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A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

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Tue, 08 March 2022

Under the hood: DRDO to build a cargo UAV for Himalayan frontier

By Kartik Wali

DYSL (CT) lab works in the area of design and development of Cognitive Radio and Cognitive Radar Systems, realising through deep neural networks and reinforcement learning algorithms.

On February 7, Defence Research and Development Organisation (DRDO)'s Young Scientist Laboratory program (DYSL) was tasked with creating a new class of unmanned aerial vehicle (UAV) capable of flying in areas of high altitude with a payload capacity of 50kg to carry out logistic operations in the Himalayan frontier—as announced in the AAV seminar 2022.

Young Scientist Laboratory program is an initiative formed with a group of five research establishments: All personnel including the scientists and the directors are below the age of 35. Located in Bengaluru, Chennai, Hyderabad, Kolkata, and Mumbai, the core focus areas of DYSL include artificial intelligence, cognitive technologies, asymmetric technologies, smart materials, and quantum technologies.

In a recent proposal seeking development partners, DYSL outlined the requirement for an octocopter with a carbon composite air-frame having a gross weight (inclusive of payload) of 80kg. The octocopter is required to airlift a payload of 50 kg at mean sea level and about 20kg at extremely high altitudes of 15,000 feet. The drone should be able to operate in cold temperatures up to negative 20 degrees Celsius.

Challenges

Operating a drone in a harsh environment is an uphill task. The lower air density in high altitude areas makes it difficult to control a drone. Freezing temperatures tend to drain the batteries so the drone has a shorter flight time. A research paper by Irina K Romanova on drones used in mountain ranges reveals the two biggest challenges faced while flying a drone in mountain ranges:

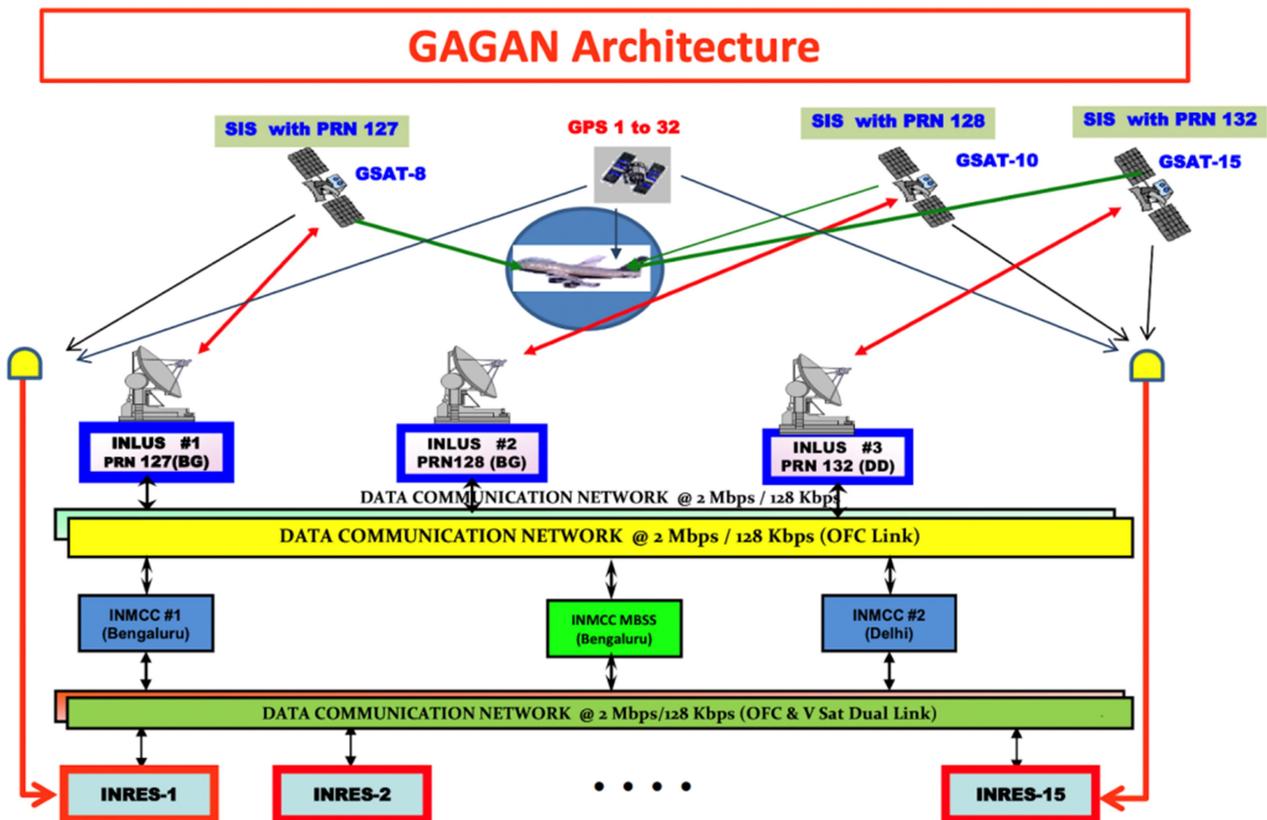
- Communication is tricky in the mountain ranges as satellite networks, broadband, radio, etc. are limited due to the remoteness of the location and lack of proper infrastructure. Due to extreme weather conditions, one may experience a lot of delays, limited bandwidth and many such difficulties. Sub-zero temperatures and the accumulation of snow makes the maintenance and development of broadband technologies quite difficult.
- Collision avoidance is one of the most difficult challenges when dealing with drones in mountain ranges. It is usually based on two components; collision detection using sensors/algorithms and a protocol to determine what participating agents should do to prevent such collisions. Therefore, it is important to understand the features of the network that the UAV is compatible with.

Recent advancements

DYSL (CT) lab was set up for providing cutting edge technology to DRDO in the cognitive field. The lab works in the area of design and development of Cognitive Radio and Cognitive Radar Systems, realising through deep neural networks and reinforcement learning algorithms.

Below, we list the significant tech developments from India over the past decade:

- Mission Sensor Technology: As part of the UAV program, the Aeronautical Development Establishment (ADE) two-axes two-gimbal stabilised payload assemblies for medium altitude air vehicles. This enables the drones to carry multi-mode payloads with medium-range target acquisition and day-night tracking.
- GAGAN(GPS and Geo-augmented navigation system): India's initiative to establish a regional satellite-based augmentation system (SBAS).



The system improves the accuracy of global navigation satellite system (GNSS) receivers by sending reference signals. The end goal is to develop a navigation system that can be utilised for all stages of flight over Indian airspace and the surrounding areas.

- NETRA: This is an indigenous airborne early warning and control system. The joint venture by DRDO and Indian Air Force showcases its unique Active Antenna Array Unit (AAAU) and secondary surveillance radar capabilities.

Link: <https://analyticsindiamag.com/under-the-hood-drdo-to-build-a-cargo-uav-for-himalayan-frontier/#:~:text=On%20February%207%2C%20Defence%20Research,in%20the%20Himalayan%20frontier%E2%80%933as>

Wed, 09 March 2022

Def Min moves Cabinet to set up independent weapon testing- certification agency

The umbrella body will ensure that private players in Indian defence sector are not at the mercy of government labs and testing facilities for getting their hardware certified for domestic use and exports.

As a first major step towards “Atmanirbharta” vision of Prime Minister Narendra Modi, the Defence Ministry has approached the Union Cabinet to green light setting up of an independent nodal umbrella body to meet the wide-ranging testing and certification requirements of weapon systems developed and manufactured by Indian private sector.

While the independent testing and certification body was envisaged in the Union Budget this year, the move is a huge step towards decoupling the Indian private defence sector industry from the clutches of the humongous veto exercising military bureaucracy on the Raisina Hill. By painting the private players as mere profiteers, the Indian military industrial complex has been at the mercy of these mandarins who are fantastic in promise but very low on delivery.

The new independent authority will ensure that private sector is not at the mercy of government’s laboratories and testing ranges for getting their equipment approved for both domestic sales and exports. With 68 per cent of defence capital procurement budget earmarked for domestic industry this financial year, it is time that the private defence sector took advantage of this move and started towards manufacturing high end products likes armed drones, autonomous combat vehicles, aircraft engines and submarines by setting up SPVs with western defence majors who are willing to set up shop in India.

