

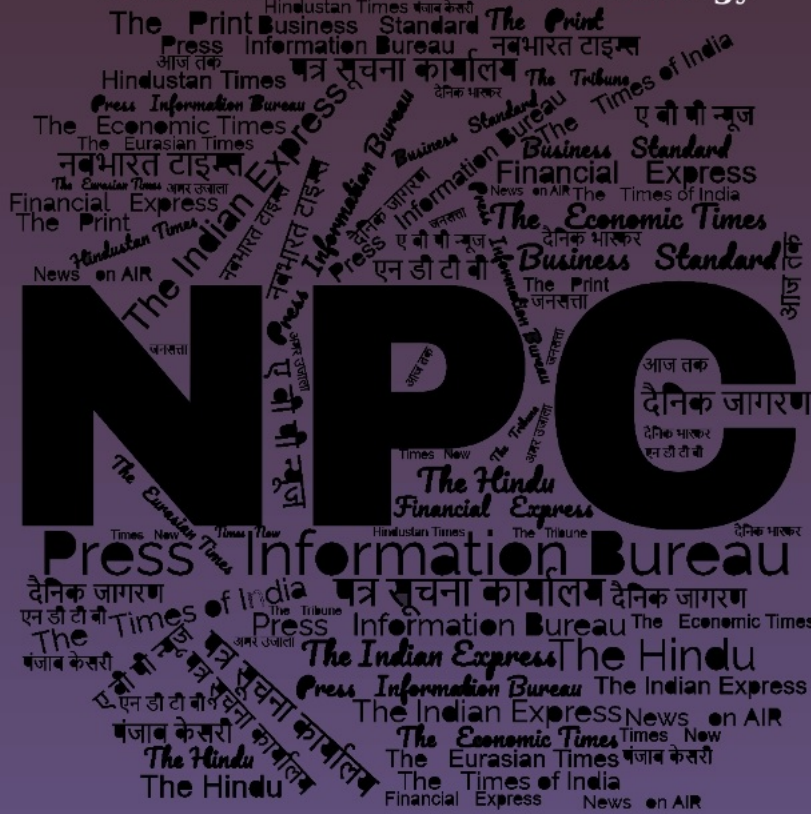
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समाचार पत्रों से चयनित अंश Newspapers Clippings

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THE ECONOMIC TIMES

Mon, 15 July 2024

India, Thailand conclude 'Maitree' military exercise

The 13th edition of the joint military exercise Maitree 2024 between the Indian Army and the Royal Thailand Army culminated with a grand closing ceremony at Tak Province, Thailand.

The ceremony, graced by Major General Narongrit Panikabutr, Commander of the 4th Infantry Division of the Royal Thailand Army, as Chief Guest, marked the successful completion of two weeks of intensive training and collaboration.

From the Indian side, Group Captain Brijesh Paul, Defence Attache to Thailand, was the guest of honour.

Major General Narongrit Panikabutr commended the dedication and proficiency displayed by the contingents of both armies throughout the exercise.

He emphasised that exercise Maitree plays a crucial role in bolstering defence cooperation between India and Thailand, reflecting their commitment to addressing regional security challenges and promoting peace under the United Nations charter. The two-week event was marked by intensive training and collaboration.

Lieutenant Colonel Mandan Ojha, Contingent Commander of the Indian Army contingent, expressed gratitude to the Royal Thailand Army for hosting the exercise. He highlighted the mutual benefits gained from the exchange of best practices and expertise, reinforcing the operational capabilities of both armies.

The Indian Army said that the exercise bolstered interoperability between both the nations. In a post on X, the Indian Army said, "Exercise #MAITREE_2024 The 13th edition of Joint Military Exercise #MAITREE between #IndianArmy & #RoyalThailandArmy concluded today at Fort Vachiraprakan, Tak Province in #Thailand.

The exercise facilitated enhanced synergy in the conduct of joint tactical operations in jungle & urban environments and also bolstered interoperability between both the Armed Forces. The joint training activities during Maitree 2024 encompassed a wide range of tactical activities including weapon training, day and night firing, rappelling, jungle survival techniques, navigation training, communication exercises, combat first aid and casualty evacuation drills among others.

These activities not only enhanced the tactical skills of the participants but also deepened the enduring friendship between the armed forces of India and Thailand.

<https://economictimes.indiatimes.com/news/defence/india-thailand-conclude-maitree-military-exercise/articleshow/111742532.cms>

THE ECONOMIC TIMES

Sat, 13 July 2024

Amid growing bonhomie, India asks Russia to advance S-400 missile system deliveries

Amid the growing close ties between India and Russia, New Delhi has asked Moscow to expedite and advance the deliveries of the S-400 air defence missile system. The Russian side has told India that they would be able to deliver the fourth and the fifth squadrons of the highly capable system by March 2026 and October 2026 respectively due to delays caused by their ongoing conflict with Ukraine.

India and Russia signed a contract with Russia in 2019 for buying five squadrons of the highly capable air defence system with ability to hit targets at up to 400 plus kilometres. "India has requested the Russian side during the recent talks to expedite the deliveries for meeting Indian Air Force requirements and try to advance the deliveries," defence officials told ANI. The Russian side has assured to look into the request, they said. Russia has already supplied three of these air defence systems which have already been operationalised and deployed along both the China and Pakistan front.

The two remaining squadrons were expected to be delivered by 2024 but the supplies got delayed due to their own issues and war there. India has deployed these missiles in areas from where it can tackle any aerial intrusion by enemy fighter aircraft, cruise missiles and even ballistic missiles.

The Indian Air Force, which recently received the indigenous MR-SAM and Akash missile systems as well as the Israeli Spyder quick reactions surface-to-air missile systems, believes the S-400 will be the game changer for it. The Indian Air Force has significantly improved its air defence capabilities in recent years. The Indian Air Force has now started working on its own Project 'Kusha', which would allow it to have an indigenous system developed by DRDO to take down enemy platforms at long ranges.

Air defence systems have been deployed in a big way by the Chinese military across the Line of Actual Control while India has also deployed own systems to counter any enemy misadventure there. Prime Minister Narendra Modi was in Moscow earlier this week and held meetings with President Vladimir Putin after which both countries are now seen as very close and have also decided to enhance their military joint ventures in production and maintenance of various weapon systems.

<https://economictimes.indiatimes.com/news/defence/amid-growing-bonhomie-india-asks-russia-to-advance-s-400-missile-system-deliveries/articleshow/111695171.cms>

Army looking at ‘360-degree’ appraisal with inputs from peers, subordinates

Seeking to bring in a more comprehensive process to assess the performance of its personnel, the Army is learnt to be considering the “360-degree appraisal” method which would include inputs from peers and subordinates too.

This is likely to be on the lines of the appraisal method learnt to be employed by the central government to assess the performance of civil servants, including officers from the All India Services and other Group A services, for empanelment to the post of joint secretary and above.

Senior officials said the issue was discussed at the Army Commanders’ Conference in May. The Army is learnt to have sought comments from all its Commands on the need for such an appraisal system.

The Army, at present, follows a three-tier hierarchical model for performance appraisal of its personnel. The initiating officer (IO), who is the immediate superior of the person being assessed, writes the Annual Confidential Report (ACR) which includes the medical and disciplinary parameters as well. This report is then reviewed by two of the IO’s senior officers in the reporting structure — the reviewing officer and the senior reviewing officer.

In the case of Junior Commissioned Officers (JCOs) and Non-Commissioned Officers (NCOs), the initiating officer is the company commander, the reviewing officer is the Commanding Officer of the unit, and the senior reviewing officer is the brigade commander.

For officers, it is similarly initiated and reviewed by their superiors in the chain of command. For Major Generals, the senior reviewing officer is the Chief of Army Staff.

The Indian Air Force also follows a similar three-tier appraisal system.

Under the “360-degree appraisal” system being discussed within the Army, two models are being considered. The first is a model which has already been adopted by the Navy and involves reciprocal feedback by a subordinate to his IO after the initiation of his ACR.

