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समाचार पत्रों से चयित अंश
Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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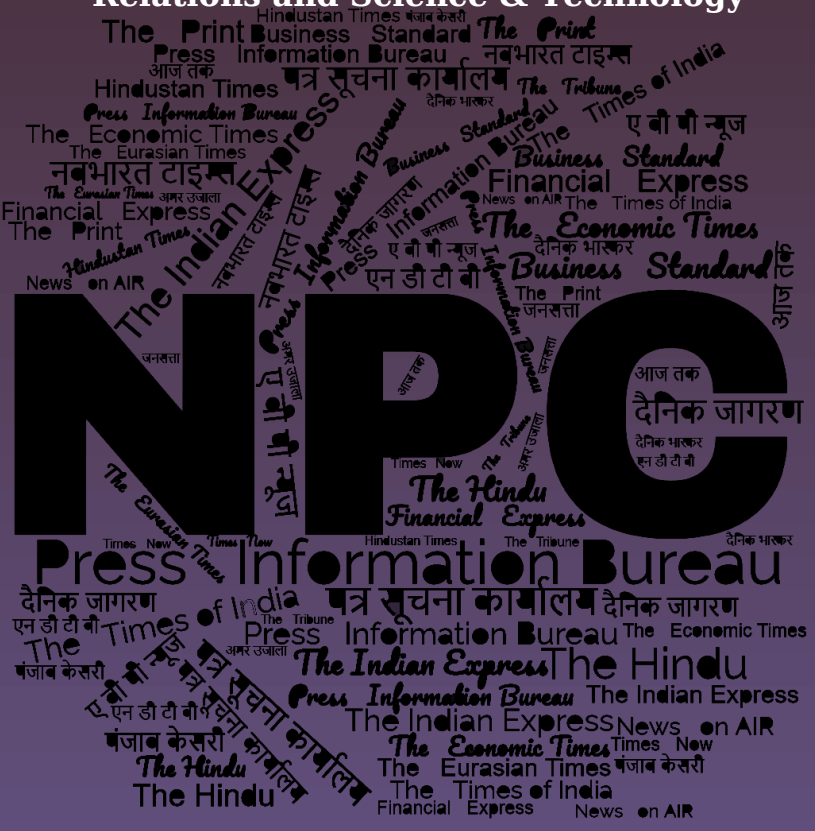

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अमर उजाला

Sun, 09 Jul 2023

डीआरडीओ की पहल: चीन सीमा से सटे क्षेत्रों में सेना के जवानों के लिए उगाए जाएंगे ताजा फल और सब्जियां

चीन शासित तिब्बत से लगते हिमाचल प्रदेश के सीमाई इलाकों में अब सैनिकों को ताजा सब्जियां और फल मिलेंगे। रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) इसके लिए सीमा पर बसे गांवों के लोगों को सब्जियां और फल उगाने के लिए प्रोत्साहित कर रहा है। इन क्षेत्रों में सेब के फल उगाने से लेकर विभिन्न सब्जियों जैसे मूली, गोभी, फूलगोभी, ब्रोकोली, ककड़ी आदि को पैदा किया जा रहा है। हिमाचल प्रदेश में यह विदेशी सीमा किन्नौर और लाहौल स्पीति जिलों से लगती है। बताया जा रहा है कि इस योजना से दो लाभ होंगे।

एक तो जवानों की सेहत ठीक रहेगी और उन्हें डिब्बाबंद खाने से गुजारा नहीं करना होगा। दूसरा गांववासियों को भी इससे स्थानीय स्तर पर ही स्वरोजगार मिलेगा। इस तरह के प्रयोग लद्दाख और अरुणाचल प्रदेश में भी हो चुके हैं। लद्दाख की शुष्क भूमि में रहने वाले लोग साल भर ताजी सब्जियां उगाना शुरू कर चुके हैं। शुष्क क्षेत्रों के लिए तो कृषि विशेषज्ञों ने एक नया ग्रीनहाउस मॉडल विकसित किया है। विशेषज्ञों की एक टीम लद्दाख किसान जवान विज्ञान मेले में इससे संबंधित एक मॉडल प्रदर्शित कर चुकी है।

इससे सशस्त्र बलों के लिए डिब्बाबंद भोजन खाने की आवश्यकता को समाप्त किया जा रहा है। हिमाचल प्रदेश के सीमाई क्षेत्रों में सब्जियां और फल उगाने के लिए राज्य के कृषि और बागवानी विश्वविद्यालयों के सेवारत और सेवानिवृत्त विशेषज्ञों की भी मदद ली जा रही है। सीमाई क्षेत्रों के ग्रामीण भी अब इसे मुनाफे का काम मानकर इसमें रुचि दिखाने लगे हैं। वे सीमाई क्षेत्र में अंदर तक जाकर अपनी जमीनों पर फसलें उगाने में दिलचस्पी लेने लगे हैं और इसके लिए डीआरडीओ की मदद से अपनी जमीनों पर कृषि व बागवानी फसल उत्पादन ढांचा भी मजबूत कर रहे हैं।

https://www.amarujala.com/shimla/drdo-initiative-army-soldiers-will-now-get-fresh-vegetables-and-fruits-in-the-areas-adjacent-to-the-china-bor-2023-07-08

The Sentinel
of this land, for its people

Mon, 10 Jul 2023

DRL-DRDO Organizes Exhibition-cum-Interaction Session in Tezpur

Defence Research Laboratory (DRL), DRDO, Tezpur organized an 'Exhibition-cum-Interaction Session' at Hem Baruah Hall, Tezpur, Assam on Saturday.

The purpose of this event was to showcase the products and technologies developed by DRL-DRDO to school, college students and general public. The exhibition's theme was 'Growth of Defence R&D Ecosystem - Way to Atmnirbharta', highlighted the significant accomplishments in the field of defence research and development. The event was held as part of the Azadi Ka Amrit Mahotsav campaign, to showcase achievement of Govt of India for the last 9 years.

The occasion was graced by Deba Kumar Mishra, Deputy Commissioner, Sonitpur as the chief guest. Dr S K Deuri, Director of LGBRIMH, Tezpur and Sandeep Khosla, DIG ITBP, Tezpur, were also present as guests of honour. Besides, officers from 4 Corps, Air Force station 11 wings Tezpur, ITBP Tezpur, and SSB frontier HQ Tezpur also attended the event with great enthusiasm. Various schools from greater Tezpur town along with a team from NCC 5 Assam Battalion were present in the event.

The programme commenced with a welcome address by Director DRL, Dr. Dev Vrat Kamboj, who aptly described the importance of Atmanirbhar Bharat and its mission to make India self-reliant across all sectors. He elaborated about the DRDO's contributions towards achieving self-reliance in defence and highlighted the organization's overall accomplishments over the past six decades. Furthermore, he mentioned DRDO's advancements in missiles, fighter aircraft, radars, sonars, electronic warfare systems, CBRN Defence technologies, and life support technologies. Director DRL also provided a brief overview of DRL Tezpur's role and achievements, including its core competencies in vector control, water quality amelioration, pharmaceutical technology, bio-prospecting, high altitude agriculture, and bio-waste management.

Deputy Commissioner Deba Kumar Mishra addressed the esteemed gathering, expressing appreciation for the role of DRDO as a whole and DRL Tezpur in particular, in nation-building. He showed keen interest in DRL's developed products and technologies, such as Capsispray, Capsigranade, High altitude Biodigesters, and Water Purification technologies. He commended DRL's R&D work, which provides technological solutions for the benefit of army personnel

deployed in the challenging terrains of North East India. Additionally, he encouraged the students and young minds present to pursue careers in the field of science. He also acknowledged DRL Tezpur's contribution in installing a Medical Oxygen plant in NE India during the COVID-19 pandemic.