The Russia-Ukraine war and the ensuing sanctions by the west reveal that the Indian private sector will have to hit the ground running as there will be a premium on self-reliance in military hardware all over the world. With the possibility of Russia being bogged down in Ukraine war increasing by the day, the spares and ammunition requirements for Russian origin weapon systems with India will run of the risk of sudden cut in the supply chains as Moscow ‘s priority will be war in the west. And last-minute replacements or acquisitions are going to cost a packet.

The “Atmanirbharta” model of PM Modi is crucial for a country that has legitimate ambitions and capability for the global high table, but will the setting up of a nodal body of testing and certification be able to herald a new era in Indian defence sector. The answer is a no unless this is accompanied with strong reforms in departments under Defence Minister Rajnath Singh as the military establishment of India is like a Mammoth that is steeped in imperial legacy and moves at its own will and pace. There is a need for total revamp of the defence military planning and forecasting so that India develops latest technologies and futuristic weapon systems. It is a sobering thought that even a country like Turkey has developed Bayraktar TB2 armed drones in 2014 and have been put to good use by the Armenians in 2020 Nagorno-Karabakh war and now the Ukrainians are using it against Russian tanks despite huge military asymmetry between the two

rivals. Armed drones, simulators for Apache and Chinook helicopters are areas that the private sector could deliver as young Indian entrepreneurs are bustling with energy and willing to participate in nation building with legitimate profits.

Before 2014, Indian defence sector catered to a military that kept silent on China and showed aggression on Pakistan. Fact is that strategic roads were not built up to China border for the fear that the PLA may use them to enter India. The May 2020 transgressions by the PLA in East Ladakh have rudely woken the Indian military establishment to the real threat on both land and high seas. Post Ukraine, self reliance or Atmanirbharta is the only panacea to deal with an uncertain world.

Link: <https://www.hindustantimes.com/india-news/def-min-moves-cabinet-to-set-up-independent-weapon-testing-certification-agency-101646797604677.html>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 08 March 2022 5:18PM

चीफ ऑफ स्टाफ कमेटी के कार्यवाहक अध्यक्ष ने मैकग्रेगर मेमोरियल मेडल प्रदान किए

जनरल एमएम नरवणे, कार्यवाहक अध्यक्ष चीफ ऑफ स्टाफ कमेटी (सीओएससी) और सेनाध्यक्ष ने चार पुरस्कार विजेताओं को प्रतिष्ठित यूएसआई मैकग्रेगर मेमोरियल मेडल प्रदान किया, जिनमें से भारतीय थलसेना से दो और भारतीय नौसेना व भारतीय वायुसेना से एक-एक विजेता शामिल थे। इन्हें सामरिक गतिविधि संबंधी सैनिक सर्वेक्षण और चरम साहसिक खेलों में उनकी उत्कृष्ट उपलब्धियों के लिए पदक प्रदान किए गए। राष्ट्रीय सुरक्षा और सैन्य मामलों पर शोध और परिचर्चा के लिए 1870 में स्थापित भारत के सबसे पुराने तीनों सेना के थिंक टैंक यूनाइटेड सर्विस इंस्टीट्यूशन (यूएसआई) में पुरस्कार समारोह का आयोजन किया गया। इस समारोह में भारतीय सेना के शीर्ष स्तर के अधिकारी और सशस्त्र बलों के कर्मियों ने हिस्सा लिया।

मैकग्रेगर मेमोरियल मेडल की स्थापना 3 जुलाई 1888 को मेजर जनरल सर चार्ल्स मेटकाफ मैकग्रेगर, केसीबी, सीएसआई, सीआईई, यूएसआई के संस्थापक की स्मृति में की गई थी। आरंभ में यह पदक सैन्य टोही और मध्य एशिया, अफगानिस्तान, तिब्बत और बर्मा में ब्रिटिश सेना के अभियानों जैसे खोजी यात्रा के लिए प्रदान किया जाता था। स्वतंत्रता के बाद साहसिक गतिविधियों के लिए भी यह पदक देने का निर्णय लिया गया। यह पदक भारतीय सशस्त्र बलों, प्रादेशिक सेना और असम राइफल्स के सेवारत और सेवानिवृत्त सभी रैंकों के लिए खुला है।

चार पुरस्कार विजेताओं के प्रशस्ति पत्र की मुख्य विशेषताएं इस प्रकार हैं: संजय कुमार, चीफ ईए (पी), भारतीय नौसेना, कार्यकाल 2018 - 2019। उन्होंने ला अल्ट्रा 111 किलोमीटर में भाग लिया, जो अगस्त 18 में खारदुंगला दर्रे को पार करने सहित सबसे कठिन दौड़ थी। उन्होंने 18 सितंबर को सोलांक स्काई अल्ट्रा (60 किलोमीटर) में नौसेना टीम में पहला स्थान हासिल किया और

दिसंबर 18 में 12 घंटे स्टेडियम की दौड़ (110 किलोमीटर) में उपविजेता रहे। उन्होंने 19 जून को हेल रेस (211 किलोमीटर) के पांच उच्च प्रारूपों को भी जीता और अगस्त 19 को मुंबई - गोवा अल्ट्रा रिले (563 किलोमीटर) में नया इंडिया बुक ऑफ रिकॉर्ड बनाया।

आर्मी एडवेंचर नोडल सेंटर (हेंग ग्लाइडिंग), स्कूल ऑफ आर्टिलरी, देवलाली के हवलदार (ओपीआर) (अब नायब सूबेदार) संजीव कुमार ने 12 दिसंबर 2018 को 8 घंटे 43 मिनट तक हवा में रहकर पावर्ड हार्नेस हेंग ग्लाइडर में 313.13 किमी के पिछले रिकॉर्ड को तोड़ते हुए सूरतगढ़ से बाड़मेर, राजस्थान, 465.33 किलोमीटर की दूरी तय कर एक नया विश्व रिकॉर्ड बनाया। उनकी उपलब्धि को लिम्का बुक ऑफ रिकॉर्ड्स, इंडिया बुक ऑफ रिकॉर्ड्स और एशिया बुक ऑफ रिकॉर्ड्स द्वारा मान्यता दी गई है।

भारतीय वायु सेना के डायरेक्टर आर्म्ड एडवेंचर के एमडब्ल्यूओ अंशु कुमार तिवारी को भारतीय सशस्त्र बलों की हवाई क्षमता का प्रदर्शन करने के लिए खारदुंगला दर्रे (17982 फीट) पर पैराशूट लैंडिंग की व्यवहार्यता की जांच करने का काम सौंपा गया था। उसमें, उन्होंने 8 अक्टूबर 2020 को 24000 फीट से सफलतापूर्वक छलांग लगाई, जिससे दुनिया के इतिहास में पहली बार इस महत्वपूर्ण पैराशूट प्रणाली की परिचालन वैधता स्थापित हुई।

पैरा स्पेशल फोर्स बटालियन के मेजर अजय कुमार सिंह ने लद्दाख के काराकोरम से उत्तराखंड तक 1660 किलोमीटर लंबे एआरएमईएक्स-21 (स्की अभियान) की योजना बनाई, प्रशिक्षित और सफलतापूर्वक नेतृत्व किया, 119 दिनों के लिए 'उच्च हिमालय' में 18000 फीट से ऊपर 26 ऊबड़-खाबड़ दर्रा को सर्दियों के दौरान पार किया। इस खोज से अत्यधिक ऊंचाई वाले इलाके में सैन्य अभियानों के लिए बेहतर समझ और क्षमताएं विकसित हुई हैं।

