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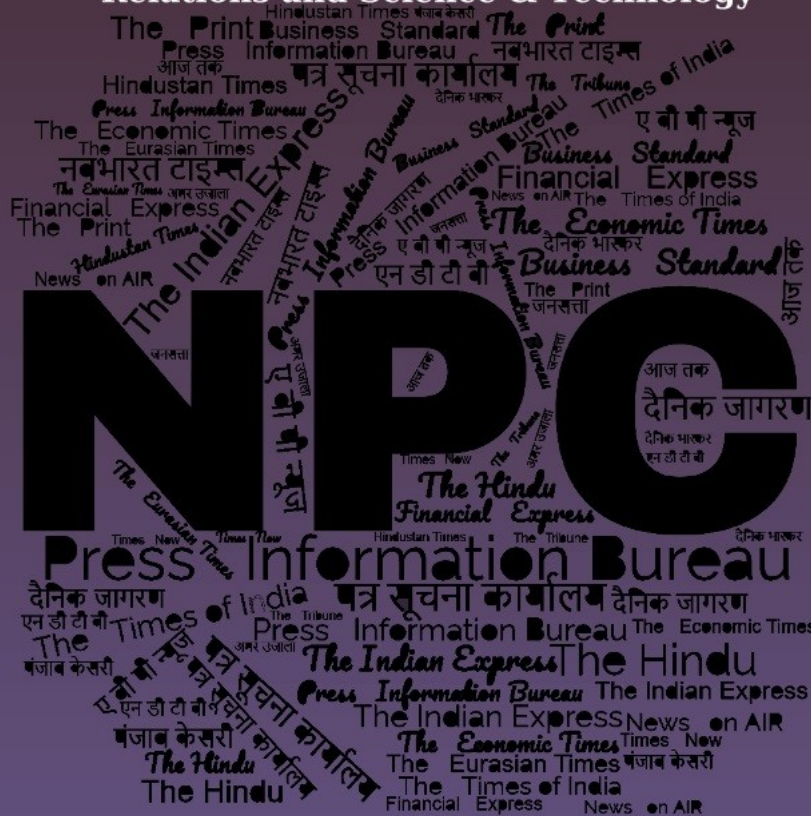
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**Press Information Bureau
Government of India**

Ministry of Defence

Thu, 25 July 2024

Indian Army Contingent Departs For Multinational Military Exercise Khaan Quest

The Indian Army contingent departed today for the Multinational Military Exercise KHAAN QUEST. The exercise is scheduled to be conducted from 27th July to 9th August 2024 at Ulaanbaatar, Mongolia. The exercise will bring together military forces from around the world to collaborate and enhance their peacekeeping capabilities. Last edition of Exercise KHAAN QUEST was conducted in Mongolia from 19th June to 2nd July 2023.

The exercise first started as a bilateral event between USA and Mongolian Armed Forces in the year 2003. Subsequently, from the year 2006 onwards the exercise graduated to a Multinational Peacekeeping Exercise with current year being the 21st iteration.

The Indian Army contingent comprising 40 personnel is being represented mainly by troops from a Battalion of the MADRAS REGIMENT along with personnel from other Arms and Services. One Woman Officer and two Women Soldiers will also form part of the contingent.

Aim of Exercise KHAAN QUEST is to prepare Indian Armed Forces for peacekeeping missions while operating in a multinational environment, thereby increasing interoperability and military readiness in peace support operations under Chapter VII of United Nations Charter. The exercise will focus on high degree of physical fitness, joint planning and joint tactical drills.

Tactical drills to be practiced during the exercise will include establishment of Static and Mobile Check Points, Cordon and Search Operations, Patrolling, Evacuation of Civilians from Hostile Area, Counter Improvised Explosive Device drills, Combat First Aid and Casualty Evacuation, among others.

Exercise KHAAN QUEST will enable the participating countries to share their best practices in Tactics, Techniques and Procedures for conduct of joint operations. The exercise will facilitate developing inter-operability, bonhomie and camaraderie between soldiers of the participating countries.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2036798>

Kargil Vijay Diwas 2024: History, significance and other details about this historic day

Kargil Vijay Diwas, celebrated every July 26, marks a significant moment in India's history—the victory over Pakistan in the 1999 Kargil War. This day honors the courage and sacrifice of Indian soldiers who defended the nation's sovereignty. Prime Minister Narendra Modi will visit Drass in Ladakh on July 26, 2024, to commemorate the 25th anniversary of this historic event.