Earlier, the chief guest inaugurated the DRL-DRDO exhibition. The exhibition was visited by dignitaries, school, college students, NCC cadets and visitors from Tezpur.

https://www.sentinelassam.com/north-east-india-news/assam-news/drl-drd-organizes-exhibition-cum-interaction-session-in-tezpur-657538

THE WEEK

Sun, 09 Jul 2023

'No Equivalent to Air-Launched BrahMos in the World': BrahMos CEO

By Sanjib Kr Baruah

What do you do, a guest asked a young man at a party. The young man answered: "I am a missile scientist with the DRDO (Defence Research and Development Organisation)." The retort, with a hint of accusation, was: "Don't you feel guilty that you are creating a weapon of destruction which will be used to kill people?" The missile scientist's response was swift and sure: "I do not work on killing people. I work to defend my nation. There is no conflict in my mind." That clear focus has helped; three decades later, the scientist leads a missile project that is a game-changer for the Indian military and its industrial complex. Atul Dinkar Rane, 59, is now the CEO and MD of BrahMos Aerospace. Of disarming disposition, Rane has a throaty chuckle that he puts to frequent and easy use. Recently, he spoke to THE WEEK on the variants of BrahMos, export potential and going hypersonic. Edited excerpts:

Q Called India's brahmastra, the BrahMos is considered the decisive, war-winning weapon in the Indian armoury. What does it signify?

BrahMos is the best in its class. It is the only supersonic cruise missile in the triad of any armed force. There was literally no defence against it when we started. Today, we hear of a few anti-missile systems. But, we have not seen too much that would affect the operations of the BrahMos.

The Indian Navy has called the BrahMos its frontline weapon. It is installing it on all ships capable of carrying it. The Indian Air Force already has a squadron and, in May, during our users' meet, the IAF chief said they are going to look at many more Su-30 squadrons with the BrahMos missile. I continuously call it a tactical weapon, but the IAF chief corrected me and said that it was a tactical weapon by definition, but it was a deterrent. That shows where the BrahMos sits today.

Q China has deployed the Russian S400 air defence system. How effective will it be against the stealth-capable BrahMos?

Right now, only a few countries have the S400. Because of the [low] reaction time from the launch of BrahMos to its impact, it is difficult for any surface-to-air missile to intercept it. A cruise missile is totally different from a ballistic missile and that is why we looked at a cruise. We are at low altitude and at very high speed. Defending against it will be tough. A supersonic cruise missile is literally impossible to intercept. Even if it is intercepted, you may intercept one or two or three. But

you would not intercept a barrage or a salvo of four, five, six. That would definitely slip through. That is the whole philosophy of a cruise missile system.

Q But why has Russia not thought of inducting the BrahMos into its military?

The Russian P800 Onyx missile is the precursor of the BrahMos. The BrahMos is a much better version. The P800 was produced in Russia, it still is. They moved from P800 to another area of work and they are happy. We have been continuously looking at Russia as a market for the BrahMos. If they had purchased it then, they would have had a lot of things to use in the current situation.

After the ongoing situation in Europe ends, we might get some orders from Russia, especially for the air-launched BrahMos. They do not have an equivalent. There is no equivalent to the air-launched BrahMos in the world. I see that as a game-changer in terms of exports.

Q Which are the countries we have struck deals with for the BrahMos?

We did this first contract selling BrahMos to the Philippines Department of National Defence. It is meant for their marine corps. It is not a large order but it is a start. It has opened the doors for many other orders. Without doubt, the Philippines will be looking for more.

People have showed a lot of curiosity. Be it NATO countries, many of the western countries, all across the world. They all want to have the BrahMos. One foreign naval chief said, 'I do not want to be on the wrong side of this missile. I want it on my side.'

Since we broke in with the Philippines, the southeast [Asian] nations are our first potential customers. Quite a few nations are talking to us. The Middle East is also interested. There are a couple of Latin American countries looking at it closely and we are in talks with them. There are a few African countries, too. So we are in talks with about a dozen countries.

The BrahMos is expensive. The buying country has to think hard whether it needs the weapon. And also decide on whether there is a need to show a bigger alignment with the selling country.

Q What are the various variants of the BrahMos and what are the future plans?

The current BrahMos is capable of being land-launched from mobile autonomous launches in coastal battery formation or land attack formation. It is capable of being launched from ships for anti-ship or land attack, from the air—anti-ship and land attack. We have also proven underwater (submarine) capability.

Next is a miniaturised version—BrahMos NG (next generation)—for air launch. We see massive business sense in that. We are designing it for the LCA Tejas. It would be able to carry two BrahMos instead of just one now. We have finished the preliminary design and are getting ready to cut metal. We will be doing trials with the Su-30 first, not the LCA, because we know its interfaces well. We are designing for the LCA with the idea that it becomes a total package. LCA Tejas equipped with the BrahMos NG and the Astra missile, totally Indian, is what we are looking at.

After that we will move to other aircraft. The big advantage is that once we are able to put the BrahMos on the LCA, we will be able to put it on any western platform.

Q We have a vibrant defence production ecosystem now. Did the BrahMos actually predate this?

Exactly. When we began BrahMos, the industries said: 'Assure us a large order and then we get into production.' That was not possible because developing and designing a system takes time. Also, we did not know the numbers. Initially, our orders were just for 12 missiles for the Navy, 30 or 40 for the Army as a test case; later, expanded to a regiment.

So the numbers were small. But it was the management of BrahMos Aerospace and the vision of those industry giants, who said that there seems to be some future in this article, that has been proven now. About 25 years later, we have been producing and integrating approximately 100 missiles a year. The numbers—missiles delivered and orders booked—are mind-boggling. If we calculate from day one, the revenue totals about $6 billion (close to Rs50,000 crore, at current conversion rate).

So the industry has learnt that we do not need to wait for a huge volume order. We can start small provided that we see that there is a future.

Q Are you saying that the BrahMos spawned a kind of ecosystem in our defence industrial complex?

That is right. With the formation of the BrahMos Aerospace, the idea was to get into production as soon as possible. Within three years, we managed to design the missile, integrate it and do a test in June 2001. And as early as 2004, we got our first order. At the start, the missile was only 13 per cent Indian. We have upped this to 76 per cent. This was possible because of the industries who chipped in almost immediately. The public sector, the private sector, all chipped in and literally became partners.

It was not that these companies were given money to start their manufacturing. They put in the money themselves. Today we have more than 200 manufacturing industries on board as part of our supply chain. This model was a first. In a way, we started the ‘Make in India’ movement and the ‘Atmanirbharta’ movement.

Q Can the BrahMos be nuclear tipped?

Our warhead is small, up to 200kg. That partly answers the question as a nuclear missile needs a bigger warhead. If it stays conventional, it can be used. The day it becomes nuclear-tipped, one would find it very difficult to be used.

Q Our neighbours are rapidly evolving into hypersonic missile technology. What is the shelf life of the BrahMos at its current state of development?

If we started out with deliveries in 2005, we are less than 20 years in. It is a missile which will be used for a long time. Even today subsonic missiles are being used all over the world. So the supersonic missile is always a plus. Hypersonic is another plus. The costs also go up the same way. Who knows, BrahMos [may] go hypersonic one day.