स्वतंत्रता से पूर्व पुरस्कार विजेताओं के एक समूह में कैप्टन एफई यंगहसबैंड (1890) को तिब्बत में अभियान के लिए और मेजर जनरल चार्ल्स विंगेट ने बर्मा में चिंदित ऑपरेशन के लिए चुना गया। स्वतंत्रता के बाद मेजर जेडसी बखशी, वीआरसी को सैन्य टोही के लिए 1949 में प्रतिष्ठित पदक से सम्मानित किया गया, कर्नल नरिंदर कुमार - सियाचिन ग्लेशियर (1978-81), स्क्वाड्रन लीडर राम करण मकर और फ्लाइट लेफ्टिनेंट राणा टीएस छिना - काराकोरम में हेलीकॉप्टर रेकी (1986), विंग कमांडर राहुल मोंगा और विंग कमांडर अनिल कुमार - एक माइक्रोलाइट विमान में विश्व अभियान (2007), कमांडर दिलीप डोंडे - याच में ग्लोब का एकल सर्कुलेशन (2010), लेफ्टिनेंट कमांडर अभिलाष टॉमी - के तहत ग्लोब का एकल और नॉनस्टॉप सर्कुलेशन पाल (2013)

इस अवसर पर जनरल नरवणे ने भारत की सामरिक संस्कृति और भविष्य के सैन्य नेताओं को पेशेवर संवारने में उनके महान योगदान के लिए यूएसआई की सराहना की। उन्होंने सैन्य अन्वेषणों और चरम साहसिक खेलों की विरासत को आगे बढ़ाने में यूएसआई की भूमिका की भी सराहना की। उन्होंने पुरस्कार विजेताओं को उनकी असाधारण प्रतिभा, धैर्य और दृढ़ संकल्प के लिए बधाई दी। उन्होंने कहा कि भारतीय सशस्त्र बल असाधारण प्रतिभा से संपन्न हैं और पुरस्कार विजेताओं के कारनामे दूसरों को प्रेरित करेंगे और संगठन और भारत के लिए पुरस्कार और गौरव लाने के लिए उनके उदाहरण का अनुकरण करने के लिए प्रेरित करेंगे।

Link: <https://pib.gov.in/PressReleasePage.aspx?PRID=1804212>



**Press Information Bureau
Government of India**

Ministry of Defence

Tue, 08 March 2022 5:18PM

**Macgregor Memorial Medals Presented By Officiating Chairman
Chiefs Of Staff Committee**

General MM Naravane, officiating Chairman Chiefs of Staff Committee (COSC) and Chief of Army Staff presented the prestigious USI MacGregor Memorial Medal to four awardees; two from the Indian Army and one each from Indian Navy and Indian Airforce, for their outstanding achievements in operational reconnaissance and extreme adventure sports. The award ceremony was held at the United Service Institution (USI), India's the oldest tri-service think tank established in 1870 for research and debate on national security and military affairs. The ceremony was attended by the Indian military top-brass and Armed Forces personnel.

MacGregor Memorial Medal was instituted on 03 July 1888 to commemorate the memory of Maj Gen Sir Charles Metcalfe MacGregor, KCB, CSI, CIE, the founder of USI. Initially this medal was awarded for military reconnaissance and journeys of exploration such as British Army expeditions in Central Asia, Afghanistan, Tibet and Burma. After independence, it was decided to award this medal for adventure activities as well. The medal is open to all ranks, serving and retired, of the Indian Armed Forces, Territorial Army and Assam Rifles.

Highlights of citations of four awardees are as follows

Sanjay Kumar, Chief EA (P), of Indian Navy, during 2018 – 2019. He participated in La Ultra 111 Kms, toughest race including crossing of Khardungla Pass in Aug 18. He secured 1st position in Navy Team in Solanq Sky Ultra (60 Kms) in Sept 18 and secured runners up in 12 hours Stadium Run (110Kms) in Dec 18. He also won High 5 Format of Hell Race (211 Kms) in June 19 and set new India Book of Records in Mumbai – Goa Ultra Relay (563 Kms) in Aug 19.

Hav (Opr) (now Naib Subedar) Sanjeev Kumar of Army Adventure Nodal Centre (Hang Gliding), School of Artillery, Devlali created a new world record in powered harness hang glider on 12 Dec 2018 by staying aloft for 8 hours & 43 minutes, from Suratgarh to Barmer, Rajsthan, over a distance of 465.33 kms. His achievement has been recognised by Limca Book of Records, India Book of Records and Asia Book of Records; breaking the previous record of 313.13 km.

MWO Anshu Kumar Tiwari of Directorate of Adventure, Indian Airforce was tasked to check feasibility of parachute landing at Khardungla pass (17982 feet), to demonstrate the airborne capability of Indian Armed Forces. In that, he undertook the jump successfully from 24000 ft on 8th Oct 2020, thereby establishing the operational validity of this critical parachute system first time ever in international history.

Maj Ajay Kumar Singh of a Para Special Forces Battalion, planned, trained and successfully led a 1660 km long ARMEX 21 (ski expedition) from Karakoram in Ladakh to Uttarkhand, across 26 rugged passes above 18000 feet in "the great Himalayas" for 119 days during winters. The exploration has led to better understanding and capabilities for military operations in super high-altitude terrain.

Pre- independence amongst a galaxy of awardees stand out Capt FE Youngusband (1890) for expedition to Tibet and Maj Gen Charles Wingate for Chindit operations in Burma. Post-independence the prestigious medal was awarded to Major ZC Bakshi, VrC for military recce in 1949, Col Narinder Kumar - Siachen glacier (1978-81), Sqn Ldr Ram Karan Makar & Flt Lt Rana

TS Chhina - Helicopter recce in Karakorams (1986), Wg Cdr Rahul Monga & Wg Cdr Anil Kumar - World expedition in a microlight aircraft (2007), Cdr Dilip Donde - Solo circumnavigation of the globe in yacht (2010), Lt Cdr Abhilash Tomy - Solo and nonstop circumnavigation of the globe under sail (2013)

Speaking on the occasion, Gen Naravane complimented the USI for their great contribution to India's strategic culture and professional grooming of future military leaders. He also appreciated the role of USI in carrying the legacy of military explorations and extreme adventure sports. He congratulated the awardees for their exceptional talent, grit and determination. He said that Indian Armed Forces are endowed with exceptional talent and the feats of the awardees will inspire and motivate others to emulate their example to bring laurels and glory to the organisation and India.

Link: <https://pib.gov.in/PressReleasePage.aspx?PRID=1804010>



Press Information Bureau

Government of India

Ministry of Defence

Tue, 08 March 2022 6:31PM

Delhi Commission for Women felicitates BRO officers for their inspirational roles on International Women's Day

- *BRO progressively inducted large number of women in its workforce, from officers to the level of Casual Paid Labourers (CPLs)*
- *BRO has adopted 'Gender Neutral Approach' and 'Zero Tolerance for Discrimination in Any Form'*
- *Women are being given equal opportunities and roles in various tasks and areas in the organisation*
- *In the year 2021-22, BRO undertook key reforms with the aim of 'Nari Shashaktikaran' by giving women independent leadership roles*

Delhi Commission for Women (DCW) felicitated four women officers from Border Roads Organisation (BRO) who have set exemplary standards in being inspirational leaders, by bestowing them with the 'International Women's Day Award', in New Delhi on the occasion of International Women's Day on March 08, 2022.

Among the proud awardees is Executive Engineer Ms Vaishali S Hiwase, who became the first General Reserve Engineer Force (GREF) Woman Officer to assume command responsibility of a Road Construction Company (RCC). Working in a difficult area in Uttarakhand, she is responsible for an important Indo-Tibet Road connecting Munisairi-Bughdiar-Milam in very challenging terrain and weather conditions.

The second recipient of the award is Major Aaina Rana, who not only became the first Indian Army woman officer to command an RCC, but also established the first All Woman RCC, wherein all her Platoon Commanders are also Women Officers, thereby enabling women establish a distinct identity for themselves.

The third woman bestowed the honour is Executive Engineer Obing Taki, commanding another RCC, in the North-East region, she is credited with constituting an all-woman work force and successfully undertaking the task of de-launching Bailey Bridges, a task thus far performed only by men.

The fourth recipient, Colonel Navneet Duggal, from Corps of Electrical & Mechanical Engineers, is the senior-most woman officer in the BRO, recently promoted to the rank of Colonel; she is heading an independent field workshop, located in Srinagar, and is responsible for the up-keep and maintenance of heavy equipment.