The Roots of Kargil Vijay Diwas

The history of Kargil Vijay Diwas dates back to the tumultuous period between India and Pakistan, which saw major conflicts, including the 1971 war that led to the creation of Bangladesh. Despite signing the Lahore Declaration in February 1999, aimed at peaceful resolution of the Kashmir issue, the peace was short-lived. Pakistani soldiers and militants infiltrated the Kargil district of Jammu and Kashmir in the winter of 1998-1999, occupying strategic positions to disrupt the link between Kashmir and Ladakh.

Operation Vijay and the Kargil War

In May 1999, the Indian Army discovered the infiltration, prompting the launch of Operation Vijay. The conflict, known as the Kargil War, involved intense battles in the challenging mountainous terrain of the Kargil district and along the Line of Control (LoC) from May to July 1999. The Indian Army successfully recaptured key positions, including Tiger Hill, after fierce fighting. The war culminated on July 26, 1999, with India securing victory but suffering significant casualties, losing nearly 490 personnel.

Significance of Kargil Vijay Diwas

Kargil Vijay Diwas is a powerful symbol of national unity and patriotism. The Kargil War brought together people from all corners of India, unified in their support for the Armed Forces. This collective spirit of resilience and solidarity continues to be celebrated on Kargil Vijay Diwas, fostering a sense of national pride among citizens. The stories of bravery and heroism from the war inspire future generations, instilling in them a sense of duty and dedication to the nation.

Celebrations Across the Nation

Kargil Vijay Diwas ensures that the sacrifices of Indian soldiers are not forgotten, serving as a solemn tribute to the heroes who defended the nation's sovereignty. Commemorative events and ceremonies will be held nationwide, including rituals, educational activities, and memorial events to honor their bravery and sacrifice. The day fosters national pride and unity, reminding every Indian of the valor and dedication of the soldiers.

Heroes of the Kargil War

Several soldiers displayed extraordinary valor during the Kargil War. Captain Vikram Batra, known for his iconic declaration, "Ye dil mange more!" led his team to recapture Point 4875 even after

being injured. He received the Param Vir Chakra posthumously. Lieutenant Manoj Kumar Pandey played a vital role in clearing enemy positions and was posthumously awarded the Param Vir Chakra for his courage and leadership.

Grenadier Yogendra Singh Yadav, who was just 19 years old, valiantly fought at Tiger Hill despite severe injuries and helped the Indian Army capture key enemy bunkers. He was awarded the Param Vir Chakra. Rifleman Sanjay Kumar showed immense bravery at Point 4875, fighting on despite multiple injuries. His pivotal actions earned him the Param Vir Chakra. Major Rajesh Adhikari led a mission to capture a bunker at Tololing and fought on with unwavering determination despite grievous wounds, earning the Maha Vir Chakra.

Kargil Vijay Diwas is a day of remembrance and national pride, honoring the sacrifices and valor of Indian soldiers. As the nation celebrates the 25th anniversary, it continues to inspire unity and patriotism, ensuring the legacy of the Kargil heroes endures.

The Kargil War, fought between India and Pakistan in 1999, was a highaltitude conflict that took place in the Kargil district of Jammu and Kashmir. The Pakistani forces had infiltrated the region, aiming to cut off the vital link between Kashmir and Ladakh. The Indian Army launched Operation Vijay to drive out the intruders and recapture strategic positions. The war saw intense battles over rugged terrain, with the Indian Army ultimately emerging victorious.

<https://economictimes.indiatimes.com/news/defence/kargil-vijay-diwas-2024-history-significance-and-other-details-about-this-historic-day/articleshow/112012604.cms>

THE ECONOMIC TIMES

Thu, 25 July 2024

Army Chief Dwivedi visits forward areas along LoC in Kashmir

Army Chief General Upendra Dwivedi on Thursday visited forward areas along the Line of Control in Kashmir valley to review the preparedness of the forces involved in counter-infiltration and counter-terror operations, officials said. The Chief of Army Staff later left for Kargil to take part in the silver jubilee celebrations of Kargil Vijay Diwas.

After arriving here on Wednesday, General Dwivedi, along with Jammu and Kashmir Lt Governor Manoj Sinha, GOC-in-C Northern Command, Chinari Corps Commander, civil dignitaries and all ranks of Chinari Corps paid homage to Naik Dilawar Khan, who laid down his life during an anti-terror operation in Kupwara.