It also includes online feedback from “system generated random peers and subordinates” before selection boards are conducted, as well as a direct online input to Naval headquarters on the IO’s leadership qualities by the person being assessed, ahead of submission of his confidential report to the IO.

The second model being considered is the “peer group perception model”, which seeks to obtain peer group feedback on the person being assessed. This is on the lines of the current system at various training establishments of the Armed Forces, where officers get assessed by their course mates and contemporaries, from their own as well as other services.

Officials said such data collated centrally over a certain period could be used to carry out a detailed and comprehensive appraisal of a person, including on his general repute and integrity.

The Army has sought views on the viability of both models from its Commands. While the Department of Personnel and Training (DoPT), in response to a petition, told the Central Administrative Tribunal (CAT) last year that it does not employ the “360-degree appraisal” system for civil servants, it had told a parliamentary panel in 2017 that it had revised its guidelines for empanelment, in April 2016, to include multi-source feedback (MSF) from at least five stakeholders, which could be seniors, juniors, peers, external stakeholders and serving secretaries.

A parliamentary standing committee report on Personnel, Public Grievances, Law and Justice, tabled in Parliament in August 2017, had said this is known as the “360-degree review”, adding that it is the same as MSF. The committee’s report had also called the “360-degree appraisal” system “opaque, non-transparent and subjective”.

<https://indianexpress.com/article/india/army-looking-at-360-degree-appraisal-with-inputs-from-peers-subordinates-9451850/>

ThePrint

Sun, 14 July 2024

Kazakh Army delegation visits special forces training school in Himachal’s Bakloh

A six-member delegation from Kazakhstan Special Forces visited the Special Forces Training School in Himachal Pradesh’s Bakloh. During the visit, the Kazakh delegation not only witnessed the training activities there, but also the infrastructure as well.

Sharing the pictures of the delegation’s visit in Bakloh on X on Saturday, the Indian Army wrote, “Kazakhstan Army Delegation Visits Special Forces Training School. A six-member Army Delegation from #Kazakhstan Special Forces visited Special Forces Training School, #SFTS, #Bakloh.” “The delegation witnessed training activities, infrastructure & skill demonstrations to foster #jointness and interoperability,” it added.

It is pertinent to note that India and Kazakhstan share warm and friendly ties.

In a telephonic conversation recently with Kazakhstan President Kassym-Jomart Tokayev, Prime Minister Narendra Modi also conveyed his full support for the success of the upcoming Shanghai Cooperation Organisation (SCO) Summit in Astana.

During the conversation, the two leaders reiterated their commitment to continue to work together to advance bilateral strategic partnerships.

The Prime Minister conveyed India’s full support for the success of the upcoming SCO Summit in Astana, and expressed confidence that Kazakhstan’s leadership would greatly contribute to the furtherance of regional cooperation.

“Had a good conversation with President of Kazakhstan H.E. Kassym-Jomart Tokayev. Thanked him for warm wishes on the success in the elections,” PM Modi wrote in a post on X.

“Reiterated the commitment to advance our Strategic Partnership with Kazakhstan. Conveyed India’s full support for the success of the upcoming SCO Summit,” he added.

The two leaders agreed to remain in touch.

<https://theprint.in/world/kazakh-army-delegation-visits-special-forces-training-school-in-himachals-bakloh/2173691/>



Sat, 13 July 2024

Armed forces plan joint tri-service procurement of explosive vans

The Indian Armed Forces are planning a joint tri-service procurement of explosive vans for the safe transport of ammunition aiming to enhance integration and cooperation among the Army, Navy, and Air Force, which is crucial for implementing the ambitious theaterisation plan.

Under the theaterisation plan, the capabilities of all three services are integrated to optimally utilise their resources for wars and operations. Joint procurement of equipment is a move in that direction. A common explosive vehicle for the three services will allow joint operation commanders to better support integrated operations, said an official on the condition of anonymity.

The Army, which is steering the joint procurement, has floated a Request for Information (RFI) — a formal process for gathering information from potential suppliers of a good or service — for this purpose.

The explosive vans will be used to safely transport various types of ammunition owned by the three services to different locations, reducing the risk of fire and other accidents that could lead to loss of lives.

“Procuring a platform jointly for the three services will also lead to reduced inventory, optimise repair infrastructure and less storage space, a shortened supply chain, increased interoperability,” an official familiar with the matter said. “There will be an enhanced flexibility as being a common platform, it will be easier to divert resources to other services.”

A second official said that a standardised ammunition-carrying platform would not only enhance purchase efficiency but will also optimise its repair and maintenance, thus allowing for service-agnostic utilisation.

According to the RFI, at present, carriage of explosives is undertaken in General Staff (GS) vehicles which is considered “hazardous” and is “grossly inadequate” due to various fire and security issues, adding that proposed vans will enhance the functional efficiency of the units of tri-services and will contribute to the operational preparedness of the tri-services.

The document said that the van would have to undergo field evaluation trials on a no-cost-no-commitment basis after their technical evaluation is completed and the concerned vendor will be required to provide spares support for the complete life of the platform.

According to the officials, the specialised vans will not only reduce untoward incidents during carriage of ammunition but also help reduce time and increase efficiency during transportation.

The procurement is among the few which the Army has been made lead for a tri service purchase indicative of increasing jointness in the way procurements are manifesting in the services.

“Earlier, each service, despite having common explosive segregation types, were individually utilising platforms for transportation which on several occasions did not meet the handling safety requirements. This also led to increased logistics costs due to multiple redundancies,” the official said.

<https://indianexpress.com/article/india/armed-forces-plan-joint-tri-service-procurement-explosive-vans-9451021/>



Sun, 14 July 2024

China is ahead in military might, but India is catching up fast

-By Lieutenant General (Retd) S.L. Narasimhan

The easiest way to compare the defence forces of two countries is to do the bean count of the weapons and equipment that they have. But that gives only one aspect of their capability. The numbers do make up for some strength, particularly when a war of attrition takes its toll on the weapons and equipment of a country. But that alone cannot win wars.

If that was the case, the more advanced countries should be winning the wars easily. That has not been the trend. There are many imponderables like training, battle experience, technology absorption, and ability of commanders to clearly read the battle and employ forces that impact the outcome of wars. When comparing the defence forces of India and China, one should consider all these factors.

Battle Experience

The People’s Liberation Army fought its last war in 1979 against Vietnam. Therefore, many analysts feel that the PLA lacks combat experience. However, my experience of dealing with the PLA on the Line of Actual Control for many years is that the PLA learns fast, and is willing to learn from everybody. It studies the campaigns fought by other countries and takes out lessons for itself. It also tries to train hard.

In contrast, the Indian armed forces are adept in both conventional and counterinsurgency operations. The near normalcy in northeast India and the improving ground situation in Jammu and Kashmir are testimony to that. Similarly, the Kargil War in 1999 proved the mettle of India’s defence forces. India also studies the campaigns being fought by other countries and takes lessons from them. The Indian armed forces are at an advantage in this aspect.

Training

Since the military reforms of 2015-16, PLA’s training for joint operations has increased tremendously. However, President Xi Jinping exhorted the PLA to overcome the “peace disease”.

The “two inabilities” (the army’s inability to fight modern wars and the officers’ inability to command) and “five incapables” (some commanders cannot judge situations, understand superiors’ intent, make operational decisions, deploy troops and deal with unexpected situations) cast a shadow on the ability of the PLA.

Post the reforms, Xi started issuing mobilisation orders, from 2018 till 2022, on the new year, and the entire PLA mobilised for a few days to exercise. Party committees at various levels were increasingly becoming involved in assessing the training of units and formations they are associated with.

These issues revealed a lack of confidence in the training being carried out by the PLA. All these indicate that the PLA forces have a long way to go in achieving the desired combat efficiency. The PLA trains with very few foreign armies. Mostly, the training missions are with the SCO (Shanghai Cooperation Organisation) countries, except India. It learns about western tactics in its exercises with Pakistan.