We are looking at the BrahMos NG first because that makes business sense. We will go hypersonic or look at hypersonic once the actual technology stabilises. Right now it is only R&D. There is no cruise weapon as such inducted into the forces which is fully hypersonic.

The ballistic missiles are hypersonic, they go at Mach 6-plus. But they are not cruise missiles. The cruise hypersonic, which is the scramjet-based hypersonic (the ramjet can just about touch hypersonic), is still in R&D. We are working on ramjet going to Mach 4.5 to Mach 5, which is the start of hypersonic. But, a lot of work is required.

https://www.theweek.in/theweek/current/2023/07/08/brahmos-aerospace-ceo-and-md-atul-dinkar-rane-interview.html

THE HINDU

Sat, 08 Jul 2023

Students throng DFRL on Open Day to Explore Innovations

Schoolchildren at the exhibition organised at the Defence Food Research Laboratory (DFRL) in Mysuru on Saturday on the occasion of Open Day. | Photo Credit: M.A. Sriram

Students thronged the Defence Food Research Laboratory (DFRL), a constituent lab of the Defence Research and Development Organisation (DRDO), Ministry of Defence, Government of India, on Saturday as it hosted an Open Day where its technologies developed over the last few years were showcased.

Established to meet the research and development needs in the area of food science and technology as well as to design and develop lightweight combat rations for Army, Air Force, Navy and paramilitary forces, the premier national institute exhibited its innovations as curious visitors went through the stalls to learn about the products that were exhibited for the public knowledge.

DFRL is a national premier institution in the fields of combat ration, and convenience food development, field amenable test kits, packaging materials for extreme environmental conditions and critical missions such as space food, supply chain management and Antarctica mission. Some of those innovations attracted the curiosity of the students and the public.

Vipin Kumar, Director, Directorate of Public Interface, DRDO HQ, inaugurated the exhibition and Vipin Gupta, Director (Admin), Office of DG (Life Sciences) was the guest of honour. DFRL Director Ajit Dutt Semwal accompanied the dignitaries and explained the products developed by the institute.

Being a Center of Excellence in food preservation, packaging, food specifications and food logistics, DFRL, with consistent efforts over the years, has developed process technologies, and novel packaging technologies for preservation of different food products with a shelf life of more than 12 months under ambient conditions, according to a note.

Many of the state-of-the-art technologies developed by the DFRL for preservation of food products and testing kits to check quality of food products and packaging materials are being used by the service forces regularly even in peacetime, according to the DFRL.

In the last nine years, many products of DFRL have been inducted into services and the technologies have been transferred to industries. “These products offer exceptional convenience to troops and consumers and are either ready-to-eat (RTE) or ready-to-constitute (RTC),” it said.

The RTE and RTC foods were on display. Some of the technologies developed in the last few years include meals ready-to-eat – terrain specific rations and meals ready-to-eat – platform specific MRE rations.

Other technologies include food packaging and delivery system for CBRN scenario; space food and logistics; biodegradable and compostable cutlery; biodegradable and compostable films; freeze dried products; ready-to-eat bars and nuts; ready-to-drink and ready-to-reconstitute juice and beverages; ready-to-reconstitute food products; nutraceutical food bars; sea dye marker; quick test kit for processed food/milk and meat; digitized hot plate; fresh curd maker; antifreeze container/bag; apricot processing plant at Ladakh; vacuum fried fruit chips; anti sea sickness supplements; self-healing system – a chemical-based heating system; modular silos for storage of army rations at high altitude; ready-to-eat katti rolls; portable microbiology lab; design and development of millet roti making machine.

https://www.thehindu.com/news/national/karnataka/students-throng-dfrl-on-open-day-to-explore-innovations/article67057813.ece

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Fri, 07 Jul 2023

Bastille Day Parade at Paris, France

The Indian Navy Marching Contingent, as part of the Tri services contingent, arrived in France for participation in the Bastille Day Parade at Paris on 14 Jul 23. The Navy team on parade will comprise of four officers and 64 sailors. The contingent will be led by Cdr Vrat Baghel. The officer is a specialist in Gunnery and Missile Warfare and has sailed on the French Ship BCR Var during exercise Varuna. He will be followed by his deputies, Lt Cdr Disha Amrith (who led the Indian Navy Contingent at the RD Parade 2023), Lt Cdr Rajat Tripathi and Lt Cdr Jittin Lalitha Dharmaraj. To commemorate the event, the Indian Navy will also be represented by INS Chennai, an indigenously built frontline destroyer, which will be deployed to France from 12 – 16 Jul 23. The ship’s crew will represent India at the Bastille Day celebrations at Brest, France.

Indian Navy is amongst the largest Navies in the world with a potent mix of ships, submarines and aircraft. It's motto in sanskrit 'Sam No Varunah' (meaning May the lord of oceans be auspicious unto us) has been taken from Rig Veda which dates back to 1500 BC. The Navy is a 'Combat Ready, Credible, Cohesive and Future Proof Force' which is manned by a highly skilled and professional workforce.

India's shipbuilding prowess has immensely contributed to the Indian Navy's coming of age and rapid modernisation. Today, the country's shipyards are building all types of vessels and it is a matter of great pride that India belongs to a very small group of select and elite countries that has built and operates its own aircraft carrier, destroyers, frigates and nuclear submarines. INS Chennai embodies the cutting edge of indigenous technology.

This year marks a quarter century of Indo-French Strategic partnership. The two countries enjoy deep ties in the maritime domain which extend to their navies as well. Indigenous construction of the Project 75 Scorpene class submarines by M/s Mazagon Dock Shipbuilders Limited in collaboration with M/s Naval Group, France, has not only enhanced Naval capability but has also paved the way for future programmes.

The Bilateral exercise (Varuna) between the two navies has matured into a complex exercise involving all domains of Naval power. It reflects the growth of India – France strategic bilateral relationship. The exercise was initiated in 1993 and christened as 'Varuna' in 2001. The 21st edition of Varuna was conducted in Jan 23 in the Arabian Sea.

https://pib.gov.in/PressReleasePage.aspx?PRID=1937964

Press Information Bureau
Government of India

Ministry of Defence

Fri, 07 Jul 2023

Cooperation with France IAF Flying Contingent Departs for Participation in the Bastille Day Flypast

A flying contingent of four Rafale fighters, two C-17 Globemasters and 72 IAF personnel has departed for France today. The fly past & marching by the IAF air warriors on Bastille Day follows a long association that the two nations share, especially in the field of the air power. Many Indians like Welinkar, Shivdev Singh, HC Dewan & Jumbo Majumdar have fought over the skies of France during the two World Wars. Some, like Jumbo Majumdar were also decorated for their gallant action, over the Falaise Gap, during the terminal phase of World War II.

The Indian Air Force has also operated multiple French aircraft starting with the Ouragan. This was followed by fighter aircraft like Breguet Alize, Mystere IVA, SEPECAT Jaguar, Mirage 2000 and now, the Rafale. Helicopters like the Alouette-III & Lama continue to render yeoman services to India, especially in the remote Himalayan areas. As a matter of fact, the IAF marching contingent is commanded by Squadron Leader Sindhu Reddy, who is an accomplished helicopter pilot. She has also extensively flown the Alouette-III helicopter in her service.