<https://economictimes.indiatimes.com/news/defence/army-chief-dwivedi-visits-forward-areas-along-loc-in-kashmir/articleshow/112011909.cms>

Security forces launch anti-tunnelling ops along International Border in Samba

Amid concerns about infiltration attempts by terrorists into Jammu and Kashmir, security forces have launched an operation along the International Border (IB) in the Samba sector to detect underground and cross-border tunnels, police said on Thursday. Scores of police and security personnel equipped with specialised gear are meticulously scanning border areas, focusing on dense bushes and forested regions as part of this operation, the police said.

"A comprehensive anti-tunnel exercise has commenced to ascertain the presence of any cross-border tunnels," said a police officer involved in the operation.

The search operations also involve deployment of drones and is being conducted daily in response to the ongoing security threats posed by potential terrorist infiltrations, he said.

"Security forces are clearing dense bushy areas to eliminate the possibility of existence of tunnels," the officer added.

Police recently said that Pakistan-sponsored terrorists have infiltrated into Jammu and Kashmir via the International Border and have been involved in terrorist attacks in the region.

Reports also indicate that between 50 to 60 foreign terrorists have infiltrated into Jammu via the International Border and Line of Control over the past few months, according to police.

Over the last six weeks, they have targeted army personnel, security forces and civilians, including pilgrims, particularly in Kathua, Doda, Rajouri, Poonch and Reasi districts.

<https://economictimes.indiatimes.com/news/defence/security-forces-launch-anti-tunnelling-ops-along-international-border-in-samba/articleshow/112018552.cms>

Korean F-15K vs Indian Su-30MKI: India, South Korea conduct joint air drill during 'Pitch Black' exercise

India and South Korea conducted joint air drills during a major multinational 'Pitch Black' exercise in Australia, involving Korean F-15K and Indian Su-30MKI fighter jets. This edition is the largest in the 43-year-long history of exercise Pitch Black, which includes participation by 20 countries, with over 140 aircraft and 4400 military personnel of various air forces, Eurasian Times reported.

The Indian Air Force contingent comprised of over 150 highly skilled Air Warriors including pilots, engineers, technicians, controllers, and other subject matter experts, who will be operating the

formidable Su-30 MKI multirole fighters, with the C -17 Globemaster and the IL-78 Air-to-Air Refuelling aircraft in combat enabling roles. South Korea has deployed six F-15K fighters and around 100 troops.

The exercise was scheduled to be conducted from 12 July 24 to 02 August 24, however, it was interfered on July 24 when an Italian Air Force Eurofighter Typhoon jet crashed after encountering an “unknown issue” during a training flight.

But now the military exercises have resumed over Northern Territory skies, as informed by the Australian officials. During the biennial multinational exercise, South Korea's F-15K and India's Su-30MKI fighter jets demonstrated exceptional performance. Such encounters between previously adversarial fighter jets often prompt questions about their relative strengths.

Following the 2008 Red Flag exercise, US Air Force pilots anonymously posted assessment videos on YouTube. One officer, while praising how F15 pilots impressed their Indian counterparts, acknowledged that American fighters were beginning to lose their competitive edge against Russian-made Su-30MKIs.

In these videos, some ISAF pilots made unverified claims, such as suggesting that the Su-30MKI's thrust vectoring capability caused rapid altitude loss in the aircraft. “So we start to pull in on him, and then all of a sudden you start to see the [Su-30’s aft-] end kick down, and he starts doing vectored thrust,” the Eurasian Times quoted pilot as saying.

But now he starts falling out of the sky. He’s falling out of the sky so fast that you don’t even have to go up. You have to pull back on the stick a little bit, pull the throttle, go to guns, and come in and drill his brains out,” he added.

<https://timesofindia.indiatimes.com/world/south-asia/korean-f-15k-vs-indian-su-30mki-india-south-korea-conduct-joint-air-drill-during-pitch-black-exercise/articleshow/112020751.cms>

THE TIMES OF INDIA

Fri, 26 July 2024

Bill introduced to strengthen US-India partnership and counter China's influence in Indo-Pacific

US senator Marco Rubio introduced a bill in American Congress on Friday that aims to strengthen the US-India partnership and counter the growing influence of China in the Indo-Pacific region. "In order to strengthen our partnership with India, it's essential we increase our strategic relationship with New Delhi. Introduced a bill to best support India as they continue to face aggression from Communist China," Marco Rubio said on X (formerly Twitter).

