig. Gen.

Yaki Dolf, Director of the Policy and POL-MIL Bureau Dror Shalom and Head of the International Defence Cooperation Directorate Yair Kulas.

In October 2021, India and Israel had agreed to form a task force to formulate a comprehensive 10-year roadmap to identify new areas of cooperation as part of efforts to further advance the bilateral defence cooperation. This was agreed at the 15th India-Israel Joint Working Group (JWG) meeting on bilateral defence cooperation held on October 27, 2021 in Tel Aviv, Israel, the Defence Ministry had stated. The JWG is the apex body between the Defence Ministries of the two countries to comprehensively review and guide all aspects of bilateral defence cooperation. At the same meeting, it was also decided to form a Sub Working Groups (SWG) on defence industry cooperation and in this regard, a Terms of Reference was signed between the two sides. The SWG would enable efficient utilisation of bilateral resources, effective flow of technologies and sharing industrial capabilities, the Ministry had stated.

Major arms supplier

Israel has been one of India's top defence partners supplying a range of high end defence equipment. Indian armed forces rely heavily on Israeli Searcher and Heron UAVs to meet their surveillance requirements with growing need for more. In the backdrop of the standoff with China in eastern Ladakh, last year the Army had leased four Heron-TP Medium Altitude Long Endurance UAVs from Israel Aircraft Industries which have since been inducted. In the second half of last year, the Army also placed orders for smaller, expendable 'SkyStriker' drones to be manufactured in Bengaluru by a joint venture between Israel's Elbit System and India's Alpha Design Technologies, which is now part of Adani Group. The two countries have several joint development projects in the pipeline, including the Long Range Surface to Air Missile also called Barak-8 for the Indian Navy's warships. The development which saw some delays is now complete and the missile systems are being inducted.

In another important project, in April, Hindustan Aeronautics Limited entered into a memorandum of understanding with IAI to convert six Boeing-767 civil passenger aircraft to midair refuelling aircraft in India for the Indian Air Force. However, another major deal for two more Phalcon Airborne Warning And Control Systems (AWACS), to add to three in Service, has been stuck for a while for final approval from the Cabinet Committee on Security. With the current focus on indigenous manufacturing and DRDO now indigenously developing larger AWACS, the Phalcon is unlikely to materialise. The Army which has operated Israeli small arms for a long time had contracted 16,497 Negev Light Machine Guns from Israel in March 2020 under fast track procurement and they have since been inducted.

<https://www.thehindu.com/news/national/india-israel-adopt-vision-statement-to-further-defence-cooperation/article65487091.ece>

THE ECONOMIC TIMES

Thu, 02 Jun 2022

India, Israel Defence Ministers Discuss High Tech, UAVs

India and Israel discussed cooperation for the development of advanced defence technologies, with a focus on Unmanned Systems, during a defence ministerial level bilateral meeting in the capital on Thursday. Defence Minister Rajnath Singh exchanged a Letter of Intent on enhancing

cooperation in the field of Futuristic Defence Technologies with his counterpart Benjamin Gantz during the meeting. "With the intention to further strengthen the existing framework of the Indo-Israeli defence cooperation architecture, both sides adopted the India-Israel Vision on Defence Cooperation," an official statement after the visit said.

The two sides discussed issues concerning bilateral and regional matters as well as existing military activities being conducted like joint development and training. "India and Israel share similar and common challenges, including those of border security and fighting terrorism. By working together, we may increase our capabilities and ensure the security and economic interests of both countries," Israeli Defence Minister Benjamin Gantz said. A cooperation agreement has been signed between the Indian DRDO (Defence Research and Development Organisation) and Israel's Directorate for Defence R&D, which will enable the expansion of technological collaboration and development between countries, an Israeli Embassy spokesperson said. "The ministers discussed partnerships within the government-to-government framework, military training, and technological cooperation with a focus on UAVs and defensive capabilities," the spokesperson added.

India has had close military relations with Israel, with joint projects underway like air defence missile systems and advanced electronics. Israel is among the top suppliers of military equipment to India, with contracts for drones, radars and ammunition being placed in the past. Several Israeli companies have formed joint ventures with Indian defence players to target Make in India projects of the defence ministry. This year marks the 30th anniversary of the formation of the official diplomatic ties between India and Israel.

<https://economictimes.indiatimes.com/news/defence/india-israel-defence-ministers-discuss-high-tech-uavs/articleshow/91970673.cms?from=mdr>

THE ECONOMIC TIMES

Fri, 03 Jun 2022

China Introduces Strategy to make Military Smarter in Backdrop of Ukraine Conflict

China is reshaping its postgraduate military studies system to make its armed forces "smarter," including cultivating more technological talent in the backdrop of changes in the international environment brought by the Russia-Ukraine conflict and also as part of its efforts to modernise the PLA. A recently released document by the Central Military Commission, titled "Opinions on accelerating the reform and development of military postgraduate education" focuses on fostering military personnel with advanced technology backgrounds and combat skills, ET has reliably learnt.