The professional ties between the two Air Forces have also been strengthened during flying exercises like Ex Desert Knight, Garuda and Orion. The IAF's Rafale aircraft, flying wings to wings with the FASF, is reflective of this strategic friendship spanning decades that continues to mature, both, on ground, as well as in air.

https://pib.gov.in/PressReleasePage.aspx?PRID=1937956

Press Information Bureau
Government of India

Ministry of Defence

Fri, 07 Jul 2023

Aatmanirbhar Bharat: MoD & HAL Sign Rs 458 Crore Contract for Two Upgraded Dornier Aircraft for Indian Coast Guard

Ministry of Defence signed, in New Delhi on July 07, 2023, a contract with Hindustan Aeronautics Limited (HAL) for procurement of two Dornier Aircraft for Indian Coast Guard (ICG) along with associated Engineering Support package at an overall cost of Rs 458.87 crore. The aircraft will be procured under the Buy (Indian) Category.

The aircraft will be fitted with a number of advanced equipment viz., Glass Cockpit, Maritime Patrol Radar, Electro Optic Infra-Red device, Mission Management System etc. The addition will further bolster the aerial surveillance capability of maritime areas of responsibilities of the ICG.

The Dornier aircraft are being indigenously manufactured at HAL (Transport Aircraft Division), Kanpur and will significantly contribute in achieving Aatmanirbharta in defence, in consonance with the 'Make in India' initiative of the Government.

https://pib.gov.in/PressReleasePage.aspx?PRID=1937926

THE ECONOMIC TIMES

Sat, 08 Jul 2023

Defence Ministry Signs Contract with HAL for Dornier Aircraft worth Rs 458 Cr

The defence ministry on Friday signed a contract with Hindustan Aeronautics Limited (HAL) for procurement of two Dornier Aircraft for Indian Coast Guard (ICG) at an overall cost of Rs 458 crore.

"The addition will further bolster the aerial surveillance capability of maritime areas of responsibilities of the ICG," Ministry of Defence said in a release.

HAL will indigenously manufacture the Dornier Aircraft at their Kanpur facility.

"It will significantly contribute in achieving Aatmanirbharta in defence, in consonance with the 'Make in India' initiative of the Government," it further stated.

The aircraft will be fitted with a number of advanced equipment including glass cockpit, maritime patrol radar, electro optic infra-red device, mission management system among other things.

Earlier this year in March, the defence ministry had sealed a deal with HAL to procure six Dornier aircraft at a cost of Rs 667 crore for the Indian Air Force.

https://economictimes.indiatimes.com/news/defence/defence-ministry-signs-contract-with-hal-for-dornier-aircraft-worth-rs-458-cr/articleshow/101575706.cms

THE ECONOMIC TIMES

Sat, 08 Jul 2023

Eastern Ladakh: Indian Army Tanks, Combat Vehicles Carry out Drills to Cross Indus River, Attack Enemy Positions

Having deployed a large number of tanks and armoured vehicles in the world's highest river valleys, Indian Army formations carried out drills in Eastern Ladakh to cross the Indus River and attacks in enemy positions.

Team ANI witnessed the special drills carried out by Indian Army's tank formations including the T-90 and T-72 tanks and BMP infantry combat vehicles to cross the mighty Indus river which flows from the Tibetan territory controlled by the Chinese Army through the entire Ladakh sector before entering Pakistan.

Army officials said that such drills are carried out to prepare for contingencies where they have to take action against the adversaries if they try to capture Indian areas by using the routes of valleys in this area. Indian Army is one of the very few armies in the world that operates tanks at high altitudes up to 16,000 feet, and in large numbers. After the Chinese forces started showing aggression in the Eastern Ladakh sector by diverting its training exercise troops, the Indian Army brought in a large number of tanks and armoured combat vehicles in the eastern Ladakh sector that has large open valleys which are very conducive for tank battles.

Earlier, the Indian Army used to carry out such drills in a big way in the Punjab sector along the Pakistan front as it was believed that only plains and deserts would see tank battles but the mindset changed later. The brigades and other formations with tanks started getting inducted into the force in Eastern Ladakh in 2013-14 onwards but the numbers increased manifold after the Galwan Valley clash incident in 2020.

The Indian Air Force's C-17 and Ilyushin-76 transport aircraft brought in tanks and BMPs from deserts and plains in large numbers after that incident.

The armoured strength in the area has been strengthened by the Army to an extent where they can tackle any misadventure by the adversary.

https://economictimes.indiatimes.com/news/defence/eastern-ladakh-indian-army-tanks-combat-vehicles-carry-out-drills-to-cross-indus-river-attack-enemy-positions/articleshow/101587908.cms

Hindustan Times

Mon, 10 Jul 2023

Indian Navy to get 26 Rafale-M Fighters and Three Attack Submarines from France

The Indian Navy will add more teeth to its already formidable arsenal in the coming years with Prime Minister Narendra Modi expected to sign a deal for acquisition of 26 Rafale-Marine fighters for the INS Vikrant aircraft carrier and a repeat order for building three more Scorpene (Kalveri) class submarines at Mazagon Dockyards Limited (MDL) through the “Make in India” route during his two-day visit to France this week, people familiar with the matter said.

While South Block is tight-lipped about the defence deals to be signed during PM Modi's visit to Paris on July 13-14, it is understood that India and France will sign a defence-industrial road map to push India to scale up its manufacturing of hardware platforms through indigenously developed engines and technologies. PM Modi and French President Emmanuel Macron will also unveil a bilateral road map for the Indo-Pacific with specific steps to ensure freedom of navigation and maritime security for sea lanes in the area contested by a rising China.

According to inputs from South Block, a meeting of the Defence Acquisition Council (DAC) has been convened by defence minister Rajnath Singh on July 13 for granting acceptance of necessity (AON) to the Indian Navy to acquire 26 Rafale-M fighters as well as give the green signal to the building of three more Kalveri class submarines at the MDL. The last of the six Kalveri class submarine, INS Vagsheer, is expected to be commissioned next year with the vessel currently undergoing tests and trials.

The three additional Kalveri class submarines will be fitted with air independent propulsion (AIP), which has been designed by the DRDO but will be tested and validated by the French Naval Group. The AIP gives longer endurance to a normal diesel attack submarine and allows it to remain submerged for over a week without the need to surface to charge its batteries.

While the DAC will approve AON for acquisition of 26 Rafale-M aircraft for INS Vikrant, the price, terms and conditions will be negotiated after this through the government-to-government route with the French government getting the best price from Dassault Aviation. All the 26 fighters will be single-seater versions with Indian Navy pilots being trained in France as well as on advanced simulators in Goa. All the French Navy pilots flying Rafale-M on aircraft carrier Charles de Gaulle have been trained on simulators as a twin-seater means reduction in the armament carrying capacity of the fighter. It is understood that one squadron (18 fighters) will be onboard INS Vikrant and the remaining eight will be based in Goa as reserves for rotation.

The repeat order for three Scorpene class submarines through the government-to-government route will not only add muscle to the Indian Navy to take up the challenge of PLA expansion in the Indian Ocean but also give a new lease of life to submarine manufacturing capacity of MDL after INS Vaghsheer is commissioned in 2024.

https://www.hindustantimes.com/india-news/indian-navy-to-get-26-rafale-m-fighters-and-three-attack-submarines-from-france-101688953456665.html

THE ECONOMIC TIMES

Sun, 09 Jul 2023

DefTech High on Agenda as PM Narendra Modi Embarks on France Trip

Full technology transfer for helicopter engines, acquisition of fighter jets for Indian Navy and the possibility of extending Scorpene submarine manufacturing line in India will be on the agenda during Prime Minister Narendra Modi's upcoming visit to Paris.