In contrast, the Indian armed forces have always proven themselves in all the exercises they have taken part in. However, the reforms that they are trying to implement are getting delayed. For example, theaterisation has been a long time coming. Deliberations on joint operations and training for them have started but there is some distance to go. The Indian armed forces train with many foreign armed forces. Their scale and level are higher. That experience serves them well in absorbing modern techniques in warfare. On the training front, one can say both are equal.

Defence Budget

China’s defence budget is three times India’s. Moreover, China produces almost all its weapons and equipment indigenously. This gives it the ability to get more value for money. China’s defence budget is opaque. By some estimates, its actual defence budget is far more than what is announced, as China does not include expenditures on its space and counter-space capabilities and expenditure on research and development.

As per the SIPRI (Stockholm Institute of Peace Research) report published in April 2024, China spent \$296 billion on defence in 2023. China used to follow the principle of defence budget growing in sync with economic growth. However, for the last few years, China’s defence budget has grown more than the rate of its economic growth. This trend will continue.

India’s defence budget this year is approximately \$75 billion as given in the interim budget. It is likely to remain the same in the budget that will be presented by the new government shortly. India has been increasingly resorting to indigenous procurement. A record 75 per cent of capital procurement has been allocated for this purpose in 2023-24. However, India is still dependent on imports for many equipment and spares.

This reduces the quantity that it can add to its inventory. India has taken many measures to increase the indigenous production capability and it will take a few years to become fully “atmanirbhar” (self-reliant). In this aspect, China has an advantage, but India is catching up fast.

Technology Absorption

The armed forces that absorb technology will have an upper hand in a war. On April 19, 2024, China dissolved its Strategic Support Force (SSF) and created three independent arms: Aerospace

Force, Cyberspace Force and the Information Support Force. Analysts have attributed many reasons for this. I feel that it is the process of adaptability that China has been good at. The SSF was established in 2016. After analysing the shortcomings of that force, China has created three new arms. A reason for that is also the changes the US is making in its forces.

The SSF had invested heavily in AI innovation, leveraging public-private partnerships to gain new technologies for intelligence; surveillance and reconnaissance; autonomous vehicles; information and electronic warfare; simulation and training; predictive maintenance; and target recognition. China has also made advances in robotics, exoskeletons (power armour), swarm drones, hypersonic weapons and unmanned systems. It has made good progress in quantum technologies in the military domain, too.

Not to be left behind, India has declared 2024 as technology absorption year. India has also made advances in exoskeletons, employment of drones and unmanned systems, and has carried out trials on quantum technologies and hypersonic weapons. It can be said that China is ahead of India in this aspect at the moment.

<https://www.theweek.in/theweek/cover/2024/07/13/india-china-military-defence-comparison.html>

THE ECONOMIC TIMES

Fri, 12 July 2024

Amid delays, HAL now aiming to deliver first LCA Mark 1A by August 15; GE engine supplies to start by September

Amid concerns over delays in the delivery of the first LCA Mark 1A fighter jet to the Indian Air Force, Hindustan Aeronautics Limited is now aiming to provide the first plane by August 15 this year. Significantly, the delays in the overall delivery schedule are likely to get addressed in some manner as the American engine maker GE has assured to start the supply of its GE-404 engines by September-October this year.

"There have been some software-related issues in integration. We are working towards addressing these issues and are now working towards delivering the first plane before August 15 this year," defence sources told ANI.

The aircraft was first planned to be delivered to the IAF by February-March timeframe this year but the schedule has been shifting for one reason or the other. The Indian Air Force is keen that it should get a completely integrated aircraft with all important specifications given by it.

Top Indian Air Force brass including the Chief of Air Staff himself have been closely monitoring the progress made in the prestigious project. The Deputy Chief of Air Staff had also recently visited the HAL hangars to review the programme. The HAL carried out the first flight of the fighter a couple of months ago. The overall delivery programme of the 83 LCA Mark1As ordered initially has been delayed by many months already due to delays in the supply of GE-404 engines by Americans as they had other high-priority projects.

Now the American manufacturer has assured to start supplying one or two engines every month from September-October but we will be asking them to further expedite the deliveries and increase the numbers supplied every month, the sources said. The indigenous fighter aircraft induction into the force will be a major step in realising self-reliance in the military sector and the Prime Minister may also be invited to the occasion, the officials said.

The LCA Mark 1A project was conceptualised after Prime Minister Narendra Modi took charge. One order worth Rs 48,000 crore for 83 planes has already been placed and another one expected to be worth Rs 65,000 crore is going to be placed for 97 planes by the end of this financial year.

The Defence Ministry has already issued a tender to Hindustan Aeronautics Limited (HAL), for the purchase of 97 made-in-India LCA Mark 1A fighter jets. This tender is the largest order for indigenous military hardware ever to be placed by the Indian government. Recently issued by the Defence Ministry to HAL, the company has been given a three-month timeframe to respond.

Government officials had informed that this program aims to replace the Indian Air Force's fleet of MiG-21s, MiG-23s, and MiG-27s, which have either been phased out or are scheduled for phase out soon. Backed by both the Defence Ministry and Air Headquarters, the indigenous fighter aircraft program is expected to significantly boost indigenization efforts and provide substantial business opportunities for small and medium enterprises engaged in the defence sector across the country.

The indigenous fighter aircraft programme, fully backed by Defence Ministry and Air Headquarters is set to be a big boost for promoting indigenisation as well as give major business to the small and medium enterprises engaged in defence business across the country, they said.

Prime Minister Narendra Modi has been pushing for the revival of the HAL which has bagged orders for building all types of indigenous fighter aircraft, and helicopters along with the engines for them under his government. The Prime Minister also undertook a sortie in the trainer variant of the indigenous fighter which was the first ever sortie by the Prime Minister of India in any combat aircraft.

<https://economictimes.indiatimes.com/news/defence/amid-delays-hal-now-aiming-to-deliver-first-lca-mark-1a-by-august-15-ge-engine-supplies-to-start-by-september/articleshow/111681003.cms>

THE ECONOMIC TIMES

Fri, 12 July 2024

Defence manufacturer Bharat Electronics secures export order worth Rs 230 crore

State-owned aerospace and defence electronics company Bharat Electronics Limited (BEL) has obtained an export order worth Euro 25.75 million (estimated value of Rs 230 crores) from Thales Reliance Defence Systems (TRDS) for the manufacture and supply of transmit-receive (TR) modules, the company informed stock exchanges on Friday.

The TR modules will be used in the radars of fighter aircraft. Additionally, BEL has secured orders valued at Rs 192 crores following the last disclosure on June 28, 2024, which comprises communication equipment, encryptors, spares and services for radars, fire control systems etc.

With these, BEL has now accumulated orders totalling Rs 5,225 crores in the current financial year. Shares of state-owned defence and aerospace company Bharat Electronics have been hitting all-time highs on and off, backed by a series of orders the firm received over the past months.

At the time of filing this report, the shares were 0.8 per cent lower at Rs 332.8, against its all-time high of Rs 340.5 it touched recently. So far in 2024, it rose 80 per cent on a cumulative basis. Over the past five years, it accumulated about 840 per cent returns for its shareholders.

The central government has set the target of achieving indigenous defence manufacturing worth Rs 175,000 crore including defence exports of Rs 35,000 crore by the year 2024-25. The government has taken several policy initiatives in the past few years and brought in reforms to encourage indigenous design, development and manufacture of defence equipment, thereby promoting self-reliance in defence manufacturing.

The government is also investing heavily in defence and aerospace manufacturing, with several defence hubs being set up. Indian defence PSUs have accumulated tremendously high returns on equities in the past few years, benefiting for the fresh orders. Notably, many global companies have either shared or showed intent, to share critical defence and aerospace knowledge with India.