The bill proposes to treat India on par with US allies such as Japan, Israel, South Korea, and Nato allies in terms of technology transfers and support India's response to increasing threats to its territorial integrity. It also seeks to bar Pakistan from receiving security assistance if it is found to have sponsored terrorism against India.

“Communist China continues to aggressively expand its domain in the Indo-Pacific region, all while it seeks to impede the sovereignty and autonomy of our regional partners. It's crucial for the US to continue its support in countering these malicious tactics. India, along with other nations in the region, is not alone,” Rubio said after introducing the USIndia defence cooperation act in the Senate.

Although the bill is unlikely to make significant progress in the current Congress due to the short timeline and political divisions, it may be reintroduced in the next Congress, given the bipartisan support for the India-US relationship.

The bill outlines a Statement of Policy that the US will support India's response to growing threats to its territorial integrity, provide necessary security assistance to deter adversaries, and cooperate with India in various areas, including defence, civil space, technology, medicine, and economic investments.

If passed into law, the bill would provide a limited exemption for India from CAATSA sanctions for purchases of Russian equipment currently used by the Indian military.

The proposed legislation would authorize the secretary of state to enter into a memorandum of understanding with India to increase military cooperation, expedite excess defence articles to India for two years, and grant India the same status as other allies.

The bill also aims to expand International Military Education and Training Cooperation with New Delhi.

<https://timesofindia.indiatimes.com/india/bill-introduced-to-strengthen-us-india-partnership-and-counter-chinas-influence-in-indo-pacific/articleshow/112029241.cms>



Thu, 25 July 2024

LCA Tejas: US Shoots India In The Foot By Sanctioning Russia Resulting In Mk-1A Engine Delay: OPED

Atamnirbhar Bharat (Self-Reliant India) was to receive its first locally developed LCA Mk-1A fighter in February 2024, but HAL wasn't able to get the fighter—the pride of the Indian Defence Industry—airborne until March.

HAL was to deliver 2 fighters by March 31, 2024, and 18 fighters by March 31, 2025. Deliveries of the aircraft are now expected to start at the end of July.

The right shift of the delivery schedule is attributed to a delay in the supply of the F404-IN20 engine that powers the Mk-1A due to supply chain issues at HAL and GE Aerospace.

When contacted by FlightGlobal, GE Aerospace said, “The aerospace industry continues to experience unprecedented supply chain pressures. GE Aerospace is working with our partner HAL and suppliers to resolve constraints and deliver F404-IN20 engines for the LCA Mk-1A program.”

Consequent to the delay in the start of delivery, the MoD held a review meeting and asked HAL to meet the delivery deadline of 18 jets by March 2025. HAL has committed to meet the contract target of 18 jets by March 2025. But to live up to its commitment, it may have to fit old F404-IN20 engines into the new aircraft!

Supply Chain Constraints

According to a McKinsey & Co. analysis published in April 2024, “Since 2020, OEMs have struggled to obtain adequate quantities of many components essential to aircraft manufacturing, including raw materials, finished castings and forgings, semiconductors, and electronics components. In consequence, production lines have slowed or stopped.”

The “analysis shows that aerospace executives were about 18 times more likely to mention supply-chain-related terms, such as “shortages,” during earnings calls in 2022 than they were in 2014.”

Component and material suppliers cater to OEM and operator demands. Whenever there is a shortage, they are forced to make tradeoffs “between supplying OEMs and servicing the aftermarket.”

Ukraine War

A closer examination of the factors contributing to supply chain constraints—raw material shortage, component shortage, semiconductor and electronics shortage—suggests that an improvement in the short term is unlikely.

Raw Material Shortage

There is a significant shortage of titanium and nickel alloys in the West, critical raw materials for manufacturing aero-engine components.

The reason – Russia is one of the largest producers of titanium. Russian state enterprise VSMPO-AVISMA supplies a significant portion of the global aerospace industry’s titanium needs. China is also a major producer that contributes substantially to the global supply.

US titanium production isn’t sufficient to meet its aerospace industry’s demands.

Nickel Alloys

Russia and China also figure on top of the list of nations that meet global Nickel alloy demands. China is the world’s largest producer and consumer of nickel.

The country has significant nickel reserves and a large metallurgical industry capable of producing various nickel alloys.

Russia has large nickel reserves, and its company, Norilsk Nickel, is one of the leading producers of nickel alloys.

Sanctions On Russia and China

Most of the supply chain issues in the aerospace industry can be attributed to Western sanctions imposed on Russia after February 2022, aimed at crippling the Russian economy. Also, the sanctions imposed on China aimed at slowing down its economic growth and rising as a world power.