The PM will visit France on July 13 and 14 and is the guest of honour at the Bastille Day Parade. He will be accompanied by a business delegation of top CEOs.

Sources told ET that the announcement of 100% technology transfer for the Shakti engine that powers the Indian advanced light helicopters (ALH) could be a highlight of the trip. The engines

are currently being made by Hindustan Aeronautics Ltd. A full technology transfer would lead to far-reaching benefits for Indian industry.

India has been looking to acquire helicopter engine technology as it has embarked on a self-dependence mission for rotary-wing aircraft. While smaller helicopters are being made domestically, the under-development Indian multi-role helicopter programme will further reduce imports.

India is also looking to acquire 26 of the Rafale M combat aircraft that France has offered. The decision to go ahead with an inter-governmental agreement (IGA) to acquire the fighter jets is likely to be cleared by the Defence Acquisition Council before the visit. Sources said DAC could clear the deal as an off-the-shelf purchase to meet the requirements of the Navy that has two operational aircraft carriers but not adequate fighter jets. An IGA model to purchase the fighters already exists, as the Air Force order for 36 Rafales followed the same route.

DAC is also likely to discuss the Navy requirement of submarines. It's expected to consider an offer from Mazgaon Dockyards to build additional three French-origin Scorpene class submarines. India has been looking for ways to augment its fleet as Russian-origin submarines are being retired after reaching the end of their service life.

India has constructed five Scorpene-class submarines at MDL, with a sixth to be commissioned early next year. Given that seven Russian-origin Kilo-class submarines are due for retirement, the case for extending the Scorpene line is gaining strength.

The Navy is also pursuing a case for new submarines under Project 75I, but it is facing delays as foreign technology providers are finding it difficult to meet requirements.

https://economictimes.indiatimes.com/news/defence/deftech-high-on-agenda-as-pm-narendra-modi-embarks-on-france-trip/articleshow/101618808.cms

FINANCIAL EXPRESS
Read to Lead

Fri, 07 Jul 2023

India-France Partnership: A Strong Foundation for Defence, Nuclear and Space Collaboration

Prime Minister Narendra Modi’s upcoming visit to France holds immense significance as it follows his recent successful state visit to the United States. The visit to France is expected to witness major announcements in the fields of defense, nuclear energy, space exploration, and more.

On Thursday, National Security Adviser (NSA) Ajit Doval engaged in productive discussions with Emmanuel Bonne, the diplomatic adviser to French President Emmanuel Macron, during his visit to Delhi.

These talks form part of a strategic dialogue, focusing on preparations for Prime Minister Modi’s upcoming visit to France. The visit holds great significance as France is a vital partner for India in defense, space, and nuclear technology, with the French offering to construct additional Scorpene submarines. While the Indian Navy is pursuing Project 75 India, aiming to develop new underwater vessels using different technology, the French were previously excluded from the tender due to not meeting certain specifications. Moreover, discussions are underway regarding a government-to-government agreement for the procurement of Rafale marine aircraft for the Indian Navy, with an

official announcement expected next week. The Indian Navy has already chosen the Rafale (M) aircraft for its aircraft carrier operations, surpassing the American F/A-18 Super Hornets.

Building engine to power Advanced Multirole Combat Aircraft (AMCA)

The French engine manufacturer Safran is expected to jointly design, develop, test, manufacture, and certify an engine for India's AMCA and deck-based fighter for aircraft carriers. In contrast to the recent US deal for jet engine co-manufacturing with limited technology transfer, reportedly France is offering India a 100 percent transfer of technology for a high-thrust jet engine. Safran's commitment to establishing a center of excellence in gas turbine technology in India showcases their dedication to fostering indigenous capabilities and strengthening the collaboration.

Meanwhile, Financial Express Online had earlier this year reported that Rolls-Royce, a prominent British company, has expressed interest in partnering with India for combat engine development, emphasizing a unique co-creation model that enables India to own the intellectual property for critical technologies.

France: A Reliable Defence Supplier:

France has proven to be a trusted and reliable defence supplier to India, contrasting with the United States' track record during crises. France was the first country to establish a strategic partnership with India in 1998, which has since expanded to over 30 countries. The enduring relationship between India and France has been centered around nuclear energy, space exploration, and defense cooperation. France's support for India during nuclear tests and its early civil nuclear agreement exemplify their commitment to this partnership.

Nuclear and Space Cooperation:

France's support for India during the nuclear tests in 1974 and 1998, as well as its early civil nuclear agreement, demonstrated their steadfastness as a nuclear partner. French companies have outperformed their American counterparts in India's nuclear market, with potential projects such as constructing nuclear reactors. Additionally, the long-standing collaboration in space technology has facilitated the development of India's independent launch capabilities, with Arianespace being a preferred agency for launching Indian satellites. The joint naval exercises and bilateral air force exercises further highlight the strategic autonomy shared between India and France.

https://www.financialexpress.com/business/defence-india-france-partnership-a-strong-foundation-for-defence-nuclear-and-space-collaboration-3160459/

THE ECONOMIC TIMES

Sun, 09 Jul 2023

Rajnath Singh to Begin 3-Day Visit to Malaysia Today

Defence Minister Rajnath Singh is all set to start his three-day official visit to Malaysia on Sunday, to deepen the defence cooperation between the two countries.

Taking to Twitter, the Defence Minister said, "Today, 9th July, I shall be reaching Kuala Lumpur, Malaysia, on a three-day official visit."

"Looking forward to hold bilateral talks with my counterpart, Mr Dato' Seri Mohamad Hasan, and deepening the defence cooperation between the two countries," he added.

Rajnath Singh and Dato' Seri Mohamad Hasan will exchange views on regional and global issues of shared interest. Singh will also call on Malaysia's Prime Minister YB Dato' Seri Anwar bin Ibrahim.

The Ministry of Defence statement said, "India and Malaysia have a common interest in peace and prosperity of the entire region. The two democracies have a robust and multifaceted relationship which has expanded into several strategic areas, including defence and security."

Both countries are committed to working under the vision of the enhanced strategic partnership established during Prime Minister Narendra Modi's visit to Malaysia in 2015, the Defence Ministry statement said.

India and Malaysia share deep and warm relations. Recently in April, India and Malaysia agreed to settle trade in the Indian rupees, the Ministry of External Affairs announced.

The announcement came against the backdrop of ongoing official efforts to Safeguard Indian trade from the impact of the Ukraine crisis.

Earlier, this June, Minister of State (MoS) for External Affairs V Muraleedharan met with Malaysia's Human Resources Minister V Sivakumar and they agreed to sign a Memorandum of Understanding on opening all sectors to Indian workers in Malaysia.

Taking to Twitter, Muraleedharan stated, "Glad to meet Hon'ble Minister of Human Resources Malaysia H.E. @Sivatronoh in Kuala Lumpur Thanked the Minister & Malaysian government for opening all sectors to Indian workers at par with other foreign workers in Malaysia. Both agreed to expedite signing an MoU in this regard."

The announcement came against the backdrop of ongoing official efforts to Safeguard Indian trade from the impact of the Ukraine crisis.