India's defence exports have touched a record Rs 21,083 crore (about USD 2.63 billion) in the financial year 2023-24, with a growth of 32.5 per cent over the last fiscal when the figure was Rs 15,920 crore. The recent figures indicate that the defence exports have grown by 31 times in the last 10 years as compared to 2013-14. The total value of defence production in India rose 17 per cent to Rs 1,26,887 crore last fiscal year.

<https://economictimes.indiatimes.com/news/defence/defence-manufacturer-bharat-electronics-secures-export-order-worth-rs-230-crore/articleshow/111687815.cms>

Business Standard

Sun, 14 July 2024

Army Chief Gen Upendra Dwivedi visits HQ; reviews logistics, preparedness

Indian Army Chief General Upendra Dwivedi visited Headquarters Madhya Bharat Area in Jabalpur and reviewed the operational logistics and administrative preparedness on Sunday.

The Army chief appreciated the contribution made by Veterans and VeerNaris during deliberations and directed that continued emphasis be maintained towards their welfare.

The Army Chief also visited the Military College of Material Management and Jammu and Kashmir Rifles Regimental Centre in Jabalpur and was briefed on the innovative adaptations of technology in training, infrastructure development and administrative activities.

Earlier on Saturday, in his maiden visit to the Northeast after taking over as Army Chief, General Upendra Dwivedi reviewed the security situation along the China border in Arunachal Pradesh and Sikkim.

In his two-day visit to all Corps formations under the Eastern Army Command, including the Dimapur headquartered 3 Corps, Gen Dwivedi was briefed about the present situation in Manipur, which has seen large-scale ethnic violence in the last year, Army officials told ANI.

The Chief, who started his tour on Thursday, also visited the Tezpur-based Gajraj 4 Corps, where he was briefed on the present situation on the Line of Actual Control with China and the operational preparedness there.

He also reviewed the ongoing infrastructure development projects in Sikkim during visit to the Sukna-based 33 Corps headquarters.

The 3 Corps looks after the Rest of the Arunachal Pradesh area, while the 4 Corps is the formation in charge of looking after the Tawang sector in Arunachal Pradesh.

https://www.business-standard.com/external-affairs-defence-security/news/army-chief-gen-upendra-dwivedi-visits-hq-reviews-logistics-preparedness-124071400120_1.html



Sun, 14 July 2024

AMCA: India's 5th-Gen Fighter May Get Private Sector Boost To Catch-Up With China Which Plans 1000 J-20s, 6th-Gen Jets By 2034

India's fifth-generation fighter program, the Advanced Medium Combat Aircraft (AMCA), is gathering pace. The first aircraft is expected to roll out of production lines by 2034 when China could be preparing to deploy its sixth-generation aircraft.

The Indian Defense Ministry is reportedly developing a strategy to involve the private sector in the design and development of the AMCA project to accelerate its completion. According to reports, the prototype is expected to be completed by 2028-29. A source quoted by the Indian media outlet 'The Hindu' said, "The design of the AMCA is ready. The prototype is expected to roll out by 2028-29, and the production is expected to begin from 2032-33. The target is to have it ready for induction in 2034, a decade from project sanction."

It is anticipated that the private sector will play a major role in helping to get production and delivery back on track. "We have to decide a model for private sector involvement. A model is expected to be worked out in the next six months," the official source said. The specifics, however, of private sector involvement are unclear until the Indian government makes an official announcement.

Like the indigenously built LCA Tejas variants, the fifth-generation aircraft project has experienced significant delays. In contrast, China has already fielded more than 200 fifth-generation J-20 fighter jets. By the time India rolls out its first fifth-generation fighter aircraft, the AMCA, China will have at least 1000 J-20 stealth fighters in its inventory.

China Moving To Sixth-Generation Fighter

China is already moving to develop sixth-generation fighter jet technologies. Although its defense programs remain shrouded in secrecy, reports over the last few years have suggested that work on a next-generation aircraft is advancing. In February 2023, the Aviation Industry Corporation of China (AVIC) shared its sixth-generation fighter aircraft concept on social media. The concept included diamond-shaped wings and a tailless design. Similar images had been released through various AVIC presentations earlier.

More recently, an ace test pilot of China's J-20 stealth fighter jet told the state-owned Chinese publication Global Times that "the technology of our country's aviation industry continues to develop; the next generation will come out soon." Additionally, Chinese analysts stated unequivocally that China will not sit on the J-20, given that other countries, including the US, had already started developing sixth-generation fighter jets.

This could leave India in a predicament. Not only is the country far from fielding a fifth-generation fighter jet but its adversary, across the border, is graduating to far more advanced technologies. Even Pakistan has approached China to acquire J-31 fifth-generation aircraft and could have them as early as 2029, much before the first AMCA is rolled out. Despite involving private players and giving a new boost to the AMCA program, India is still lagging in trials. This does not augur well for New Delhi, especially as Beijing continues to assert itself more aggressively and has only ramped up deployment and infrastructure development along the disputed border.

A Capability Gap That Continues To Widen

The Indian Air Force (IAF) has a limited number of outdated fighter jets to protect Indian airspace, a result of delayed acquisition and sluggish development of domestic aircraft. Over 15 years ago, when India and Russia collaborated to create the Fifth Generation Fighter Jet (FGFA), the country's search for next-generation aircraft had begun.

The AMCA was launched in 2010 and has also faced delays. The first flight of the AMCA aircraft was reportedly planned for 2024-2025. The project called for five prototypes to complete a four-year flight-testing program. The AMCA was supposed to go into series production by 2028 or 2029. Nevertheless, all strategies have failed, and the Defence Research and Development Organisation (DRDO) is being criticized for establishing ambitious deadlines and consistently failing to meet them. As a result, India is now facing a significant capability shortfall with no interim solution until the arrival of the first AMCA.

Options For India To Narrow The Gap

EurAsian Times asked former IAF boss, Air Marshal Anil Chopra if there was a way India could look to fill the gap. Air Marshal Chopra said, "India needs an external solution — to purchase at least two to three squadrons of advanced fighter jets as a stop-gap solution since we know the AMCA won't be fielded until 2035. India might have three options: the US F-35 Lightning II, the

Russian Su-57 Felon, or opt to become a co-developer in one of the two European next-generation aircraft programs, the GCAP (Global Combat Air Programme) or the FCAS (Future Combat Air System).”

However, the veteran said that even if India decided to purchase a fifth-generation fighter, there would be hurdles to overcome. “While the US got its F-35 to India for the Aero Show last year for the first time, it would not be willing to sell the aircraft as India operates the Russian S-400 air defense system. A waiver could be considered, but if the Pentagon did not give a waiver to a NATO ally (Turkey), it is unlikely that it will come to India at this point.”

EurAsian Times understands that while the Su-57 could have been a plausible option since India wanted to develop it at one point, the Russians have developed the aircraft in limited numbers. It is currently involved in a war that ceases to end, and production could be a massive issue. Other experts that EurAsian Times spoke to said that India cannot be caught sleeping while the timelines of its fifth-generation aircraft continue to be pushed further away. An expert pointed out that India’s LCA Tejas MK-1 flew before the JF-17 but hasn’t matched up to the latter’s production or induction.

The troubles for AMCA are manifold. It was previously reported that the aircraft would not immediately be a fifth-generation stealth aircraft as it will have external storage. In addition, India has also been struggling with an engine that would power the AMCA. As the Air Marshal puts it, “India is stuck between the jaws of a vice for the risks associated with available options.” Even the consortiums developing sixth-generation aircraft have to unanimously agree to add more partners, specifically with the addition of India.

When asked what would be the best way forward for India to get a stop-gap solution until it inducted AMCA, Air Marshal Chopra said, “India could opt for the F4 or F5 variant of Rafale. It could buy 114 Rafale F4s under the MRFA (Medium Multi-Role Fighter Aircraft) contract, which will also allow local production and bolster the ‘Make in India’ policy. To top it all, it could buy the most advanced iteration of Rafale F5 to bridge the capability gap with adversaries.”