The sanctioning has been indiscriminate. Western leaders ignored repeated warnings by industry experts who advocated a long-term approach that would not negatively impact the Western aerospace industry.

For example, in April 2022, Airbus CEO Guillaume Faury warned that sanctioning Russia's VSMPO-AVISMA would damage European aerospace "while barely hurting Russia's economy."

Aggressive sanctioning has led to a splintering of the world, which is derailing established supply chain dynamics. A multipolar world with trade barriers will aggravate the skilled labor shortage and skew the supply-demand imperative.

Conclusion

It's interesting to note how US sanctions against Russia have disrupted not just Indian defense procurement from Russia but also our defense procurement from the US itself.

With sanctions against Russia and China continuing, it's unlikely that supply chain issues in the aerospace industry will ease soon. As the world gets further splintered, supply chain constraints can only increase due to trade barriers and reduced market sizes.

According to FlightGlobal, F404 deliveries to HAL are likely to begin in September, helping HAL to accelerate LCA Mk-1A production.

However, as things stand, Russia's SMO may not end for years. Sanctions could persist for decades. Global fragmentation, already a reality, could get worse. In other words, supply chain woes could shift right or left.

If supply chain constraints persist, further slip-ups in the supply of F404-IN20 engines are possible.

India's dependence on GE Aerospace is heavy. It's the chosen powerplant for LCA Mk-1, LCA Mk-1A, LCA Mk-2, and AMCA.

There is a need for caution with our heavy dependence on GE in this changing world. But the most categorical takeaway from what has transpired is the need for India to urgently plug the gap in aero engine development and directly secure its raw material and electronics supply chain.

<https://www.eurasiantimes.com/lca-tejas-us-shoots-india-in-the-foot/>

The Tribune

Thu, 25 July 2024

On maiden visit to Valley, Army Chief reviews security at LoC in Kupwara

Army Chief General Upendra Dwivedi on Thursday visited the Line of Control (LoC) in North Kashmir and reviewed the security situation along the LoC.

Dwivedi's first visit to Kashmir after taking charge as the Chief of Army Staff (COAS) comes at a time when Kupwara district in North Kashmir witnessed several anti-militancy operations recently. The Army has also foiled infiltration bids at the LoC.

In a post on X, the Army's Additional Directorate General of Public Information (ADGPI) said, the Army Chief exhorted soldiers to "remain steadfast in meeting emerging security challenges".

"General Upendra Dwivedi (COAS) visited the forward locations of the Chinar Corps and reviewed the security situation along the Line of Control. He also interacted with the Commanders and troops on ground," the ADGPI said.

Before his maiden visit to Kashmir as CAOS, General Dwivedi had visited Jammu twice and reviewed the security amid the rise of militancy in Jammu region.

The Army Chief also laid a wreath and paid homage to Naik (Gunner) Dilwar Khan, who was killed in an anti-militancy operation in North Kashmir's Kupwara district.

Several senior administrative and civil officers also attended the wreath-laying ceremony, which was held at the Srinagar-based Chinar Corps headquarter on Wednesday evening.

Dilwar Khan, a resident of Himachal Pradesh, was critically injured during an anti-militancy operation in the Trumkhan forests of Kupwara. An unidentified militant was also killed during the encounter.

"The COAS and all ranks of the Indian Army salute his immense valour and sacrifice and stand firm with the bereaved family in this hour of grief," the ADGPI wrote on X.

<https://www.tribuneindia.com/news/j-k/on-maiden-visit-to-valley-army-chief-reviews-security-at-loc-in-kupwara-643328>



Thu, 25 July 2024

Indian Navy installs Lanza-N surveillance radar on INS Mysore

The Indian Navy has installed a new radar on one of its Delhi-class guided-missile destroyers to enhance surveillance capabilities.

Janes understands that the Indian Navy has installed the naval version of Spanish company Indra's Lanza 3D air surveillance radar on its second Delhi-class destroyer, INS Mysore (D60), as part of the vessel's mid-life upgrade.

In May 2023 Indra announced it will supply three Lanza-N 3D radars to the Indian Navy. Indra said at the time that it had delivered the first of these radars to the Indian Navy, while the production of the second and third radars had been initiated.

Indra has also partnered with India's Tata Advanced Systems Limited (TASL) to deliver additional Lanza-N radars to the Indian Navy. TASL will acquire Lanza-N's core elements from Indra and build 20 additional Lanza-N radars in India for integration on multiple undisclosed Indian Navy vessels.