MoS V Muraleedharan also attended cultural performances organised as part of an event titled 'Pravasi Bharatiya Utsav'.

https://economictimes.indiatimes.com/news/defence/rajnath-singh-to-begin-3-day-visit-to-malaysia-today/articleshow/101609267.cms

DECCAN HERALD

Sat, 08 Jul 2023

India Committed to Strengthen its Relations with Tanzania: EAM Jaishankar

External Affairs Minister S Jaishankar on Saturday reaffirmed India's commitment to strengthen relations with Tanzania as he held "comprehensive and productive" talks with his counterpart here to create the pathway to boost bilateral ties in various sectors, including trade.

Jaishankar met Tanzania's Minister of Foreign Affairs and East African Cooperation Dr. Stergomena Tax at the 10th India-Tanzania Joint Commission Meeting.

"Comprehensive and productive meeting of the 10th India-Tanzania Joint Commission on Economic, Technical and Scientific Cooperation today in Dar es Salaam. Thank my co- chair FM Dr. Stergomena Tax," he tweeted.

Jaishankar said his discussions with Tax covered various domains of cooperation including political, trade and investment, development partnership, capacity building, defence and security,

agriculture, health, education, skill and ICT development, energy, mining, blue economy, people-to-people and cultural relations.

"Shared perspectives on the region and of our collaboration in Commonwealth, NAM and UN," he tweeted.

Jaishankar said in a statement that India and Tanzania's relations have always been strong and have been characterised by high-level visits, several agreements, very robust economic engagement, growing development cooperation, and excellent cooperation in the multilateral forum.

"For us, Tanzania is the fourth-largest trade partner in Africa. It is the biggest development partner in the continent, and I am truly pleased that the current momentum is now developing into a growing cooperation, and I would like to reaffirm India's commitment to strengthen and deepen our relations with Tanzania," he said in his opening remarks at the meeting.

Highlighting bilateral engagements, he said the two countries saw increasing political cooperation and broadening of trade basket, despite the challenges of the COVID-19 and disruptions caused by conflicts in other parts of the world.

"We have seen our bilateral trade cross to new levels. Our figures, in fact, show that it is now in excess of USD 6.4 billion. Our investments in Tanzania are also increasing," he said in a statement issued by the Ministry of External Affairs.

"I would like to thank the Tanzanian Government for creating a positive, enabling environment for our business communities to expand their activities," he said.

India is today among the fastest-growing large economies of the world and Tanzania is certainly among the fastest-growing economies in Africa, and this rapid growth on both ends will surely create more opportunities for businesses, Jaishankar said.

"I'm very confident that today's meeting would help to make our relationship more contemporary. It would allow us to fashion a new agenda for us to take forward. And certainly, the political leaderships in both our countries expect that the foreign ministries would create the pathway to take our relationship to a higher level," he said.

Jaishankar arrived here on Thursday after visiting Zanzibar.

https://www.deccanherald.com/national/india-committed-to-strengthen-its-relations-with-tanzania-eam-jaishankar-1235149.html

Hindustan Times

Mon, 10 Jul 2023

From Jet Engines to RPAS: How US is Sharpening India's Edge in Defence

The upcoming mega deals with the United States for jet engines and weaponised remotely piloted aircraft systems (RPAS) have turned the spotlight on the US's role in equipping the Indian military with modern weapons and systems, the capability boost it has provided to the armed forces, and the country's attempts to diversify its arms purchases, officials aware of the matter said on Sunday.

The two proposed deals with a combined value of more than $4 billion also underline India's push for indigenisation as they will involve transfer of technology in areas where the country has struggled to achieve a breakthrough, the officials said asking not to be named.

The acquisition of 31 MQ-9B General Atomics RPAS and the production of General Electric's F414 engines in the country came into sharp focus during Prime Minister Narendra Modi's first state visit to the US in June.

The US-origin platforms currently in the Indian armed forces include the C-17 Globemaster III heavy-lifters, C-130J special operations aircraft, P-8I submarine hunter planes, AH-64E Apache attack helicopters, CH-47F (I) Chinook multi-mission helicopters, MH-60R naval helicopters, and M777 ultra-light howitzers. Each of these platforms has helped India fill critical capability gaps and sharpen its military edge, the officials said.

These platforms were gradually inducted into the armed forces 2011 onwards and have a combined value of more than $16 billion. The C-17s, C-130Js, P-8Is, Chinooks, Apaches and the M777s have played a key role in strengthening the military's posture in the Ladakh sector in the backdrop of the lingering border row with China along the Line of Actual Control, the officials said. India has also bought Sig Sauer assault rifles for its troops from the US.

The India-US defence relationship is on an upward trajectory, and weapons and systems bought from the US during the last decade have significantly boosted India's capabilities to take on the challenges it faces, said Air Vice Marshal Anil Golani (retd), additional director general, Centre for Air Power Studies.

"But what we need now is transfer of critical technologies to produce weapons and systems in the country. It remains to be seen what kind of technology transfer the jet engine and drone deals will involve. Mere licensed production and assembly of platforms isn't enough to power the indigenisation drive," Golani said.

The jet engine and drone deals with the US are being negotiated at a time when the US is attempting to wean India away from its dependence on Russian military hardware in the backdrop of the Ukraine crisis and offering to provide alternatives for the supply of weapons, systems and spares to keep the Indian armed forces battle ready.

The deal between the world's leading aircraft engine maker GE Aerospace and Hindustan Aeronautics Limited (HAL) to produce fighter jet engines in the country for the Tejas light combat aircraft Mk2 will involve 80% technology transfer, is estimated to be worth around $1 billion, and will result in the new fighter jet having an indigenous content of around 75%.

The deal to produce 99 F414 engines under licence is likely to be signed during the current financial year, and the first lot of engines will be made in India three years thereafter. The technology transfer will cover 11 critical areas many of which were entirely off-limits more than a decade ago when GE Aerospace, and India's Aeronautical Development Agency (ADA) began talks on the possible production of the engines in the country.

Back then, the US agreed to only 58% technology transfer, keeping a string of key engine technologies out of India's reach, as previously reported by HT.

India will also negotiate a higher element of transfer of technology in the drone deal (estimated to be worth $3 billion) it is pursuing with the US to boost the military's strength. India is looking at doubling the element of technology transfer that is currently on offer --- from 8-9% to 15% to 20%,

To be assembled in India, the versatile platform will have the capability to strike targets with its on-board weapons, it will be used for intelligence, surveillance and reconnaissance (ISR); and its other roles include electronic warfare, defensive counter air and airborne early warning.

Building defence capabilities is a top priority for India. The country was the fourth biggest military spender in the world in 2022 after the US, China and Russia, the Stockholm International Peace Research Institute said in a report published in April.

In February, India set aside ₹5.93 lakh crore for defence spending in this year's budget, including a capital outlay of ₹1.62 lakh crore for the military's modernisation. (The budget also includes a revenue expenditure of ₹2.7 lakh crore and pension outlay of ₹1.38 lakh crore.)

India allocated ₹5.25 lakh crore for military spending in last year's budget, ₹4.78 lakh crore in 2021-22, and ₹4.71 lakh crore the year before.

India has also taken several steps over the last four to five years to boost self-reliance in defence. These include creating a separate budget for buying locally made military hardware, increasing foreign direct investment from 49% to 74%, and notifying hundreds of weapons and systems that cannot be imported.

https://www.hindustantimes.com/india-news/upcoming-mega-deals-highlight-us-role-in-equipping-indian-military-and-push-for-indigenisation-101688925694122.html

THE TIMES OF INDIA

Sun, 09 Jul 2023

Day after US' Offer, Ukraine Says it will Use Cluster Bombs along 'Defence Lines'

Ukraine's defence minister Oleksii Reznikov welcomed a US decision to send cluster bombs to Kyiv, saying it would help to liberate Ukrainian territory but promised the munitions would not be used in Russia.