Rafale is one of the contenders of IAF’s 114 aircraft proposal. Reports indicate that the Indian Navy has shortlisted the Rafale-M (Marine). The IAF already has the infrastructure for two more Rafale squadrons. Meanwhile, veteran Vijinder Thakur, a prominent voice on India-Russia relations and former IAF pilot advocates for the Su-57.

Writing for the EurAsian Times, he believes Russia has incorporated significant upgrades in the fighter, exceeding IAF’s expectations. Since India put its FGFA (fifth-generation fighter program) participation on hold, Russia has not only improved the Su-57 but also operationally tested the aircraft, first in Syria and then in Ukraine. The only realistic option India has is a collaboration with Russia if IAF is serious about countering the ever-increasing threat from China and Pakistan. F-35s may cost India its sovereignty, he quipped.

<https://www.eurasiantimes.com/chinas-6th-gen-fighter-to-be-operational/>

Sat, 13 July 2024

Armoured vehicles: India's answer to rising terror attacks; how they compare with China's Norinco VP11

Recent terror attacks on Indian military convoys have highlighted the urgent need for enhanced protection. Incidents in regions like Jammu and Kashmir have underscored the vulnerability of convoys to IEDs and ambushes, prompting India to bolster its armoured vehicle fleet. Here's how India's response compares to China's strategy in protecting their military convoys.

India's Armoured Vehicles

India has significantly enhanced the security of its military convoys. The primary armoured vehicle used is the Tata Kestrel, developed by Tata Motors and the Defence Research and Development Organisation (DRDO). The Kestrel is an 8×8 wheeled armoured amphibious vehicle designed for multi-terrain mobility. It features advanced armour protection, modern weaponry, and surveillance systems. The vehicle's V-shaped hull withstands IED blasts, providing enhanced protection against roadside bombs and small arms fire.

Additionally, India employs the Mine Protected Vehicle (MPV), specifically designed to protect against landmines and improvised explosive devices (IEDs). These vehicles are crucial in regions prone to insurgent activities, such as Jammu and Kashmir and the northeastern states.

China's Armoured Vehicles

China has developed a range of armoured vehicles with a strong focus on technology and versatility. The Norinco VP11 is one of China's leading armoured vehicles for convoy protection. It features a modular armour system adjustable based on mission requirements and offers excellent protection against IEDs and small arms fire. Additionally, China uses the VN4, a multi-role armoured vehicle known for its agility and adaptability in various combat scenarios.

China's armoured vehicles are equipped with advanced communication systems and integrated battle management systems, providing real-time situational awareness and coordination capabilities.

Comparative Analysis

While both India and China prioritize the protection of their military convoys, their approaches reflect different strategic priorities. India's focus is on improving mobility and protection in challenging terrains, leveraging indigenous development with collaborative innovation. China's approach stresses advanced technology integration and versatility, aiming to maintain superiority in various combat environments.

<https://www.financialexpress.com/business/defence-armoured-vehicles-indias-answer-to-rising-terror-attacksnbsphow-they-compare-with-chinasnbspnorinco-vp11-3552648/>

Business Standard

Fri, 12 July 2024

ThyssenKrupp JV in fray for building six conventional submarines

The global tender for building six state-of-the-art conventional submarines for the Indian Navy has boiled down to a contest between two joint ventures (JVs).

One features German shipbuilder ThyssenKrupp Marine Systems (TKMS), in partnership with India's premier defence shipyard Mazagon Dock Shipbuilders Limited (MDL). In contest with the 180-year-old German shipbuilder is Spanish shipyard Navantia, which is bidding in partnership with Indian engineering giant Larsen and Toubro (L&T). TKMS is Germany's only supplier of submarines and marine electronics.

The six submarines, powered by air-independent propulsion (AIP), are being built under a Rs 45,000 crore programme called Project 75-I under the "strategic partner" (SP) acquisition category. This requires qualified Indian firms to build a weapons platform in partnership with a foreign original equipment manufacturer (OEM) chosen by the defence ministry.

On Wednesday, the chief executive officer of TKMS India, Khalil Rehman, addressed the press in New Delhi, making a detailed case for the first time for India to build a TKMS submarine under the "strategic partner" programme.

Rehman's first point was that, in India, the state-owned MDL is the only shipyard experienced in submarine construction. With its storied history dating back to the 18th century, MDL has built numerous cutting-edge warships, including two classes of submarines for the Indian Navy.

These include two Shishumar class and six Kalvari class submarines, which were instrumental in enhancing India's underwater warfare capabilities. The Shishumar class submarines were built in partnership with HDW through a technology transfer agreement. The two lead boats were built in Killough with Indian teams integrated into the build process. That enabled the indigenous construction of the third and fourth submarine in India.

Separately, MDL collaborated with various international suppliers for procuring critical components for the Shishumar class submarines. This included sourcing propulsion systems, sonar equipment, and weapons systems from leading global manufacturers, and their successful integration.

"It is a testament to the level of maintenance ToT shared by Germany that these submarines, in more than 30 years of service, have never had to return to Germany for refit; the maintenance overhaul and modernisation of the boats is fully in the control of India," said Rehman.

The Project-75 (I) design is based on the well-established HDW Class 214 submarine, which has a proven track record and is currently in service with several navies worldwide.

Its technological advancements include AIP, Lithium-Ion battery technology, sensor and combat systems, and stealth features. These advancements ensure superior performance, increased

endurance and reduced detectability. These are crucial for naval operations in diverse environments.

The TKMS/MDL design for Project-75 (I) combines proven reliability and technological advancements. It can attack with precision-guided weapons including torpedoes, anti-ship missiles such as MBDA's SM-39 Exocet, and other precision-guided munitions.

TKMS has implemented different models in Italy, Israel, South Korea, Brazil and India in the past. Some of the major benefits of the TKMS experience have resulted in complete indigenous design of submarines by recipient countries, gaining autonomy in maintenance and manufacturing, the development of an export industry, stronger bilateral cooperation and increased security.

The German government and HDW, TKMS's predecessors, and Italy decided to cooperate at an early stage of building the Class 212A submarine. The Italian government purchased the 212A design for Fincantieri, its own shipbuilding champion. Europe's leading maritime defence companies — TKMS and Fincantieri -- developed a unique cooperation model for future Italian submarines, strengthening the defence capabilities of both countries.

https://www.business-standard.com/external-affairs-defence-security/news/thyssenkrupp-marine-systems-jv-in-fray-for-building-aip-submarines-124071200991_1.html

THE ECONOMIC TIMES

Mon, 15 July 2024

China, Russia start joint naval drills, days after NATO allies called Beijing a Ukraine war enabler

China and Russia's naval forces on Sunday kicked off a joint exercise at a military port in southern China on Sunday, official news agency Xinhua reported, days after NATO allies called Beijing a "decisive enabler" of the war in Ukraine.

The Chinese defense ministry said in a brief statement forces from both sides recently patrolled the western and northern Pacific Ocean and that the operation had nothing to do with international and regional situations and didn't target any third party.

The exercise, which began in Guangdong province on Sunday and is expected to last until mid-July, aimed to demonstrate the capabilities of the navies in addressing security threats and preserving peace and stability globally and regionally, state broadcaster CCTV reported Saturday, adding it would include anti-missile exercises, sea strikes and air defense.

Xinhua News Agency reported the Chinese and Russian naval forces carried out on-map military simulation and tactical coordination exercises after the opening ceremony in the city of Zhanjiang. The joint drills came on the heels of China's latest tensions with NATO allies last week.

The sternly worded final communique, approved by the 32 NATO members at their summit in Washington, made clear that China is becoming a focus of the military alliance, calling Beijing a "decisive enabler" of Russia's war against Ukraine.

The European and North American members and their partners in the Indo-Pacific increasingly see shared security concerns coming from Russia and its Asian supporters, especially China. In response, China accused NATO of seeking security at the expense of others and told the alliance not to bring the same "chaos" to Asia.