The Lanza-N radars will be delivered to the Indian Navy under a INR12 billion (USD143 million) contract secured by TASL from the Indian Ministry of Defence (MoD) in 2019 to supply 23 shipborne 3D air surveillance radars to the service by 2029.

<https://www.janes.com/osint-insights/defence-news/c4isr/indian-navy-installs-landa-n-surveillance-radar-on-ins-mysore>

Science & Technology News



Press Information Bureau
Government of India

Ministry of Science & Technology

Thu, 25 July 2024

Novel computational model could help early detection of cervical cancer

A new computational model that can improve the diagnosis of cervical dysplasia or abnormal cells growth on the surface of cervix, has the potential for use in early detection of cervical cancer.

Precise pattern identification and classification are crucial for diagnosis and management of cervical cell dysplasia.

Scientists from Institute of Advanced Study in Science and Technology (IASST), an autonomous institute of the Department of Science and Technology (DST) set out to develop a model that would be practically applicable in real-world situation and have unmatched accuracy while requiring the least amount of computation time.

Dr. Lipi B. Mahanta and her team experimented with different color models, transform techniques, feature representation schemes and classification methods to develop a powerful machine learning (ML) framework. This comprehensive analysis and experimentation aimed to identify the optimal combination for detecting cervical dysplasia.

The model's performance was tested on two datasets: one collected from healthcare centers in India and a publicly available dataset.

Using a method of image processing -- Non-subsampled Contourlet Transform (NSCT) and the YCbCr color model (a way to represent colors in an image), the new model achieved an average accuracy of 98.02%.

The findings published in the journal 'Mathematics' by MDPI highlighted the potential of their computational model to revolutionize cervical dysplasia detection.

The innovative model could revolutionize the detection of cervical dysplasia and provide healthcare professionals with highly accurate tools for better diagnostic precision and improved treatment outcomes.

Link: <https://doi.org/10.3390/math10214126>

<https://pib.gov.in/PressReleasePage.aspx?PRID=2036843>



Fri, 26 July 2024

NISAR missing from ISRO's plan, mission unlikely this year

The keenly-awaited NISAR space mission, a first of its kind collaborative exercise between the space agencies of India and the United States, it seems, will not happen this year. NISAR did not figure in the list of missions the Indian Space Research Organisation submitted to the Lok Sabha on Thursday in response to a question on space missions to be launched this year.

NISAR, which stands for NASA-ISRO Synthetic Aperture Radar, is designed to make extremely granular observations of the Earth at regular intervals. The satellite is powerful enough to capture changes as small as one centimetre in size during its repeated observations over the same terrain. It will therefore be able to study the dynamic processes happening on Earth's surface, like retreat of glaciers, changes in vegetation and forest cover, and even the movements during earthquakes and volcanoes. Scientists expect this satellite to provide new insights into our understandings of processes like climate change or natural hazards.

NISAR was slated for a launch in the first half of this year, and the satellite, that had been put together in the United States after one of the two radars and some other components had been flown in from India, had been delivered to Bengaluru last year.

However, in further testing, one of the key components, a 12-metre large antenna, was discovered to be in need of some improvements. The spacecraft had to be shipped back to the United States earlier this year for the upgrade. ISRO, in the meanwhile, had maintained that it was still hopeful for a launch in the second half of the year. The response to the Parliament question, however, shows that the launch might not be part of the plan this year.

It listed at least six missions that would be launched in the next five months, including the first unmanned flight under the Gaganyaan programme. The Spadex, or Space Docking Experiment, mission that will demonstrate ISRO's capability to join or assemble parts of a satellite in space is also expected to be launched. Spadex will lay the groundwork for ISRO's plans to build a permanent space station by 2030.

Docking is a process where two spacecrafts, both moving at extremely high speeds but not relative to each other, are aligned in a precise orbit and joined together — a capability necessary for joining

different modules in space to create a space station. ISRO chairman S Somanath has previously said that this mission was likely by November or December.

A TDS-01 mission, that is meant to be technology demonstration for an electronic propulsion system designed by Institute for Plasma Research-Gandhinagar, would also be launched later this year, ISRO said. Besides these, navigation satellite NVS-02, meant for the country's IRNSS constellation, will be carried by a GSLV rocket. ISRO plans to carry out a launch of the newly-introduced SSLV (Small Satellite Launch Vehicle) rocket as well.