At the same time, while the world's attention is focused towards Russia-Ukraine conflict, Beijing has quietly increased its military presence in the Western Pacific region. According to a report in South China Morning Post, China sent its Liaoning Aircraft Carrier and seven escort ships for training through the Miyako Strait since May 2, where the PLA Navy carried out battle exercises and staged more than 100 fighter take-off and landing operations near the Okinawa Islands.

An article published on May 30 in South China Morning Post, quoting several military experts, assessed the growing self-sufficiency of China's military-industrial complex minimized any impact of the Ukraine conflict and sanctions on Russia on its arms production. The article

claimed that China had been working for more than two decades to reduce its dependence on Russian arms by indigenously developing their own versions. However, an article in the 'Eurasian Times' that quoted a conference on May 17 at the China Aerospace Studies Institute reported that the Russia-Ukraine conflict would impact the fleet of the PLA's Air Force as Russia would not be able to service or provide engines and components of Chinese fighters due to its involvement in the war. China lags in jet engine production. In terms of performance, its indigenous engines are still falling short in comparison to Russian ones, sources said.

The ongoing conflict has left both Russia and Ukraine vulnerable to cyber-attacks aimed at obtaining sensitive military data. It is learnt that Chinese hackers were exploiting these vulnerabilities and reportedly unleashed cyber-attacks on Russian defence systems to obtain military data. An Israeli-American cyber-security firm "Check Point" revealed that Chinese hackers tried to steal Russian defence data, which continued after Russia launched its military operation in Ukraine. The report provided new evidence of Chinese efforts to spy on Russia, pointing to the complexity of the relations between them. ET has learnt that Beijing continues to view Russia as a target for acquiring sensitive military technological information.

Chinese hackers apparently also targeted Ukrainian organizations but the attacks appear to be focused more on gathering information and intellectual property rather than causing chaos or disruption that could sway the conflict in favour of Ukraine or Russia, ET has learnt. Underlining growing military threat from China, Gen. Mark Milley, Chairman of the US Joint Chiefs of Staff, recently warned that the world faces looming global war with 'robot tanks & AI weapons' as threats grew from China. While speaking to the cadets graduating from the US Military Academy, West Point, he noted that there was potential for an international conflict as China intended to change the current rules based international order.

<https://economictimes.indiatimes.com/news/defence/china-introduces-strategy-to-make-military-smarter-in-backdrop-of-ukraine-conflict/articleshow/91973601.cms>

Science & Technology News



Press Information Bureau
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Ministry of Science & Technology

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A Unique Liquid-Mirror Telescope Sees First Light in the Indian Himalayas

A new telescope facility atop a mountain in the Himalayan range will now keep a watch on the overhead sky to identify transient or variable objects such as supernovae, gravitational lenses, space debris, and asteroids. The telescope, commissioned at Devasthal, a hill in Uttarakhand, will help in surveying the sky making it possible to observe several galaxies and other astronomical sources just by staring at the strip of sky that passes overhead. It is the first liquid mirror

telescope in the country and the largest in Asia. Built by astronomers from India, Belgium and Canada, the novel instrument employs a 4-meter-diameter rotating mirror made up of a thin film of liquid mercury to collect and focus light. It is located at an altitude of 2450 metres at the Devasthal Observatory campus of Aryabhata Research Institute of Observational Sciences (ARIES), an autonomous institute under the Department of Science and Technology (DST), Govt. of India in Nainital district, Uttarakhand.

The scientists from the three countries spun a pool of mercury which is a reflective liquid, so that the surface curved into a parabolic shape which is ideal for focusing light. A thin transparent film of mylar protects the mercury from wind. The reflected light passes through a sophisticated multi-lens optical corrector that produces sharp images over a wide field of view. A large-format electronic camera located at the focus records the images. Prof. Paul Hickson (University of British Columbia, Canada), an expert on liquid mirror technology, said that “the rotation of the earth causes the images to drift across the camera, but this motion is compensated electronically by the camera. This mode of operation increases observing efficiency and makes the telescope particularly sensitive to faint and diffuse objects.”

“ILMT is the first liquid-mirror telescope designed exclusively for astronomical observations installed at the Devasthal Observatory of ARIES,” said Prof. Dipankar Banerjee, Director, ARIES. Prof. Banerjee mentioned that Devasthal Observatory now hosts two four-meter class telescopes – the ILMT and the Devasthal Optical Telescope (DOT). Both are the largest aperture telescopes available in the country. Prof. Banerjee is also enthusiastic about the application of Big Data and Artificial Intelligence/Machine Learning (AI/ML) algorithms that will be implemented for classifying the objects observed with the ILMT. He stated, “I am hopeful that this project will attract and motivate several young minds from scientific and engineering backgrounds to take up challenging problems.”