Its foreign ministry maintained that China has a fair and objective stance on the war in Ukraine. Last week, a U.S. Coast Guard cutter on routine patrol in the Bering Sea also came across several Chinese military ships in international waters but within the U.S. exclusive economic zone, American officials said.

Its crew detected three vessels approximately 124 miles (200 kilometers) north of the Amchitka Pass in the Aleutian Islands, which mark a separation and linkage between the North Pacific and the Bering Sea. Later, a fourth ship was spotted approximately 84 miles (135 kilometers) north of the Amukta Pass. The U.S. side said the Chinese naval vessels operated within international rules and norms.

<https://economictimes.indiatimes.com/news/defence/china-russia-start-joint-naval-drills-days-after-nato-allies-called-beijing-a-ukraine-war-enabler/articleshow/111741725.cms>



Fri, 12 July 2024

US Army eyeing new multifunction precision radar

US Army officials are looking to fast-track the development of a new multifunction precision radar (MFPR) system to support the ground service's ongoing development of its Hypervelocity Gun Weapon System (HGWS), according to a recent industry solicitation.

The request for information (RFI), issued by the army's Rapid Capabilities and Critical Technologies Office (RCCTO) on 8 July, is calling for industry details on "technical skills, facilities, tooling, and personnel" required for the development of an MFPR prototype.

The information provided by industry via the request for proposals (RFP) must also demonstrate a company's ability to develop two functional MFPR prototypes for operational demonstration by fiscal year (FY) 2027, the solicitation stated. Based on the responses to the RFP, army officials anticipate issuing a development contract for the radar prototypes no later than August, it added.

Any viable MFPR prototype system, according to army officials, must be able to receive and transmit data across "an operational band that is available or could be available" for US Department of Defense (DoD) use, the RFI said.

The prototype must also be capable of providing "radar track data and support projectiles in flight" while also providing "long-range, high-precision, and maximized angular coverage for search detection, identification, and tracking of threats", army officials said in the solicitation.

In terms of target and threat tracking capability, industry offerings for the MFPR programme must be capable of seeking, detecting, and tracking air and missile threats while distinguishing between “friendly projectiles” and valid threats, the RFI stated.

<https://www.janes.com/osint-insights/defence-news/defence/us-army-eyeing-new-multifunction-precision-radar>

THE ECONOMIC TIMES

Sat, 13 July 2024

North Korea threatens to boost nuclear capability in reaction to US-South Korea deterrence guidelines

North Korea threatened Saturday to boost its nuclear fighting capability and make the US and South Korea pay "an unimaginably harsh price" as it slammed its rivals' new defence guidelines that it says reveal an intention to invade the North.

On Thursday, President Joe Biden and South Korean President Yoon Suk Yeol authorised the signing of joint nuclear deterrence guidelines as part of efforts to enhance their capabilities to cope with North Korea's growing nuclear arsenal.

The guidelines were adopted a year after the two countries established a consultation body to bolster information-sharing on nuclear operations and discuss how to integrate US nuclear weapons and South Korean conventional weapons in contingencies. In a statement carried by state media, North Korea's Defence Ministry said the US-South Korea guidelines betrayed "their sinister intention to step up their preparations for a nuclear war against" North Korea.

The statement said its enemies' escalating nuclear threats urgently require North Korea to further improve its nuclear deterrent readiness and add unspecified "important elements to the composition of the deterrent".

It said the US and South Korea will "pay an unimaginably harsh price" if they fail to stop provocative acts. Details of the US-South Korean guidelines weren't available, but experts say they are largely about how the two countries would integrate US nuclear weapons and South Korean conventional weapons to respond to various potential contingencies caused by North Korean attacks and provocations.

Experts say the US and South Korea are expected to map out detailed concept and operation plans based on the guidelines and review them via bilateral military exercises. The guidelines are the first of kind between the allies.

The US has repeatedly promised to use all its military capabilities to protect South Korea if it is attacked by North Korea, but many experts in South Korea believe the US lacks plans on how it would implement its extended deterrence to its ally.

South Korea has no nuclear weapons. North Korea has argued it was forced to pursue nuclear weapons to deal with US-led nuclear threats. US and South Korean officials have steadfastly said they have no intention of attacking North Korea.

Concerns about North Korea's nuclear program have grown in recent years as the North has performed a slew of provocative missile tests and openly threatened to use nuclear weapons preemptively in potential conflicts with its adversaries.

<https://economictimes.indiatimes.com/news/defence/north-korea-threatens-to-boost-nuclear-capability-in-reaction-to-us-south-korea-deterrence-guidelines/articleshow/111713233.cms>

Science & Technology News

The Indian EXPRESS

Sun, 14 July 2024

Researchers develop spacesuit that can turn urine into drinking water: Report

A groundbreaking spacesuit inspired by the “stillsuits” from the science fiction film *Dune* could revolutionise astronaut capabilities during spacewalks in future lunar expeditions, recycling urine into drinking water, according to a report by *The Guardian*.

The prototype, which collects urine, purifies it and can return it to the astronaut through a drinking tube within five minutes, aims to support astronauts on extended missions under NASA’s Artemis program, which aims to land astronauts on the lunar south pole by 2026 and eventually send humans to Mars by 2030.

Developed by researchers at Weill Cornell Medicine and Cornell University, led by Sofia Etlin, the suit incorporates advanced technology. It features a vacuum-based external catheter and a combined forward-reverse osmosis unit to ensure a continuous supply of purified water directly to the astronaut via a drinking tube within five minutes of collection.

The initiative addresses critical challenges faced by astronauts, such as the limited water supply during prolonged lunar spacewalks, which can last up to 24 hours in emergencies.

“Astronauts currently have only one litre of water available in their in-suit drink bags,” Sofia Etlin, a researcher at Weill Cornell Medicine and Cornell University and co-designer of the suit, was quoted as saying by *The Guardian*.

“This is insufficient for the planned longer-lasting lunar spacewalks, which can last 10 hours, and even up to 24 hours in an emergency,” Etlin added.

Current solutions like the maximum absorbency garment (MAG) have been criticised for their discomfort and leakage issues, prompting the need for more efficient waste management systems in space.

The compact and lightweight design of the system, weighing approximately 8kg and measuring 38cm by 23cm by 23cm, is deemed suitable for integration into spacesuits, providing essential hydration and comfort during missions. Researchers are set to conduct extensive tests with volunteers in New York to validate the system's functionality and safety under simulated microgravity conditions before deployment in actual space missions.

<https://indianexpress.com/article/technology/science/researchers-develop-spacesuit-that-can-turn-urine-into-drinking-water-9449660/>



Mon, 15 July 2024

Thermonuclear blasts and new species: Inside Elon Musk's plan to colonize Mars

For more than two decades, Elon Musk has focused SpaceX, his rocket company, on his lifelong goal of reaching Mars.

Over the past year, he has also ramped up work on what will happen if he gets there.

Musk, 53, has directed SpaceX employees to drill into the design and details of a Martian city, according to five people with knowledge of the efforts and documents viewed by The New York Times. One team is drawing up plans for small dome habitats, including the materials that could be used to build them. Another is working on spacesuits to combat Mars' hostile environment, while a medical team is researching whether humans can have children there. Musk has volunteered his sperm to help seed a colony, two people familiar with his comments said.

The initiatives, which are in their infancy, are a shift toward more concrete planning for life on Mars as Musk's timeline has hastened. While he said in 2016 that it would take 40 to 100 years to have a self-sustaining civilization on the planet, Musk told SpaceX employees in April that he now expects 1 million people to be living there in about 20 years.

"There's high urgency to making life multi-planetary," he said, according to a publicly posted video of his remarks. "We've got to do it while civilization is so strong."

Musk has long tried to defy the impossible and has often managed to beat tough odds. But his vision for life on Mars takes his seemingly limitless ambitions to their most extreme — and some might say absurdist — point. No one has ever set foot on the planet. NASA doesn't expect to land humans on Mars until the 2040s. And if people get there, they will be greeted by a barren terrain, icy temperatures, dust storms, and air that is impossible to breathe.