Speaking on the occasion, DG BR Lt General Rajeev Chaudhry reaffirmed his confidence in the abilities of the women members of the BRO. He also appreciated the efforts of the Delhi Commission for Women in recognising the achievements of these strong-willed women, in the 75th Year of Independence. He also conveyed that in the BRO, women empowerment, in the truest sense, has been achieved by incorporating an attitudinal change in the areas where women are being employed. This is achieved by treating Women with proper respect, dignity, fairness and equality and most importantly empowering them with adequate responsibilities and resources to execute various organisational tasks.

Lt General Chaudhry also spoke of the initiatives taken by BRO for the betterment of Women Civil Paid Labourers, who work in difficult working conditions by improving their quality of life, imparting education to their girlchild as part of social welfare programmes and assisting them in managing their own finances and documentation.

Link: <https://pib.gov.in/PressReleasePage.aspx?PRID=1804046>



Tue, 08 March 2022

On Women's Day, Army Chief Naravane visits AWWA exhibition in New Delhi

The AWWA has organized a Pan India exhibition for its artists and entrepreneurs at various locations in the country including Udhampur, Jaipur, Bhatinda among other cities.

On the occasion of International Women's Day, Indian Army Chief General MM Naravane visited the exhibition of artists and entrepreneurs organized by the Army Wives Welfare Association (AWWA) at DLF Promenade Mall, Vasant Kunj, New Delhi on Tuesday.



General MM Naravane, the Chief of Army Staff visited the exhibition of artists and entrepreneurs organized by the Army Wives Welfare Association (AWWA) at DLF Promenade Mall, Vasant Kunj, New Delhi

The AWWA organized a Pan India exhibition for its artists and entrepreneurs at various locations in the country including Udhampur (Chinar Complex), Jaipur (Jawahar Kala Kendra), Bhatinda (Mittal Mall), Hisar (Miraj Mall), Lucknow (MB Club), Kolkata (Academy of Fine Arts, Rabindra Sadan), Chandigarh (Elante Mall) and Pune (SGS Mall) from March 5-8, 2022.

The Army Chief appreciated the effort showcasing their

art and entrepreneurial skills thereby revealing their creative side, apart from being a pillar of strength to her husband, a loving mother to her kids, a companion to her friends and a professional.

Over 600 plus registrations were done by the Army Wives to showcase their arts and business idea, which are shortlisted and exhibited on Women's Day, an apt day to highlight the artistic side of ladies from the Armed Forces fraternity.

The visit of the Army Chief has rendered support to the celebration of achievements of women of the Armed forces fraternity in various cultural and socio-economic fields. The COAS was appreciative of the talent and innovative ideas put on display by the ladies and motivated them to take an active part in such initiatives.

Link: <https://www.indiatvnews.com/news/india/international-women-s-day-army-chief-mm-naravane-visits-awwa-exhibition-new-delhi-photos-2022-03-08-763330>



Wed, 09March 2022

Navy to induct women cadets from NDA: Centre to Supreme Court

The Indian Navy has decided to induct women cadets from the National Defence Academy (NDA), the Centre told the Supreme Court on Tuesday.

Additional Solicitor General Aishwarya Bhati informed a Bench led by Justice Sanjay Kishan Kaul that the Navy had decided to induct women through the NDA — education, logistics and Naval Armament Inspectorate. She said the Centre had filed an affidavit in this regard.

“Your Lordships kept the matter for International Women’s Day, Milords. Some people say it’s symbolism, but I think it’s necessary,” Bhati said.

She said the Navy didn’t have direct induction of women or men through the NDA. However, in view of the court’s direction to give Permanent Commission to women officers they were allowed entry and now the Navy has decided to induct cadets from the NDA in three branches.

“The induction of women cadets in NDA has been a major policy decision. The respondents need sufficient time for deliberating implications in the long term for induction and deployment of ex-NDA women cadets in the Indian Armed Forces. It is, therefore, submitted that the respondents require at least three months’ additional time towards this,” read the Centre’s affidavit.

The intake of women in the NDA will depend upon the induction of women in the armed forces, it added.

The Bench recorded that it was the first instance that a male or female cadet would be trained at the NDA for direct induction as PC officers in the three branches, as at present no PC male officer is directly inducted to these branches to the NDA.

The Bench refused to deal with the issue of reservation of seats for SCs, STs, and Other Backward Classes in the NDA, saying, “Social revolution does not come overnight and takes time.”

The top court said that for the time being, it would only go into the issue of admissions of women in these education institutions which had been only for boys all along. It listed the matter for further hearing on July 19.

Link: <https://www.tribuneindia.com/news/nation/navy-to-induct-women-cadets-from-nda-centre-to-top-court-376193#:~:text=The%20Indian%20Navy%20has%20decided,the%20Supreme%20Court%20on%20Tuesday.>



Wed, 09 March 2022

Indian Defence Equipment That Use Spares, Maintenance Support from Ukraine Could be Hit Harder by War

About 60% of India's military hardware is Russian-origin, while several guns, tanks, weapon systems as well as gas turbine engines of ships get their spares from Ukraine.

The ongoing Russia-Ukraine war might have a far bigger impact on some of the critical equipment in the inventory of the Indian Armed Forces which get their spares and other maintenance support from Ukraine, senior defence officials told News18.com.

As reported by News18.com earlier this week, the Indian defence establishment is primarily concerned about the impact the conflict may have on the supply of spares and after-sales support for some of the Russian-origin equipment that form the mainstay of the Army, Navy and the Indian Air Force.

Other planned capital procurements from Russia, such as VISHORAD systems and the Ka-226T utility helicopters, have been put on hold. About 60% of India's military hardware is Russian-origin.

A top defence official told News18.com that while with Russia, the government is exploring different options, including diplomatic routes, to keep the spares' supply and deliveries of major equipment like the S-400s going, a bigger challenge would be to get spares from war-ravaged Ukraine.

"The extent of damage to Ukraine's military infrastructure is yet to be ascertained. It has to be assessed if the production lines for supply of spares for the various equipment and weapon systems in use with the Indian Armed Forces are operational or have seen damages in the conflict," an official said.

Defence sources said some of the critical equipment that get their spares from Ukraine include the 130mm medium guns, spares for T-72 tanks as well as the T-90 tanks, the OSA-AK surface-to-air missile system, and Tunguska anti-aircraft weapon system.

The gas turbine engines of several ships of the Indian Navy also come from Ukraine and the country has also been providing critical parts for the upgrade of the IAF's transport aircraft AN-32, a programme which has been nearly completed.

Ukraine, sources said, was also aiming to bag a contract from India on the upgrade of Smerch multiple rocket launcher system.

A defence source said a large part of the defence design bureaus and the manufacturing facilities of the erstwhile Soviet Union are now in Ukraine. “Ukraine had also shown interest in participating in other hi-tech programmes of the Indian Armed Forces, such as in supply of anti-UAV systems and upgrade programme of tanks which are in the pipeline,” the source said.

<https://www.news18.com/news/india/indian-defence-equipment-that-use-spares-maintenance-support-from-ukraine-could-be-hit-harder-by-war-4852928.html>



Wed, 09 March 2022

Russia in talks with India to continue defence co-operation despite western sanctions, says Moscow’s deputy envoy to New Delhi

Roman Babushkin, Moscow’s deputy envoy to New Delhi, tells Anirban Bhaumik of DH that Russia is not in a war with the people of Ukraine, but launched a special military operation only to ‘denazify’ and ‘demilitarise’ the nation. He said that Moscow only wants to ensure that the territory of Ukraine is not used against Russia. The sanctions imposed on Russia by the US and other western nations will hit the global economy, he said.

Russia, however, remains committed to implementing all its agreements with India for supplying military hardware, including S-400 missile defence systems. The Deputy Chief of Mission of the Embassy of Russian Federation in New Delhi added that Moscow will share with the Government of India the findings of the probe into the death of Naveen Shekharappa Gyanagoudar, a resident of Karnataka in southern India, who was killed at Kharkiv in eastern Ukraine on March 1.

Why did Russia have to launch military operations in Ukraine? Couldn’t Russia and NATO have resolved the differences through dialogue?