Top view of the ILMT located at the Devasthal Observatory of ARIES showing the liquid mercury mirror covered by a thin mylar film.

“The wealth of data generated with the ILMT survey will be exemplary. In the future, several young researchers will be working on different science programs utilizing the ILMT data,” said Dr. Kuntal Misra, who is the Project Investigator of ILMT at ARIES. “When regular science operations begin later this year, the ILMT will produce about 10 GB of data every night, which will be quickly analyzed to reveal variable and transient stellar sources,” said Dr. Brajesh Kumar, ILMT Project Scientist at ARIES. The 3.6 metre DOT, with the availability of

sophisticated back-end instruments, will allow rapid follow-up observations of the newly-detected transient sources with the adjacent ILMT.

“The data collected from ILMT will be ideally suited to perform a deep photometric and astrometric variability survey over a period of typically 5 years,” notes Project Director Prof. Jean Surdej (University of Liège, Belgium and University of Poznan, Poland). The ILMT collaboration includes researchers from ARIES in India, the University of Liège and the Royal Observatory of Belgium in Belgium, Poznan Observatory in Poland, the Ulugh Beg Astronomical Institute of the Uzbek Academy of Sciences and National University of Uzbekistan in Uzbekistan, the University of British Columbia, Laval University, the University of Montreal, the University of Toronto, York University and the University of Victoria in Canada. The telescope was designed and built by the Advanced Mechanical and Optical Systems (AMOS) Corporation and the Centre Spatial de Liège in Belgium.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1830501>



Press Information Bureau
Government of India

Ministry of Science & Technology

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New Manufacturing Process for Steel Alloy Powder for Developing Efficient Cooling Channels can Make Pressure Die Casting More Efficient

Researchers have developed a manufacturing process for steel alloy powder that can act as a tool for developing efficient cooling channels for pressure die casting. This can help improve the tool service life, quality of cast parts and reduce number of rejections during the casting process. Pressure die casting is used to manufacture devices ranging from medical devices to industrial equipment. Manufacturing of die tools with efficient cooling channels by conventional processes for Pressure Die Casting (PDC) have been challenging. In conventional manufacturing, the die tools are designed with compromised straight-line cooling channels.

A team of researchers at the International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) has developed an additive manufacturing process for a steel alloy powder called AISI H13 which can act as a tool material for efficient cooling channels or conformal cooling channels (CC) for pressure die casting (PDC). Such CC systems show great promise to substitute conventional cooling systems as the former can provide more uniform and efficient cooling effects and thus improve the production quality and efficiency significantly. The additive manufacturing process offers the freedom to give any desired shape to the cooling channels so that they can carry out the cooling efficiently. The research has been published in the Transactions of the Indian National Academy of Engineering

The additive manufacturing process in which ARCI, an autonomous institute of the Department of Science and Technology (DST), has acquired considerable expertise, opens a new world of design innovation that previously was impossible to achieve by the conventional manufacturing process. ARCI has emerged as a nationally important center for metal additive manufacturing (AM) by establishing powder bed fusion-based selective laser melting (SLM) and electron beam

melting (EBM) additive manufacturing facilities. The researchers have used their expertise in the AM-SLM method in this manufacturing process.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1830500>

Business Standard

Thu, 02 Jun 2022

SankhyaSutra Unveils 'Made In India' Software for Aircraft Design

SankhyaSutra Labs, a subsidiary of Jio Platforms Limited, which develops high-fidelity aerodynamics and multiphysics simulation software, showcased its products and solutions at AeroCon 2022. The software will primarily find applications in aerospace and defence industry, in addition to automotive, semiconductor manufacturing, and process industries. According to the company, achieving accurate simulation of turbulent flows often required in aerospace and defence designing is a challenging task due to the involvement of multiple scales of swirling motions, also known as vortices.

SankhyaSutra Labs said it develops next-generation high-fidelity CFD tools that do not use approximate turbulence models. "When we speak about self-reliance in defence, we often tend to focus on the ability to manufacture various hardware components indigenously," Dr Sunil Sherlekar, CEO at SankhyaSutra Labs, said in a statement. "This journey towards self-reliance would be incomplete without indigenous design tools, which are the key enablers of this journey. At SankhyaSutra, we are developing deep technology for India and the world," he added. Incubated in 2015, SankhyaSutra Labs has its R&D centre in Bengaluru with target customers across the globe.

The company has planned a major product launch in October this year.