Yet Musk is so wedded to the idea of creating a civilization on Mars — he once said he plans to die there — that it has propelled nearly every business endeavor he has undertaken on Earth. His vision

for Mars underlies most of the six companies that he leads or owns, each of which could potentially contribute to an extraterrestrial colony, according to the documents and the people with knowledge of the efforts.

The Boring Co., a private tunneling venture founded by Musk, was started in part to ready equipment to burrow under Mars' surface, two of the people said. Musk has told people that he bought the social platform X partly to help test how a citizen-led government that rules by consensus might work on Mars. He has also said that he envisions residents on the planet will drive a version of the steel-paneled Cybertrucks made by Tesla, his electric vehicle company.

Musk, who is worth about \$270 billion, has publicly declared that he only accumulates assets — which include a roughly \$47 billion Tesla pay package — to fund his plans for Mars.

“It’s a way to get humanity to Mars, because establishing a self-sustaining city on Mars will require a lot of resources,” he testified in court in 2022 about his Tesla pay.

Whether Musk can achieve his vision for a Martian colony in his lifetime is debatable.

“You can’t just land 1 million people on Mars,” said Robert Zubrin, an aerospace engineer who has known Musk for 20 years and wrote the book “The Case for Mars.” Any colonization of the planet would unfold over decades, he said.

Zubrin added that Musk is being particularly distracted from his Mars ambitions by his recent work on X. The tech billionaire often faces criticism for being spread too thin among the companies he runs.

While Musk has spoken about Mars for years and SpaceX released two basic drawings of a colony around 2018, many specifics and the company’s shift toward civilization planning haven’t previously been reported. Musk has largely kept the colonization plans quiet because SpaceX, under a \$2.9 billion contract with NASA, must first send a rocket to the moon, two people with knowledge of the company said.

The Times interviewed more than 20 people close to Musk and SpaceX about the plans for a Martian city and reviewed internal documents, emails, social media posts and legal documents. Many of the people spoke on the condition of anonymity because they had signed nondisclosure agreements. Even they were skeptical that Musk would build a Martian city in his lifetime. Some of them said he was just trying to best Jeff Bezos, Amazon’s founder who envisions humans living in giant space stations throughout the solar system. Musk has laid out an aggressive timeline for Mars to make them work harder, others said. Drawings of the colony are sometimes referred to as a “hype package,” two of them said.

Musk and SpaceX didn’t respond to requests for comment. In a post on X after this article was published, Musk said he had not volunteered his sperm and that no one at SpaceX had been directed to work on a Martian city. “When people have asked to do so, I’ve said we need to focus on getting there first,” he wrote.

Saving Humanity

Musk has been fascinated by Mars since reading Isaac Asimov’s 1951 science fiction novel, “Foundation,” when he was 10. In the book, the protagonist builds a colony across a galaxy to save humanity from the fall of an interstellar empire.

“They find a planet far away from the galactic center and try to preserve human knowledge and civilization there while the center of the galaxy kind of falls apart,” Musk said in a 2013 interview for a science video.

In 2001, Musk tried buying a Russian rocket to reach Mars, said Jim Cantrell, a former SpaceX employee who visited Russia with him that year. But after three trips, the Russians refused to sell, and one official spit on Musk’s shoes, Cantrell said.

In 2002, Musk founded SpaceX, a privately held company in Hawthorne, California. It eventually created partly reusable rockets and landed government contracts, including with NASA. In recent years, it started Starlink, a satellite internet service that has expanded worldwide.

To reach Mars, SpaceX has built Starship, a nearly 400-foot reusable rocket. Starship’s immediate purpose is to take NASA astronauts to the moon, though it might later ferry residents to Mars and could also act as a small space station.

A future version of Starship may have a living space in its nose, three people familiar with the rocket said. Plans call for several floors of living quarters, with amenities like a running track and a movie theater, two of the people said. One drawing of Starship’s interior, a version of which Musk has posted on X, shows a violinist hovering in zero gravity as she plays for a crowd.

Starship may carry 100 passengers at a time to Mars, a journey that would happen about every two years, Musk told the International Astronautical Congress in a 2016 presentation. NASA has said a trip to Mars, located about 140 million miles from Earth, would take up to nine months.

In 2018, SpaceX engineers gathered with university researchers and others for a private meeting in Colorado to discuss the technology needed to survive on Mars, according to notes of the meeting obtained by the Times. Topics included harvesting ice to make water and selecting the right area on Mars to build a colony.

By last year, the latest versions of Starship had been built at Starbase, a SpaceX facility in Boca Chica, Texas. In June, Starship successfully returned from a test flight to space for the first time.

Colony Planning

Over the years, Musk has dropped hints about how he thinks people would live on Mars.

One theme revolves around the continuation of human life on the planet. Scientists haven’t determined whether people can have children in space. Musk has said children won’t be allowed on the first flights to Mars because of the dangers, though he expects them to live there eventually.

But Musk has a plan. In his 2013 interview for the science video, he said he hoped to create his own species on Mars, an idea that he has repeated over the years to SpaceX employees and others close to the company.

“I think it’s quite likely that we’d want to bioengineer new organisms that are better suited to living on Mars,” he said in the interview. “Humanity’s kind of done that over time, by sort of selective breeding.”

He also has a strategy for warmth. In a 2022 podcast interview, he said he would tackle the planet’s icy temperatures with a series of thermonuclear explosions that would warm the planet by creating

artificial suns. Hundreds of solar panels, potentially built by Tesla, will help heat homes and create energy, three people familiar with his plans said.

Musk's pronouncements have in recent months shifted into more concrete planning by SpaceX employees.

The industrial design team has been creating and updating renderings for a city, two people said. The colony will center on a giant dome for communal living, with smaller domes scattered around it. Discussions have lately focused on what materials to use for the domes. Musk is particularly concerned with making sure the city looks cool, two other people said.

One internal drawing obtained by the Times shows a family with young children standing in a dome neighborhood, gazing up at the stars.

In April, Musk told SpaceX employees that the Mars colony would be self-sustaining in case something happened to Earth and rockets couldn't reach it anymore.

To achieve that, Musk plans to use Starship as sort of a Noah's Ark, carrying plants and animals on the initial voyage, three people familiar with the plans said. Residents would then build greenhouses on Mars to grow food.

SpaceX has partnered with Impossible Foods, the plant-based alternative meat company, to provide food in SpaceX's cafeterias, but also to test the products as a possible protein source for Mars, two of the people said.

Civilization Secured?

Like Musk, many of SpaceX's more than 12,000 employees believe in life on another planet, according to the people familiar with the company and documents viewed by the Times. Workers sometimes wear "Occupy Mars" or "Rocket Parent" T-shirts to work and post suggestions for the Mars colony on an internal site. One recent idea was to build the city on the side of a giant crater.

Some employees working on the Mars plans are based in Boca Chica, while others from the Southern California office fly in on Mondays and leave on Fridays. Many work more than 100 hours a week.

The Boca Chica site has an industrial complex called Stargate, with an office that some liken to being in a Las Vegas casino because the lack of windows makes it hard to tell if it is day or night, three people said. A new office under construction there will have more windows, they said. Current and former employees said the Boca Chica site has sometimes lacked basic safety protocols, like caution tape around dangerous equipment.

SpaceX has grappled with a lawsuit and a complaint from the National Labor Relations Board related to eight former employees who said they were fired for complaining about Musk's behavior and for making allegations of sexual harassment and discrimination at the company. SpaceX hasn't responded to the lawsuit and has sued the NLRB, claiming it acted unconstitutionally.

Still, some employees said it was worth working there to create a Mars colony.

In a recent goodbye email viewed by the Times, a female SpaceX manager who worked on the Mars program described "brutal" hours and conditions, especially for working parents. But she also

said the company was “an astonishing place” and that she would “trade this experience for nothing.”

Musk’s presence in Boca Chica has waned recently, people familiar with the company said. He visits about once a month, sometimes in the middle of the night for a few hours with his toddler son X Æ A-12, two of the people said, compared with at least once a week previously.