Dialogue has always been and remains a priority choice of Russia. During three recent decades, we were engaged in various levels of conversation on European security.

After the collapse of the Soviet Union, Russia was assured numerous times that NATO would not expand and would not admit new members. But the US-led bloc not only cared little to adhere to its commitments but also was taking measures to dismantle dialogue architecture with Russia and continued to expand. In order to justify itself – since obviously after the cold war there was a problem of the NATO identity and purpose – they increasingly started conducting unfriendly activities, including anti-Russian military exercises and deploying more weapons in the region, which were against the security interests of Russia. After the western countries supported an unconstitutional coup in Ukraine in 2014, the NATO leaders started openly using Ukraine and its extreme nationalist neo-Nazi policies against Russia and everything related to Russia, even suppression of the Russianspeaking population of Ukraine and genocide against people, who didn’t recognise illegitimate Western-sponsored regime. Since 2014, around 14,000 people in Donetsk and Lugansk regions have been killed during ceasefire violations and targeted shelling. Kyiv authorities from the very beginning were not going to implement the Minsk Agreements and conduct a direct dialogue with Donetsk and Lugansk.

In recent years, NATO has intensified supplying military equipment and weapons to Ukraine exceeding thousands of tons. That was the condition when the Russian red lines were about to be crossed, and in December 2021 we went with proposals for NATO to ensure legally-binding security guarantees for Russia, including non-expansion of the bloc and disarmament control. But they ignored our proposal.

In fact, since the western nations were silent over what was happening in the eastern part of Ukraine, Russia in order to stop the war there had to launch a special military operation. It is aimed at denazification and demilitarisation of Ukraine. Russia is not waging war against Ukraine and its people. We are only fighting the ultranationalists and their neo-Nazi ideology to protect the people of Ukraine and not to allow its territory to be used against Russia.

For these purposes, the Russian Armed Forces are only using high-precision weapons to target the military infrastructure in Ukraine. They don't target civilians or civilian infrastructure. They are not using prohibited weapons. They are not capturing and taking civilians as hostages, unlike what is being rampantly done by the forces fighting for the nationalist regime of Ukraine.

How do you view India's stand and its abstentions from voting on the issue of the Russia-Ukraine conflict at the UN Security Council, General Assembly and Human Rights Council?

We welcome India's balanced and independent approach on the issue of Ukraine. It shows that India is a responsible global power. India has a very deep understanding of the crisis in Ukraine. It is also in India's national interest not to allow anyone to manipulate it or dictate what stand it should take on such issues in international platforms.

Will Russia share the findings of the probe into the death of 21-year-old medical student Naveen Shekharappa Gyanagoudar in Kharkiv in eastern Ukraine, apparently due to shelling? Can Russia help bring back home his mortal remains?

It is a very unfortunate incident. We are not sure about the circumstances that caused this tragedy. The Russian Armed Forces do not target civilians. If it was shelling, videos that went viral clearly show that a missile came from the western side. Let's also keep in mind that the Kyiv regime started disseminating weapons for free for everyone, including criminals, who were freed from prisons.

Among them are racists and neo-Nazis, and one of the versions is that the Indian student died in cross-firing. We will be interested in conducting an investigation into the incident and we will be sharing our findings with the Government of India and will coordinate on the issue of repatriation of his mortal remains.

Has Russia been in touch with India for the evacuation of its citizens from Ukraine? What did Russia do or what had Russia offered to do to facilitate the evacuation of India's citizens?

Currently, this is the priority issue in our dialogue on various levels, including between President Vladimir Putin and Prime Minister Narendra Modi. The Russian Government and the Russian Armed Forces are always ready and committed to do whatever they can to evacuate the citizens of India from Ukraine. All arrangements are there to receive the Indians at the Russian border. Already a couple of times we announced ceasefire to ensure safe evacuation, but the people are not let go by the Ukrainian nationalists, who even go beyond the control of Kyiv. Moreover, they often use civilians as human shields. That delays evacuation.

How do you view India's decision to send humanitarian assistance to Ukraine and its resistance to the US bid to expand the Quad's ambit to make it criticise Russia's military operations in Ukraine?

We view India's humanitarian assistance to Ukraine positively, for sure. Russia is also providing a lot of humanitarian assistance to the people of Ukraine, particularly in the cities which have been liberated. We are providing food, medicines and other essentials.

As far as the Quad is concerned, Prime Minister Modi made it clear that this mechanism should remain focused on its agenda, which has nothing to do with the situation in Europe. It's a strong message that India is not going to allow anyone to manipulate and pressurise it. The United States has an old habit of trying to politicise multilateral institutions to advance its own agenda. Unlike the US, Russia does not believe in coercing or blackmailing any of its friends.

The US has sought to draw a parallel between Russia's military operations in Ukraine and China's mobilisation of troops along its Line of Actual Control with India. What is your view?

The US is in fact trying to pressurise India to make it change its position on the issue of Ukraine. But each situation should be seen differently. The crisis in Ukraine was preceded by a sequence of particular events, decisions and actions by the western countries that ultimately led to Russia's military operations in Ukraine.

As far as the India-China boundary issue is concerned, it is completely different. As a sincere wellwisher of both India and China, Russia hopes that the two nations will be able to amicably resolve the border crisis through bilateral talks and mechanisms and without any external interference. We are not taking sides in this matter. What Russia really can do is to provide suitable platforms and opportunities to India and China to have more options for a constructive dialogue. For example, Foreign Ministers of India and China had a number of bilateral talks on the sidelines of the meetings of the Shanghai Cooperation Organization (SCO), including the ones held in Russia. This means that this platform is comfortable for both sides. There are other similar mechanisms, like the BRICS and the RIC, which provide good opportunities to expand common ground and create a positive atmosphere for negotiations. The US, on the other hand, is only trying to use this bilateral issue in its geopolitical purposes, provoking aggressive thinking and trying to use India in order to pursue its own agenda of containing China.

How will you deal with the challenges the western sanctions on Russia pose to Russia-India relations, including delivery of S-400 missile defence systems and other military hardware?

Neither India nor Russia recognises unilateral sanctions. The US and other western nations claim to be champions of human rights, but the unlawful unilateral sanctions they impose on nations in fact violate human rights and make common people suffer, as we have seen in Iran, North Korea and Syria.

The sanctions are becoming extraordinary these days. The unlawful sanctions imposed by the US and other nations not only target economic and financial systems, but affect everything. They are, for example, targeting Russian airlines and Russian media these days. They are even trying to bar Russia's representatives from participating in international sports and cultural events.

Such sanctions will certainly hit the global economy – you can see that the energy prices are increasing day by day because of the western sanctions policy. You cannot isolate a big country such as Russia from the global economy and global policy. By deciding to withdraw from Russia, the western companies are losing a huge market. And, as far as the Russian economy is concerned, we have been living under sanctions for years now. For us, there's not much new. There are many alternative options, including the expansion of mutually beneficial co-operation with the Asian nations, including India.

With India, we are trying to figure out ways to continue our co-operation and adapt the mechanisms of payments, some of them are already in place, including the use of national currencies, which is going to be expanded. It will also be very important to ensure smooth continuation of our decadeslong defence co-operation as one of the pillars of the Russian-Indian special and privileged strategic partnership. We remain committed to implement all our agreements, including the one for supplying S-400 missile air-defence systems to India. We enjoy an exceptional level of goodwill, mutual understanding and trust, and nothing will disrupt friendly ties between India and Russia.

<https://www.deccanherald.com/international/russia-in-talks-with-india-to-continue-defence-co-operation-despite-western-sanctions-says-moscow-s-deputy-envoy-to-new-delhi-1089520.html>

Here's a look at what Russian military equipment Indian defence uses

According to an estimate, nearly two-thirds of India's military equipment originates in Russia. This includes fighter jets, tanks, warships as well as guns. In practical terms, the Indian military is dependent on Russia to supply both building materials and finished products.

Right now, India cannot afford to take a stance against Russia, especially given our military dependence and the ever-present two-war threat. In the last few years, threats of a 'two-front war' involving Pakistan and China needling India simultaneously have become all the more real.