<https://indianexpress.com/article/technology/science/nisar-missing-from-isros-plan-mission-unlikely-this-year-9476215/>



Thu, 25 July 2024

ISRO is developing reusable rockets, spaceplane for affordable access to space

New Delhi: Earlier in the year, ISRO revealed that its reusable spaceplane was dubbed 'Pushpak', a deviation from the straightforward naming conventions the Indian space agency uses for its launch vehicles. ISRO is conducting tests on a prototype of the spaceplane, that is being built along the lines of the iconic Space Shuttles of NASA. The Pushpak is actually closer in design to the secretive X-37B spaceplane of the US military, as well as the Chinese counterpart which is so secretive that even its name is not known.

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ISRO's reusable rockets

In his response, Space Minister Jitendra Singh noted, "ISRO has initiated the development activities towards the demonstration of Vertical Take-off and Vertical Landing (VTVL), which is an enabling technology for recovery and reuse of booster stages of heavier launch vehicles. ISRO is also working on the critical technologies for Scramjet propulsion, which will be useful during the atmospheric phase of the flight of a launch vehicle, as the oxidizer for the fuel is derived from the atmosphere itself. This reduces the need for carrying the oxidizer along with the fuel and will benefit in bringing down the cost of access to space."

ISRO has recently successfully demonstrated its scramjet technology with its most powerful sounding rocket. Rocket engines typically use both the propellant and an oxidizer, which they carry

in closed tanks. The scramjet engine use the ambient atmospheric air moving at high speeds through the vehicle as the oxidizer, with air intake systems to capture and compress the air.

<https://www.news9live.com/science/isro-is-developing-reusable-rockets-spaceplane-for-affordable-access-to-space-2630429>



Thu, 25 July 2024

Epsilon Indi Ab: The First Directly Imaged Mature Exoplanet Close to Earth

In a remarkable discovery, an international team of astronomers, including Dr Prashant Pathak from IIT Kanpur, has identified a giant planet orbiting a star similar to our Sun. Named Epsilon Indi Ab (Eps Ind Ab), this “super-Jupiter” is the first mature exoplanet to be directly imaged using the James Webb Space Telescope (JWST). The findings, published in the prestigious journal “Nature”, mark a significant milestone in space exploration.

The Discovery Process

The breakthrough was achieved using the JWST’s Mid-InfraRed Instrument (MIRI), which enabled the direct imaging of the exoplanet. Eps Ind Ab orbits the K5V-type star Epsilon Indi A, located approximately 12 light-years from Earth. Unlike traditional methods that infer the existence of exoplanets through gravitational influences or the dimming of starlight, direct imaging allows scientists to observe the planet itself. This technique is particularly challenging due to the overwhelming brightness of host stars, which can obscure the faint light from orbiting planets.

To overcome this, the team used a coronagraph on the JWST’s MIRI camera, effectively creating an artificial eclipse to block the starlight. This allowed the detection of faint signals from Eps Ind Ab. The planet’s proximity to Earth and the JWST’s advanced capabilities were crucial in this successful observation.

Characteristics of Epsilon Indi Ab

Eps Ind Ab is a super-Jupiter, boasting a mass at least six times greater than Jupiter, making it significantly larger than any planet in our solar system. It is relatively cold, with a temperature around -1°C (30°F), and orbits its star at a distance 28 times greater than the Earth-Sun distance. This vast orbit contributes to its lengthy orbital period of approximately 200 years. The planet’s atmosphere shows an unusual composition, with a high metal content and a distinct carbon-to-oxygen ratio compared to planets in our solar system. These findings open new avenues for understanding planetary formation and evolution.

Insights from the Research Team

Dr Prashant Pathak, a key member of the research team, emphasized the significance of this discovery. “This discovery is exciting because it gives us a chance to learn more about planets that

are very different from our own. By studying Eps Ind Ab and other nearby exoplanets, we hope to gain a deeper understanding of planetary formation, atmospheric composition, and the potential for life beyond our solar system.”

Elisabeth Matthews from the Max Planck Institute for Astronomy in Germany, and the lead author of the research article, highlighted the challenges and surprises faced during the discovery. “To our surprise, the bright spot that appeared in our MIRI images did not match the position we were expecting for the planet. Previous studies had incorrectly estimated the planet’s mass and orbital separation. With the help of the JWST, we were able to set the record straight.”