The US announced on Friday it would supply Ukraine with widely banned cluster munitions for its counteroffensive against occupying Russian forces.

Reznikov said the munitions would help save the lives of Ukrainian soldiers, adding Ukraine would keep a strict record of their use and exchange information with its partners. "Our position is simple - we need to liberate our temporarily occupied territories and save the lives of our people," Reznikov wrote on Twitter.

"Ukraine will use these munitions only for the de-occupation of our internationally recognized territories. These munitions will not be used on the officially recognized territory of Russia."

Cluster munitions are prohibited by more than 100 countries. They typically release large numbers of smaller bomblets that can kill indiscriminately over a wide area. Those that fail to explode pose a danger for decades.

Moscow again criticised the US decision on Saturday, describing it as another "egregious" example of Washington's "anti-Russian" course. "Another 'wonder weapon', which Washington and Kyiv are counting on without considering its grave consequences, will in no way affect the course of the special military operation, the goals and objectives of which will be fully achieved," foreign ministry spokeswoman Maria Zakharova said in a statement.

Jake Sullivan, US President Joe Biden's national security adviser, sought on Friday to make the case for providing the arms to Ukraine to reclaim territory seized since Russia invaded in February 2022. "We recognize that cluster munitions create a risk of civilian harm from unexploded ordnance," Sullivan told reporters. "But there is also a massive risk of civilian harm if Russian troops and tanks roll over Ukrainian positions and take more Ukrainian territory and subjugate more Ukrainian civilians because Ukraine does not have enough artillery," he said.

Reznikov said the military would not use cluster munitions in urban areas and would use them only "to break through the enemy defence lines".

Russia, Ukraine, and the United States have not signed the Convention on Cluster Munitions, which bans the production, stockpiling, use, and transfer of the weapons.

Ukrainian President Volodymyr Zelenskiy, returning home from a visit to Turkey, brought with him five commanders of Ukraine's former garrison in Mariupol, forced to live in Turkey under the terms of a prisoner exchange last year.

The commanders, lionised as heroes in Ukraine, led last year's defence of the port, the biggest city Russia captured in its invasion. Thousands of civilians were killed inside Mariupol when Russian forces laid the city to waste during a three-month siege.The Ukrainian defenders, who held out in tunnels and bunkers under a steel plant, were finally ordered by Kyiv to surrender in May last year. Moscow freed some of them in September last year.

https://timesofindia.indiatimes.com/world/europe/day-after-us-offer-ukraine-says-it-will-use-cluster-bombs-along-defence-lines/articleshow/101605313.cms

THE ECONOMIC TIMES

Sun, 09 Jul 2023

Russia Calls on NATO to Discuss Ukraine Nuclear Plant at Summit

Russia's Foreign Ministry spokesperson Maria Zakharova said on Sunday that the leaders of the U.S.-led transatlantic NATO defence alliance should discuss Ukraine's Zaporizhzhia nuclear plant at their summit this week.

NATO leaders will meet in Vilnius on July 11-12 to tackle a wide range of topics, from divisions over Ukraine's membership bid and Sweden's accession to boosting ammunitions stockpiles and reviewing the first defence plans in decades.

Accusing Ukraine of "systematic infliction of damage" to the Zaporizhzhia nuclear plant, Zakharova said that "the NATO summit's key attention should be devoted to it."

"After all, the vast majority of the alliance members will be in the direct impact zone" (if something were to happen at the plant), Zakharova said on the Telegram messaging app.

Vilnius is some 1,000 kilometres (620 miles) from the nuclear plant, Europe's largest.

Both Russia and Ukraine have accused each other of planning to attack the plant, which is located on Russian-held territory in Ukraine's Zaporizhzhia region, near the front line of Russia's conflict with Ukraine.

Ukraine President Volodymyr Zelenskiy has for days warned of the grave threat at the facility, most recently saying Russian forces had mined the roof of several reactors.

The International Atomic Energy Agency experts based at the plant that they had yet to observe any indications of mines or explosives at the plant, but they also needed more access to be sure.

https://economictimes.indiatimes.com/news/defence/russia-calls-on-nato-to-discuss-ukraine-nuclear-plant-at-summit/articleshow/101610261.cms

Press Information Bureau
Government of India

Ministry of Science & Technology

Fri, 07 Jul 2023

Union Minister Dr Jitendra Singh Says, India has the Potential to be a Green Hydrogen Exporter: Addresses the International Conference of Green Hydrogen 2023 Organized by Government of India

Dr Jitendra Singh says Prime Minister Shri Narendra Modi approved the launch of the National Green Hydrogen Mission with a budgetary outlay of about 2.4 billion dollars and it reflects India's firm resolve to address the difficult challenges of de-carbonization on our pathways to Net Zero in 2070

Hydrogen Mission has great potential for job generation through Startup ecosystem through creation of a mechanism for harnessing proactive support of Banking Finances: Dr Jitendra Singh

India has been at the forefront of the global narrative for fighting climate change and has done far more than what would be a commensurate response that would be called for on account of our historical or even our current per capita carbon emissions: Dr Jitendra Singh

Union Minister of State (Independent Charge) Science & Technology; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh today said that India has the potential to be a Green Hydrogen exporter.

Addressing the International Conference of Green Hydrogen 2023, Dr Jitendra Singh said, Prime Minister Shri Narendra Modi approved the launch of the National Green Hydrogen Mission with a budgetary outlay of about 2.4 billion dollars and it reflects India's firm resolve address the difficult challenges of de-carbonization on our pathways to Net Zero in 2070.

Dr Jitendra Singh pointed out the painstaking efforts undertaken over the last two years since the Prime Minister had announced India's intention to create a dedicated mission for Green Hydrogen culminating in the announcement of the National Green Hydrogen Mission in January this Year.

The Minister said, India has been at the forefront of the global narrative for fighting climate change and has done far more than what would be a commensurate response that would be called for on account of our historical or even our current per capita carbon emissions.

Dr Jitendra Singh said, India is uniquely poised to emerge as a prominent global leader in production of Green Hydrogen not just on the basis of its abundant renewable energy resources and the benefits of one of the world's lowest costs of regeneration, but also because of its R&D ecosystem and the framework designed for R&D in cross-cutting sectors of hydrogen production, transport, electrolyze manufacturing, support infrastructure, fuel cell EVs, storage and utilisation.

Dr Jitendra Singh said, as Minister for Science and Technology, it's wonderful to see the positive synergy between the private sector and academic institutions and he hoped that this translates into

effective collaboration in every field of research required in the expansion of possibilities of Green Hydrogen.

Dr Jitendra Singh also pointed out that Hydrogen Mission has great potential for job generation through the Startup ecosystem as India has emerged number three in the world with about one lakh startups and 100 odd Unicorns in various sectors including in cutting edge science frontiers. He said, Indian Startup system proposed to create a mechanism for harnessing proactive support of Banking Finances.

Dr Jitendra Singh informed that a draft R&D Roadmap for Green Hydrogen Ecosystem in India has been released and thanked Professor Ajay Sood, Principal Scientific Advisor and his team and the Ministry of New and Renewable Energy For this milestone. A public-private partnership framework for R&D called the Strategic Hydrogen Innovation Partnership or SHIP will be facilitated under the Mission. The Framework will entail creating a dedicated R&D fund, with contributions from Industry and Government institutions, the Minister added.