Given this geo-political scenario, any hypothetical clash with Pakistan or China, or both together, will see Delhi look towards Moscow, whether it's for military resupplies or spares.



Soldiers in Indian and Russian tanks participate in a joint-military drill.

Here is a look at the Russian military equipment which is currently being used by the Indian defence forces:

Smerch multi-rocket system

The BM-30 Smerch is a heavy, multiple rocket launcher. It was designed to defeat armoured targets in concentrated areas, artillery batteries, command posts and ammunition depots.

Grad multi-rocket system

The BM-21 'Grad' is a Soviet truck-mounted 122 mm multiple rocket launcher. The complete system with the BM-21 launch vehicle and the M-21OF rocket is known as a Grad multiple rocket launcher system.

M-46 artillery guns

The M-46 is a manually loaded, towed, 130 mm artillery field gun. For many years, the M-46 was one of the longest range artillery systems around, with a range of more than 27 km.

T-55 Pillbox config:

The T-55 is a Soviet-built Main Battle Tank (MBT). Pillboxes are similar to bunkers, but they are usually fairly small, between 6 and 10 square feet. The Indian army used T-55 tanks as pillboxes along the Line of Control.

T-90 Tanks:

The T-90 is a third-generation Russian MBT. It uses a 125 mm 2A46 smoothbore main gun, the 1A45T fire-control system, an upgraded engine and gunner's thermal sight. Protective measures include a blend of steel and composite armour, smoke grenade dischargers, Kontakt-5 explosive-reactive armour and the Shtora infrared ATGM jamming system.

T-72 Tanks:

The T-72 is a Soviet-designed MBT. In front-line Russian service, T-72s are being upgraded or augmented by the T-90, which is a modernised version of the T-72B. The T-72 has been exported and produced in many countries.

BMP-II

The BMP-2 is a second-generation, amphibious infantry fighting vehicle introduced in the 1980s in the Soviet Union. It is an agile, reliable and serviceable vehicle with adequate engine power for most all-terrain missions.

Konkurs ATGM:

The Konkurs Anti-tank Guided Missile is a Semi-automatic command to line of sight missile (SACLOS). The missile was initially designed to be fired from vehicles. It can be fired from later models of the 9M111 launchers.

Kornet:

The 9M133 Kornet is a second generation Russian man-portable anti-tank guided missile (ATGM) intended for use against main battle tanks. It was first introduced into service with the Russian army in 1998. The Kornet is among the most capable Russian ATGMs.

OSA Surface-to-Air missile (SAM):

It is a highly mobile, low-altitude, short-range tactical surface-to-air missile (SAM) system developed in the Soviet Union in the 1960s and fielded in 1972. Osa was the first mobile air defence missile system incorporating its own engagement radars on a single vehicle.

Pechora SAM:

The S-125 Neva/Pechora is a Soviet surface-to-air missile system. Due to its two-stage design, it is more effective against more manoeuvrable targets than its predecessors.

Strela SAM:

The Strela is a light-weight, shoulder-fired, surface-to-air missile. It falls under the category of Man-portable air-defence systems (MANPADS). It is designed to target aircraft at low altitudes with homing guidance and destroy them with a high explosive warhead.

Shilka anti-air gun

The ZSU-23-4 'Shilka' is a lightly armoured Soviet self-propelled, radar-guided anti-aircraft weapon system. It is named after the Shilka River in Russia. Afghan soldiers nicknamed it the "sewing machine" due to the sound the guns on it made while being fired.

Tunguska anti-aircraft system:

It is a Russian self-propelled, anti-aircraft weapon, armed with a surface-to-air gun and missile system. It is designed to provide day and night protection for infantry and tank regiments against low-flying aircraft, helicopters, and cruise missiles in all weather conditions.

Dragunov SVD:

The Dragunov sniper rifle is a semi-automatic designated marksman rifle which uses 7.62×54mm rounds. It was developed in the Soviet Union between 1957-63 and has since become the standard squad support weapon in several countries.

Kalashnikov:

A Kalashnikov rifle is any one belonging to a series of automatic rifles based on the original design of Mikhail Kalashnikov. They are commonly called AKs. They are some of the most widely used guns in the world, with an estimated 72 million rifles in global circulation.

OSV-96 rifles:

The OSV-96 is a Russian heavy semi-automatic precision rifle that uses 12.7×108mm ammunition. The rifle is capable of engaging infantry at a distance of up to 1800 metres. It keeps the shooter outside of the effective range of conventional calibres, providing a distinct advantage over lower calibre rifles.

NSV Machine gun:

The NSV is a 12.7mm calibre heavy machine gun of Soviet origin. It is no longer produced in Russia. After the Soviet Union breakup, the licence to make NSVs went to Kazakhstan. The NSV has been manufactured in Bulgaria, India, Poland and Yugoslavia under licence.

BrahMos Missile:

The BrahMos is a medium-range ramjet supersonic cruise missile that can be launched from submarines, ships, aircraft or land. It is notably one of the fastest supersonic cruise missiles in the world. It is a joint venture between the Russian Federation's NPO Mashinostroyeniya and India's DRDO.

Link: <https://www.indiatoday.in/india/story/here-a-look-at-what-russian-military-equipment-indian-defence-uses-1922205-2022-03-08>



Tue, 08March 2022

‘Russia tilt’ essential to India’s strategic security

By Saurabh Joshi

India could do more to help resolve the Ukraine conflict, despite its reliance on Russia for weapons and diplomacy with China.

India has held its nose and abstained five times since the February 24 invasion of Ukraine by Russia. While none of these abstentions has affected the outcome of the vote, they were driven by the South Asian country’s need to secure its supply of defence equipment, the majority of which it gets from Russia, experts say.

India’s reliance on Russian military and strategic equipment is “huge”, said retired Lieutenant General Deependra Singh Hooda, former commander of India’s northern army. “I mean, 60-70 percent of the equipment is Russian,” he said, listing air force fighters and air defence systems, army’s armour and the navy’s aircraft carrier and frigates. Notably, “who else will lease a nuclear submarine to you?” he asks.

For example, the Indian Air Force operates Sukhoi Su-30MKI, MiG-29 and MiG-21 fighters of Russian origin, besides IL-76 and Antonov An-32 transport aircraft, Mi-35 and Mi-17V5 helicopters and the recently acquired S-400 air defence system. India’s army operates the Russian-origin T-72 and T-90 main battle tanks. The Indian Navy’s INS Vikramaditya aircraft carrier was originally the Russian Admiral Gorshkov and it operates MiG-29K fighters. The navy also flies IL-38 maritime surveillance aircraft and Kamov Ka-31 helicopters. India has a nuclear submarine on lease from Russia and the latter is also helping India build its own nuclear submarines.

Apart from that, there are currently four warships on order from Russia (two of which are to be built in the Indian coastal state of Goa), and New Delhi also has plans to acquire the Igla air defence system and 200 utility helicopters.

Although over the past few years, India has been working on diversifying its sources of military equipment, this dependence cannot be easily or quickly substituted. “It’s just not possible to suddenly replace 60-70 percent of your equipment,” Lt-Gen Hooda told Al Jazeera.

Payment plan

That said, this dependence on Russian equipment is expected to become more difficult to manage because of the slew of sanctions on that country.

Laxman Behera, an expert on India’s defence acquisitions and an associate professor at Jawaharlal Nehru University’s (JNU) Special Centre for National Security Studies thinks India will face difficulties paying for its Russian kit and will have to find an “alternate mechanism” to make those payments.

While India has made rupee-rouble payments in similar cases earlier, the cumulative effect of sanctions on Russian banks, their severance from the SWIFT system and the “continuous fall of the rouble”, might even require India to resort to less preferred barter deals if the exchange rate is not “acceptable to both”, Behera says. “We buy their equipment and we sell them agricultural products,” he adds, citing an example of a potential exchange.

Link: <https://www.aljazeera.com/economy/2022/3/8/russia-tilt-essential-to-indias-strategic>

ThePrint

Tue, 08 March 2022

CAATSA sanctions on India would be ‘extraordinarily foolhardy’: Senator Cruz

India is a critical ally of the US and it would be “extraordinarily foolhardy” to impose any sanctions on New Delhi under the punitive CAATSA law for its purchase of the S-400 missile defence system from Russia, a top Republican Senator has told the Biden administration.