The Path Forward

The discovery of Eps Ind Ab is just the beginning. The next step involves obtaining spectra to provide a detailed fingerprint of the planet’s climatology and chemical composition. Thomas Henning, Emeritus Director at the Max Planck Institute for Astronomy and co-PI of the MIRI instrument, expressed the team’s long-term goals. “We hope to also observe other nearby planetary systems to hunt for cold gas giants that may have escaped detection. Such a survey would serve as the basis for a better understanding of how gas planets form and evolve.”

Global Collaboration

This discovery was made possible through a collaboration of researchers from renowned institutions worldwide, including the Max Planck Institute for Astronomy in Germany, the Space Telescope Science Institute in the USA, IIT Kanpur in India, and several other leading research organizations. This global effort highlights the collective pursuit of knowledge and the advancement of our understanding of the universe.

Bottomline

As astronomers continue to explore distant worlds, each new finding brings us closer to unravelling the mysteries of the cosmos and understanding the vast array of planetary systems beyond our own. This pioneering discovery serves as a testament to human curiosity and the relentless pursuit of knowledge, inspiring future generations of scientists and space enthusiasts alike.

<https://www.financialexpress.com/business/defence-epsilon-indi-ab-the-first-directly-imaged-mature-exoplanet-close-to-earth-3564856/>



Fri, 26 July 2024

SpaceX's Falcon 9 cleared to return to space, FAA says

SpaceX's Falcon 9 rocket has been cleared to return to space by the U.S. aviation regulator after it was grounded by a rare mid-flight failure, the Federal Aviation administration (FAA) said on Thursday.

The FAA said it did not find any public safety issues in the anomaly that occurred during the failed July 11 launch and the rocket can return to flight operations while the overall investigation continues.

SpaceX said in a post on X that it was ready to return the rocket to flight as soon as Saturday, July 27.

Falcon 9, which is the world's most used rocket, was grounded after one broke apart in space and doomed its payload of Starlink satellites, the first failure in more than seven years of a rocket relied upon by the global space industry.

In a statement on Thursday, SpaceX said that a liquid oxygen leak led to excessive cooling of one of its engine components and damaged its hardware.

"A crack in a sense line for a pressure sensor" was identified as the cause of the leak and that the failed sense line and sensor on the second stage engine will be removed for near term launches, SpaceX added.

Falcon 9 is the only U.S. rocket capable of sending NASA crews to the International Space Station. NASA is expecting to launch its next astronaut mission in August, with SpaceX's Crew Dragon astronaut capsule launching atop the rocket.

<https://www.reuters.com/technology/space/spacexs-falcon-9-cleared-by-authorities-return-space-faa-says-2024-07-26/>



Thu, 25 July 2024

India Showcases Space Technology at Australian Space Forum

The Indian National Space Promotion and Authorization Centre (IN-SPACe) showcased India's growing space technology capabilities at the 17th Australian Space Forum in Adelaide. A delegation of Indian space startups, led by Dr. Vinod Kumar, Director Promotion, IN-SPACe, and Shashank Saxena, Deputy Director IN-SPACe, attended the forum from July 24-25.

Participants included representatives from Indian companies such as Agnikul Cosmos, TakeMe2Space, Dhruva Space, Bellatrix Aerospace, XDLINX Space, mistEO, OrbitAid Aerospace, and Skyroot Aerospace. The delegation highlighted cutting-edge space projects, products, and services, engaging in numerous business-to-business meetings with Australian counterparts.

Two significant Memorandums of Understanding (MoUs) were signed during the forum. The first MoU was between HEX20, an Australian satellite platform company, and OrbitAid, an Indian company specializing in satellite life extension solutions. This partnership will focus on in-orbit refuelling technology demonstrations.

The second MoU was signed between HEX20 and TakeMe2Space, an Indian startup building AI-driven compute and storage satellite infrastructure. This collaboration aims to integrate TakeMe2Space's AI modules and subsystems into HEX20's flatsats and provide access to TakeMe2Space's OrbitLab platform for researchers and students to test and run their models on actual satellites in real-time.

Both MoUs were signed in the presence of Dr Vinod Kumar and Enrico Palermo, Head of the Australian Space Agency.

Dr Kumar emphasized the importance of the forum, stating, "The Australian Space Forum provided an invaluable platform for Indian space startups to showcase their capabilities and explore potential collaborations with Australian partners. These MoUs represent a significant step towards strengthening ties between our two nations in the space sector."

The forum underscored India's growing influence in space technology and its commitment to fostering international collaborations to advance space exploration and innovation.

<https://www.financialexpress.com/business/defence-india-showcases-space-technology-at-australian-space-forum-3564813/>