"Accurate and reliable simulations can potentially reduce the need for expensive and time-consuming experiments, such as wind tunnel experiments, which are used in the designing of aircrafts," said Dr Vinay Kariwala, VP Business Development at SankhyaSutra Labs. Reliance Industries Ltd had acquired an 83 per cent stake in SankhyaSutra Labs in 2019, with an investment of Rs 216 crore. Prime Minister Narendra Modi inaugurated the two-day 'Bharat Drone Mahotsav 2022' in the capital.

https://www.business-standard.com/article/companies/sankhyasutra-unveils-made-in-india-software-for-aircraft-design-122060200544_1.html



Thu, 02 Jun 2022

Early Detection of Arthritis Now Possible Thanks to Artificial Intelligence

Neural network learns to differentiate between healthy and inflamed bones using finger joints. Researchers have been able to teach artificial intelligence neural networks to distinguish between two different kinds of arthritis and healthy joints. The neural network was able to detect 82% of the healthy joints and 75% of cases of rheumatoid arthritis. When combined with the expertise of a doctor, it could lead to much more accurate diagnoses. Researchers are planning to investigate this approach further in another project. This breakthrough by a team of doctors and computer scientists has been published in the journal *Frontiers in Medicine*.

There are many different varieties of arthritis, and determining which type of inflammatory illness is affecting a patient's joints may be difficult. Computer scientists and physicians from Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) and Universitätsklinikum Erlangen have now taught artificial neural networks to distinguish between rheumatoid arthritis, psoriatic arthritis, and healthy joints in an interdisciplinary research effort.

Within the scope of the BMBF-funded project "Molecular characterization of arthritis remission (MASCARA)," a team led by Prof. Andreas Maier and Lukas Folle from the Chair of Computer Science 5 (Pattern Recognition) and PD Dr. Arnd Kleyer and Prof. Dr. Georg Schett from the Department of Medicine 3 at Universitätsklinikum Erlangen was tasked with investigating the following questions: Can artificial intelligence (AI) recognize different forms of arthritis based on joint shape patterns? Is this strategy useful for making more precise diagnoses of undifferentiated arthritis? Is there any part of the joint that should be inspected more carefully during a diagnosis? Currently, a lack of biomarkers makes correct categorization of the relevant form of arthritis challenging. X-ray pictures used to help diagnosis are also not completely trustworthy since their two-dimensionality is insufficiently precise and leaves room for interpretation. This is in addition to the challenge of placing the joint under examination for X-ray imaging.

Artificial networks learn using finger joints

To find the answers to its questions, the research team focused its investigations on the metacarpophalangeal joints of the fingers – regions in the body that are very often affected early on in patients with autoimmune diseases such as rheumatoid arthritis or psoriatic arthritis. A network of artificial neurons was trained using finger scans from high-resolution peripheral quantitative computer tomography (HR-pQCT) with the aim of differentiating between "healthy" joints and those of patients with rheumatoid or psoriatic arthritis. HR-pQCT was selected as it is currently the best quantitative method of producing three-dimensional images of human bones in the highest resolution. In the case of arthritis, changes in the structure of bones can be very accurately detected, which makes precise classification possible.

Neural networks could make more targeted treatment possible

A total of 932 new HR-pQCT scans from 611 patients were then used to check if the artificial network can actually implement what it had learned: Can it provide a correct assessment of the

previously classified finger joints? The results showed that AI detected 82% of the healthy joints, 75% of the cases of rheumatoid arthritis, and 68% of the cases of psoriatic arthritis, which is a very high hit probability without any further information. When combined with the expertise of a rheumatologist, it could lead to much more accurate diagnoses. In addition, when presented with cases of undifferentiated arthritis, the network was able to classify them correctly.

“We are very satisfied with the results of the study as they show that artificial intelligence can help us to classify arthritis more easily, which could lead to quicker and more targeted treatment for patients. However, we are aware of the fact that there are other categories that need to be fed into the network. We are also planning to transfer the AI method to other imaging methods such as ultrasound or MRI, which are more readily available,” explains Lukas Folle.

Hotspots could lead to faster diagnoses

Whereas the research team was able to use high-resolution computer tomography, this type of imaging is only rarely available to physicians under normal circumstances because of restraints in terms of space and costs. However, these new findings are still useful as the neural network detected certain areas of the joints that provide the most information about a specific type of arthritis which is known as intra-articular hotspots. “In the future, this could mean that physicians could use these areas as another piece in the diagnostic puzzle to confirm suspected cases,” explains Dr. Kleyer. This would save time and effort during the diagnosis and is already in fact possible using ultrasound, for example. Kleyer and Maier are planning to investigate this approach further in another project with their research groups.

<https://scitechdaily.com/early-detection-of-arthritis-now-possible-thanks-to-artificial-intelligence/amp/>