Yet his resolve for a Martian civilization appears unbowed.

<https://indianexpress.com/article/technology/science/thermonuclear-blasts-and-new-species-inside-elon-musks-plan-to-colonize-mars-9452828/>



Mon, 15 July 2024

IIA researchers develop online tool to create star catalogue

Indian researchers at the Indian Institute of Astrophysics (IIA) in Bengaluru and their collaborators have developed a new online tool to create a comprehensive star catalogue for the Adaptive Optics System (AOS) of the upcoming Thirty Meter Telescope (TMT).

TMT is an international scientific endeavour which would come up at Maunakea in Hawaii. According to the Department of Science and Technology, the TMT, the Giant Magellan Telescope, and the European Southern Observatory’s Extremely Large Telescope represent the future of ground-based astronomy. India is a key partner in the TMT project, with India TMT Center at IIA leading the national collaboration.

The new tool can enable this ground-based telescope, which is one of the largest to be operational in the next decade, to generate sharper astronomical images. “The AOS on TMT, known as the Narrow Field Infrared Adaptive Optics System (NFIRAOS), will be enhanced by a Laser Guide Star (LGS) facility.

This facility will project up to nine lasers into the sky to create artificial guide stars. However, atmospheric turbulence affects these laser beams, so measuring atmospheric tip-tilt is uncertain. To correct these effects, the AO system requires feedback from three real stars, known as Natural Guide Stars (NGS),” said Dr. Sarang Shah from IIA. Researchers at the IIA and their collaborators have developed an automated code that can be used as an online tool to create a catalogue of Near Infrared (NIR) stars.

“The automated code can compute the expected near-infrared magnitudes of stellar sources identified in various optical sky surveys using their optical magnitudes,” said Dr. Smitha Subramanian, co-author and faculty at IIA.

Using multi-band optical photometry from the PAN-STARRS telescope, the researchers filtered and identified stars, predicting their near-infrared magnitudes through innovative methods. They validated their approach using data from the UKIDSS survey of the United Kingdom Infrared Telescope, achieving over 85% accuracy in their NIR magnitude predictions. India’s participation in the TMT collaboration involves the IIA, the Inter-University Center for Astronomy and

Astrophysics (IUCAA), Pune, and the Aryabhata Research Institute for Observational Sciences (ARIES), Nainital.

<https://www.thehindu.com/news/national/karnataka/iia-researchers-develop-online-tool-to-create-star-catalogue/article68403331.ece>

ThePrint

Fri, 12 July 2024

Much-searched-for black hole finally identified in Milky Way using fast-paced stars — Nature study

A team of astronomers led by a group from the Max Planck Institute for Astronomy in Heidelberg, Germany, has identified a long-searched member of the black hole family — an intermediate-mass black hole (IMBH) in Omega Centauri, the most massive star cluster of the Milky Way galaxy.

The peer-reviewed results were published Wednesday in the journal *Nature*.

This discovery provides strong support to the age-old theory regarding galactic evolution, which proposes IMBH to be the building blocks of supermassive black holes.

In astronomy, black holes, based on their masses, can be categorised as stellar-mass, supermassive, and intermediate-mass. Stellar black holes, with masses between one and few dozen solar masses, and supermassive black holes, with masses of million or even billion solar masses, are well-known. IMBH, with masses between 100 to 100,000 times the mass of the Sun, have been notoriously hard to find, until recently.

According to a statement released by the Max Planck Institute of Astronomy, the black hole at the heart of Omega Centauri appears to be the “missing link” between stellar and supermassive black holes which is frozen in an intermediate stage of evolution.

The IMBH is significantly less massive than the black holes typically found in the centres of galaxies.

This IMBH is estimated to be 8,200 times the mass of the Sun, and adds evidence to the theory that Omega Centauri was a galaxy with a core that was swallowed by the Milky Way, stopping the growth of the black hole at intermediate mass.

Hubble reveals stars around hidden black hole

This discovery was made possible by tracking the fast-paced stellar movements — the tipping-off signal of a gigantic black hole in the bulky crowded centre of the globular star collection of Omega Centauri, located at a distance of about 18,000 light years from the Sun.

Omega Centauri is a massive collection of around 10 million stars and is visible to the unaided eye from the southern latitudes of Earth as a speck in the night sky. Through a small telescope, it appears as a spherical collection of stars called globular clusters. These are so dense in the middle that it becomes impossible to tell them apart.

Based on an earlier statement by the Max Planck Institute of Astronomy, this new study led by Maximilian Häberle from the institute has confirmed long-standing suspicions of astronomers that Omega Centauri harbours a central black hole.

Using precision-based techniques, Häberle's team analysed over 500 images of Omega Centauri to detect the tiniest star motions in crowded central regions. Most of these pictures captured by the Hubble Space Telescope (HST) for over 20 years were initially produced to calibrate the instrument.

However, these very images helped the scientists make the biggest discovery of their time. With ever-repeating views of Omega Centauri, they served as a perfect dataset which led the researchers to unearth a small subset of seven fast-moving stars by closely monitoring the movements of almost 150,000 stars.

These stars have differing speeds and directions.

Why the stars have high speeds

The presence of a concentrated mass in the proximity of stars could explain their high speeds, as they whip around the central mass. Whether this mass was a mere collection of single stars or a massive central black hole was a question that required careful analysis.

The study found the estimated velocities of these rapidly moving stars to be significantly higher than the escape velocities of the Omega Centauri, which refer to the minimum velocities required to escape the gravitational force of any celestial body.

His team performed a broader analysis that helped them determine that there is a central mass in Omega Centauri, which is equivalent to at least 8,200 solar masses. Moreover, the images do not identify any visible location at the deduced location of the central mass. This is what would be expected of a black hole.

The authors said that further observations are needed to test their hypothesis that Omega Centauri was a swallowed galaxy, and also stressed on the need for direct observation of the IMBH.

<https://theprint.in/science/much-searched-for-black-hole-finally-identified-in-milky-way-using-fast-paced-stars-nature-study/2171610/>



Sun, 14 July 2024

Bengaluru-based startup Pixxel Space plans to mine asteroids for building settlements in space

As it readies its constellation of Earth observation satellites, Bengaluru-based startup Pixxel Space has plans to map the Moon and asteroids, and look for materials required to build settlements in outer space.

n interaction with PTI editors at the agency's headquarters here, Pixxel Space co-founder and CEO Awais Ahmed spelt out the long-term plans of the startup and these include exploration of asteroids with the intention of finding building materials or possible fuel sources for future settlements in space. "We are building hyper-spectral cameras that look at the Earth. The same cameras can be turned outwards to look at other objects in space. We can send these spacecraft to the Moon, Mars or the asteroid belt, and build a map of the solar system," Ahmed said. He said the startup would also like to place satellites in orbits around the Moon -- cis-lunar orbits -- to explore the Earth's only natural satellite in greater detail.

"We can go between Mars and Jupiter in the asteroid belt and identify which of these asteroids are stunning and useless, and which of them have certain precious materials that can be useful in space," Ahmed said. Satellites can look for ice on asteroids which can be used as fuel by splitting it into hydrogen and oxygen, and can also be stored as water, he said. "So, when humanity expands towards space it does not make sense to mine all of that material from Earth when there's so much more material actually available in space," ahmed said.

He said Elon Musk's SpaceX was building railroads for the space revolution, while Amazon founder Jeff Bezos' Blue Origin and others were building habitats for space. "We want to be the ones to provide the material to sort of make it all happen. But very long term vision," Ahmed said. Pixxel Space plans to launch six hyper-spectral satellites later this year as part of its constellation to map the Earth in greater detail. Another 18 satellites are slated for launch next year that will complete the Bengaluru-based startup's constellation in low Earth orbit.

<https://www.deccanherald.com/science/space/bengaluru-based-startup-pixxel-space-plans-to-mine-asteroids-for-building-settlements-in-space-3105104>