The US administration is required under domestic law, Countering America’s Adversaries through Sanctions Act (CAATSA) to impose sanctions on any country that has significant transactions with Iran, North Korea or Russia.

CAATSA is a tough US law that authorises the administration to impose sanctions on countries that purchase major defence hardware from Russia in response to Russia’s annexation of Crimea in 2014 and its alleged meddling in the 2016 US presidential elections.

“There are reports that the Biden administration is contemplating imposing CAATSA sanctions against India, the largest democracy on Earth, a decision that I think would be extraordinarily foolhardy,” Senator Ted Cruz said during a hearing on pending nominations by the powerful Senate Foreign Relations Committee.

Cruz, who represents the State of Texas in the United States Senate, said that over the last one week, the bilateral relationship between India and the United States had deteriorated under the Biden administration.

“India is a critical ally across a number of areas, and the US-India alliance has broadened and deepened in recent years. But under the Biden administration, it’s gone backwards,” Cruz said.

“India is not the only country to have voted against us, and against condemning Russia,” he said, in reference to India’s abstention in the UN General Assembly votes condemning Russia’s aggression in Ukraine.

India has faced flak from US lawmakers, both Republicans and Democrats, for choosing to abstain from a UN vote on Wednesday to rebuke Russia's attack on Ukraine.

A total of 141 nations voted in favour of the move condemning Russia's invasion of Ukraine and five nations were against it, with 35 countries, including India, abstaining. The UNGA resolution was similar to the one circulated earlier in the 15-nation Security Council on which India also had abstained.

The UNSC resolution, which received 11 votes in favour and three abstentions, was blocked after permanent member Russia exercised its veto.

"The United Arab Emirates also abstained in yesterday's vote. The UAE is a close ally of the United States, and during the Trump administration, was a critical player in the Abraham Accords that fundamentally transformed the entire Middle East, and brought Israelis and Arabs together under American leadership," Cruz said.

At a different hearing by the Senate Foreign Relations Committee, he said that in the past year under the Biden administration, the US relations with India have worsened significantly.

This was manifested among other things in their latest abstention at the United Nations, he told Assistant Secretary of State for South and Central Asia Donald Lu.

"I will acknowledge that India and the United States have not voted the same at the United Nations over this past week. I assure you that we continue to have an important dialogue with India at the highest levels to try to narrow that gap and to help India to see the importance that we place on a coordinated message to Moscow," Lu said.

Cruz tweeted that the Biden administration was very, very slowly discovering that alienating allies and boosting enemies is not a great way to conduct foreign policy. "All it took were several generational global catastrophes and wars abroad, and 1970s inflation and gas prices at home," he said.

In October 2018, India had signed a USD 5 billion deal with Russia to buy five units of the S-400 air defence missile systems, despite a warning from the then Trump administration that going ahead with the contract may invite US sanctions.

The US has already imposed sanctions on Turkey under the CAATSA for the purchase of a batch of S-400 missile defence systems from Russia.

Following the US sanctions on Turkey over the procurement of S-400 missile systems, there were apprehensions that Washington may impose similar punitive measures on India.

Russia has been one of India's key major suppliers of arms and ammunition. PTI LKJ VN MRJ AKJ MRJ MRJ

<https://theprint.in/world/caatsa-sanctions-on-india-would-be-extraordinarily-foolhardy-senator-cruz-2/863368/>

ThePrint

Tue, 08March 2022

Israeli Air Force shows F-35's first aerial 'kills' of Iranian drones in declassified video

In what is perhaps its first recorded kill ever, the Israeli Air Force (IAF) has declassified a video of its American F-35 fighter jet bringing down two Iranian drones.

“About a year ago, two Iranian UAVs were intercepted, carrying weapons in order to transfer them to the Hamas terrorist organization. The drones were intercepted before crossing the border into Israeli territory,” the IAF Monday tweeted, along with a 45-second video of the F-35 shooting down the UAVs.

“It was the first operational interception of its kind in the world, in which an F-35 successfully intercepted an aerial target,” Squadron Deputy Commander Maj. G can be heard saying in the video.

“Essentially, we receive information about hostile aircraft approaching Israeli airspace. It requires us to scramble ‘Adir’ (F-35I) fighters. As soon as we arrived at the scene, we conducted an interception of two Iranian aircraft that were aiming to infiltrate Israeli territory in order to commit hostile action,” Squadron Commander Col. N says.

The video also shows footage of the F-35’s interception, including radio contact between the controller and the formation leader of the squadron.

“We will not let any factor threaten Israeli airspace or interfere with Israeli sovereignty,” Col. N added.

According to a report by The Drive, the intercepted Iranian UAVs in question are the Shahad 197 type, which boasts a range of 2,000 km, a wingspan of 7 metres, and a flight speed of approximately 2,000 km per hour. Similar UAVs had been intercepted by Israel in February 2018.

Link: <https://theprint.in/defence/israeli-air-force-shows-f-35s-first-aerial-kills-of-iranian-drones-in-declassified-video/864186/>



Tue, 08March 2022

Modern design technique gives 60-year-old B-52s new lease on life

The iconic B-52 Stratofortress bomber has been a mainstay of the U.S. Air Force’s fleet since it was first introduced during the height of the Cold War.

But with the average B-52 now 60 years old and increasingly showing its age, the bomber is getting a fresh lease on life — in the form of a new slate of F130 engines from Rolls-Royce North America. In a briefing with reporters March 4, officials from Rolls-Royce and Boeing detailed how modern digital design techniques are helping craft the B-52’s new engines and related systems.

The Air Force announced in September that Rolls-Royce had received the \$2.6 billion Commercial Engine Replacement Program contract to keep the B-52 flying into the 2050s — roughly 100 years after the first B-52 was flown. The aircraft’s current Pratt & Whitney-made TF33 engines, which also date back to the early 1960s, are expected to reach the end of their life spans by the end of this decade.

This is the bomber’s “pacing concern,” Robert Gass, Boeing’s strategic development and investment manager, told reporters at the Air Force Association’s Air Warfare Symposium in Orlando, Florida.

“Pratt made a great engine that has served the B-52 very well, but it is approaching the end of its life,” Gass said. “We have to act now in order to keep that B-52 viable.”

The Air Force said in September that Boeing, which originally built the B-52, will be in charge of integrating the new Rolls-Royce engines into the bomber. The first group of modified B-52s are expected to be delivered by the end of 2028. And digital design techniques — similar to methods

that helped accelerate the creation of other recent aircraft, like Boeing's T-7A Red Hawk trainer — are helping streamline the process for upgrading the B-52. Gass said the digital design effort is focusing on the bomber's power pods — its four nacelles that each hold a pair of engines. The F130 engine of the B-52 is seen in a test cell at a Rolls-Royce facility in Indianapolis, Ind., on May 29, 2019. (Alan Petersime/Rolls-Royce)

The process began by creating a digital map of the B-52's systems and how they function. Once that was in hand, Gass said, designers created 3D models of the aircraft's engines and other components. This allowed engineers to more easily visualize what they were designing, how the pieces would fit together, and how the components they were working on would connect and affect other parts undergoing designs by other teams. The process is still in the early stages, Gass noted, but there are anecdotal reports that this method allowed designers to catch problems, such as parts that were conflicting with one another, earlier in the process.

Candice Bineyard, director of defense programs at Rolls-Royce, said the two companies have been “trading” digital models with one another. This helped engineers spot “minor tweaks” that needed to be made to ensure engines would fit precisely inside the B-52 nacelles, she said, or find the best spot where newly added components should go.

“That's really what you want in this phase, is to figure it out sooner rather than later, before you go to full-rate production,” Bineyard said. “So we're seeing those benefits already.”

In the fourth quarter of this year, she said, Rolls-Royce will start testing its engine prototypes at NASA's Stennis Space Center in Mississippi, to see how they will operate in the B-52 nacelle. The engineering and manufacturing development phase is expected to last into 2026, she added.

She noted the new engine will be able to receive maintenance work on the aircraft without the need for removal for major repairs. And the digital modeling will make it easier to produce clear and precise manuals for the maintainers in charge of keeping the engines running, she added.

The re-engining will do more than just keep the B-52 in the air, according to Gass. It will give the plane more range, endurance and flexibility in how the Air Force can use the B-52, and it will reduce fuel and maintenance costs. As the B-52's engines receive upgrades, Gass said, so will its related subsystems, including power generation and pneumatics. The B-52 will also receive new cockpit displays and digital engine controls, new struts and structures for the engine pods, and a new aircraft health maintenance system to help the Air Force sustain it for the next three decades.

Gass said the modernization will set the table for additional upgrades in the future to help keep the bomber running into the 2050s.

The F130 is a “proven” engine with more than 29 million flight hours, Bineyard said, and already powers the Air Force's C-37 and E-11 aircraft. And as the B-52 closes in on the century mark, it is likely these new engines will be the last the venerable bomber will have before its eventual retirement.

“This engine will stay on [the B-52's] wing for the life of this aircraft ... well into the 2050s,” Bineyard said.

Link: <https://www.defensenews.com/air/2022/03/08/heres-how-21st-century-design-is-giving-60-year-old-b-52s-a-new-lease-on-life/>

Tue, 08 March 2022

ISRO's Chandrayaan-2 mission makes first of its kind observation below Moon's surface!

The 'Exosphere' happens to be the outermost region of the upper atmosphere of the celestial body wherein the constituent molecules and atoms rarely collide with each other and are able to escape into space.

According to the Indian Space Research Organisation, Chandra's Atmospheric Composition Explorer-2 (CHACE-2) that is a quadrupole mass spectrometer onboard Chandrayaan-2 mission, has made the first-of-its-kind observations in the tenuous lunar exosphere of the global distribution of Argon-40. The Bengaluru-headquartered space agency said in a statement on Tuesday that these observations helped in providing insight into the dynamics of the lunar exospheric species along with the radiogenic activities in the first few tens of metres below the lunar surface.

The 'Exosphere' happens to be the outermost region of the upper atmosphere of the celestial body wherein the constituent molecules and atoms rarely collide with each other and are able to escape into space. The Moon which the Earth has features a surface-boundary exposure. For Earth's Moon, there are different constituents in the exosphere that are fed from the surface by many processes like solar wind sputtering, thermal desorption, micrometeorite impact vaporisation and photo-stimulated desorption.

The exospheric atoms may be lost to space by the thermal escape and get ionised by photo-ionisation that charge exchange with the solar wind ions. They can be whisked away by the solar wind's convective electric field, but some of these atoms/ions can be deposited back on the lunar surface. Hence the lunar exosphere exists as a result of a dynamic equilibrium between sink processes and several sources. According to ISRO, the CHACE-2 observations provide the diurnal and spatial variation of Ar-40 covering the equatorial and mid-latitude regions of the Moon.

Despite the differences in topography and temperature for the mid-latitude regions, the CHACE-2 observations for the first time showed that the variation in the number density of Ar-40 with respect to solar longitudes are similar to that of low latitude regions.

Link: <https://www.financialexpress.com/lifestyle/science/isros-chandrayaan-2-mission-makes-first-of-its-kind-observation-below-moons-surface-check-details/2454454/>

Indian scientists inch closer to unraveling mystery behind high temperature in solar atmosphere

The scientists found that the jets are kept intact against instabilities by the magnetic field in the Sun, and by the polymer chains in the polymeric solution respectively.

In a major step towards unraveling the mystery behind the heating up of the solar atmosphere, Indian scientists have decoded the science behind the jets of plasma, the fourth state of matter consisting of electrically charged particles that occur in the sun's chromosphere.

“The jets, or spicules, appear as thin grass-like plasma structures constantly shoot up from the surface and are then brought down by gravity. The amount of energy and momentum that these spicules can carry is of fundamental interest in solar and plasma astrophysics,” a ministry of Science and Technology note here stated on

“The processes by which plasma is supplied to the solar wind, and the solar atmosphere is heated to a million degrees Celsius, still remain a puzzle,” the further stated.

Led by astronomers at the Indian Institute of Astrophysics, an autonomous institute of the Department of Science & Technology (DST), a team of interdisciplinary researchers from India and UK have explained the origin of ‘spicules’ on the Sun, using laboratory experiments as an analogy. They found that the physics underlying paint jets when excited on a speaker is analogous to the solar plasma jets. In trying to explore the underlying physics of spicule dynamics, the team turned to an audio speaker. A bass speaker responds to excitation at low frequencies like the rumbling sounds heard in movies. When a liquid is placed above such a speaker and the music is turned on, the free surface of the liquid becomes unstable beyond a particular frequency and starts vibrating.

An example of “Faraday excitation” observed in nature is when droplets of water splash on the back of a partially submerged male alligator during a mating display. However, a fluid-like paint or shampoo will result in unbroken jets when excited on a speaker since its long polymer chains give it directionality.

Sahel Dey, from the Indian Institute of Astrophysics (IIA), and the first author of the study explained: “The solar plasma can be imagined as threaded by magnetic field lines, much like the long chains in polymer solutions. This makes both the systems anisotropic, with properties varying with the direction in space.” Mathematically too, there exists an analogy in the treatment of stresses involved, though there are obvious differences as well, he said

“Spurred by the visual similarity between the solar spicules and the jets of paint on the speaker, we investigated the roles of magnetic field on the Sun using state-of-the-art numerical simulations of the solar plasma. In parallel, we explored the role of polymer chains by using slow-motion videography on Faraday waves in polymeric solutions,” Murthy O V S N, co-author from the Azim Premji University where the laboratory experiments were conducted said.

The scientists found that the jets are kept intact against instabilities by the magnetic field in the Sun, and by the polymer chains in the polymeric solution respectively. The research has been published on 3rd March 2022 in the journal ‘Nature Physics’.

The scientists elaborated that the plasma right below the visible solar surface (photosphere) is perpetually in a state of convection, much like boiling water in a vessel heated at the bottom. This is ultimately powered by the nuclear energy released in the hot-dense core. The convection serves

almost periodic but strong kicks to the plasma in the solar chromosphere, the shallow semi-transparent layer right above the visible solar disk.

The chromosphere is 500 times lighter than the plasma in the photosphere. Therefore, these strong kicks from the bottom, not unlike alligator bellowing, shoot the chromospheric plasma outward at ultrasonic speeds in the form of thin columns or spicules.

Spicules come in all sizes and speeds. The existing consensus in the solar community has been that the physics behind the short spicules is different from that of taller and faster spicules, the scientists further added.

Link: <https://www.thestatesman.com/technology/indian-scientists-inch-closer-unraveling-mystery-behind-high-temperature-solar-atmosphere-1503050570.html>



Tue, 08March 2022

IIIT Hyderabad's Annual R&D Showcase to Be Presented For the First Time in Metaverse

- Themed around Technology takeaways from the COVID pandemic
- Total showcase, focus on translation
- Metaverse hosting by CIE's Avishkar accelerator startup NextMeetLive

IIITH's annual R&D Showcase will be held this year on Saturday 12 March 2022 in a hybrid model – physically on campus for students and in the metaverse for visitors. The Showcase will be hosted on the metaverse by NextMeetLive, one of CIE at IIITH's Avishkar accelerator startups.

The Showcase this year is themed Tech-away – Accelerating the Future, specially technology orbitshifts triggered by seminal life-altering events like the COVID pandemic in the metaverse.

IIITH's annual R&D Showcase celebrates the spirit of Research & Development where faculty and students share their work with the public in keeping with its endeavour to promote applied research that benefits society.

This year's lineup includes roundtables on Quantum Science & Technology as well as Cyber Physical Convergence. There will also be pitches on research product possibilities, research connected startup demos, 600 research demos from IIITH's 28 research centres, and a summary showcase.

Link: <https://www.prnewswire.com/in/news-releases/iiit-hyderabad-s-annual-r-amp-d-showcase-to-be-presented-for-the-first-time-in-metaverse-803620439.html>