The R&D programme under the Mission will seek to develop globally competitive technologies in various segments. Consortium-based approach and leveraging the strengths of each institution/industry will be encouraged.

The Minister said India will also leverage the inherent strengths and technological experience of institutions such as BARC, ISRO, CSIR, IITs, IISc and many more and expressed confidence that this will see some path breaking research that will come out of the exercise and create huge multiplier effects on the domestic green hydrogen manufacturing sector in this decade and the next.

Dr Jitendra Singh said, it is encouraging to see that the Conference has provided a platform for all stakeholders to come together and deliberate on the great global challenges facing humanity in the form of climate change and to discuss one of the most promising pathways for decarbonizing hard to abate sectors through green hydrogen.

The variety of speakers was an excellent mix of technical experts, scientists and private sector practitioners, as well as public policy experts, internationally reputed innovators and offtake industries and it brought to fore the exemplary need to create such platforms for industry academia collaboration.

In his address, Professor Ajay Sood said, Green Hydrogen is here to stay and informed that so far 16 nations have announced Green Hydrogen Mission Plans. He said, an integrated approach is needed to minimise failure to this Mission and it should be looked at from five viewpoints-technical, commercial, regulatory, product integration and logistics.

https://pib.gov.in/PressReleasePage.aspx?PRID=1937988

THE HINDU

Sun, 09 Jul 2023

ISRO to Transfer SSLV to Private Sector

The Indian Space Research Organisation (ISRO) will soon transfer its Small Satellite Launch Vehicle (SSLV) to the private sector, after conducting two development flights of the rocket that seeks to provide on-demand services to put satellites weighing up to 500 kg in a low-earth orbit.

The space agency has decided to opt for the bidding route to transfer the mini-rocket to the industry, a senior official said.

"We will be transferring the SSLV completely to the private sector. Not just the manufacturing, but full transfer," the official said. The maiden flight of the SSLV in August last year was a failure due

to vibration disturbance for a short duration on the Equipment Bay deck during the second-stage separation. The ISRO took corrective actions after conducting an in-depth analysis of the fault and carried out a successful launch of the SSLV in February.

The SSLV injected the ISRO's EOS-07 satellite, US-based firm Antaris' Janus-1 and Chennai-based space start-up Space Kidz's AzaadiSAT-2 satellites into a 450-km circular orbit.

Small rockets, such as the SSLV, target nano and micro-satellites, which weigh less than 10 kg and 100 kg respectively, and offer on-demand launch services, without requiring clients to wait for larger rockets to carry them as co-passengers.

Last year, the ISRO had awarded a contract to build five polar satellite launch vehicles (PSLVs), its warhorse rocket with 54 successful launches, to a consortium of Hindustan Aeronautics Limited and Larsen and Toubro.

A recent report prepared by the Indian Space Association and consultancy firm EY India said commercial satellite launch services can see India's domestic space industry contribute $13 billion to the economy by 2025.

The SSLV was the sixth launch vehicle developed by the ISRO after the Satellite Launch Vehicle-3 (SLV-3), Advanced Satellite Launch Vehicle (ASLV), Polar Satellite Launch Vehicle (PSLV), Geosynchronous Satellite Launch Vehicle (GSLV) and Launch Vehicle Mark-3 (LVM-3). The SLV-3 and the ASLV have since been retired.

https://www.thehindu.com/sci-tech/science/isro-to-transfer-sslv-to-private-sector/article67060814.ece

Fri, 07 Jul 2023

Chandrayaan 3 will be a Success, Corrected our Mistakes, Lander Strengthened: Ex-ISRO Chief to News18

The Indian Space Research Organisation has silently worked over the past four years to launch Chandrayaan 3, India’s ambitious project to land on the moon and get a rover to carry out scientific experiments to study the lunar environment. The man who headed Chandrayaan 2 and oversaw preparations for Chandrayaan 3, former ISRO chairman K Sivan, spoke exclusively to News18 about the launch and the work that followed after the last mission failed. Edited excerpts:

Ever since the failure of Chandrayaan 2 in 2019, how has the journey been over the past nearly 4 years, especially for the team which is working on the project?

Over the past four years, tremendous work has been done. And the first and foremost one was that in Chandrayaan 2, the landing phase was not successful, whereas the orbital mission was partly successful. The data that we gathered during that time, that data was analysed very thoroughly, understood what really went wrong, and now for each problem that we observed corrective actions have been taken. Not only that, wherever the margins are less, the robustness level was increased. In the past four years, these works were done very thoroughly, meticulously, and then the tests have been done very exhaustively and ensured that everything is intact. With this confidence, now the ISRO is going for the next mission, Chandrayaan 3. ISRO has spent a lot of time looking at what went wrong in Chandrayaan 2. What really went wrong, according to you? Things that you can explain to a common man.

Basically, there were a few things, not only one problem. One was the propulsion system. Dispersion in the propulsion system in certain regions of the flight was more than what we expected, that means in that total landing phase we had four phases: one is that rough breaking phase where the maximum velocity has to come down, then the altitude hold phase, then fine breaking phase, then landing phase. Like that four phases are there.

In the rough breaking phase, this propulsion system worked very nicely without any problem. In the altitude hold phase, yes, that time also propulsion system worked very nicely, but the dispersion level was sometimes more than what we assumed before the flight. This was one problem and because dispersion levels were more than expected, the guidance software was not able to handle it properly, so it was misbehaving. Instead of correcting, instead of reducing the thrust level, it was increasing the thrust level. So, our guidance software misbehaved. Along with the guidance software misbehaviour, with the control systems also there were limitations. All these three things combined made this landing a hard landing. If anyone of the issues was not there, the mission would have been a success. We have understood the total data, analysed the data, and understood the problem. Now corrective actions have been taken considering all these issues.

You talk about corrective actions; any changes to either the rover or the lander apart from the corrective steps that you mentioned?

Yes. Some improvements were made to overcome the problem. From what we have seen, we have added more redundancy. Suppose one system is failing, the data will be taken from the other system. This redundancy has been increased. The allowable dispersion level is enhanced, the leg design has been modified to withstand higher landing velocity also.

So you are saying if in case the lander lands with a higher speed, it can still withstand the impact?

Higher speed, yes, but not like very large speed, like earlier it could withstand up to 2 metres/second velocity, now that has been increased to 3 metres/ second. Some extra margins have been built in the allowable limit within the capacity, within the correctable actions. Robustness margins have been increased in this one.

For the whole team, how different will this Chandrayaan 3 be?

Actually, when we went ahead with the Chandrayaan 2 also, people had confidence that it will be going without any problem because space scientists always go ahead with the mission after ensuring that whatever problem is encountered will be corrected and with that confidence only we go through. In Chandrayaan 2 also we went through like that. But the space system is hard always in the first mission, we always learn something that wouldn't have come out on the ground, it will happen only in the flight. That's what we used to call unknown unknowns. So this type of thing comes in the first mission. So for us, unfortunately, it ended up with a mission failure, but we have learnt a lot of things. We have full confidence that this time it will be successful because we know that all the issues that we faced are corrected and also additional margins have been increased.

How easy or difficult was it to motivate the team? We saw the Prime Minister being present when the mission failed, you got emotional, and after that, you got back to work. What were the challenges according to you?

The main challenge was analysing the data, going through the data and finding out the exact cause, that's a real challenge. We used to get a huge amount of data for a flight and each byte of data was analysed to understand what really went wrong. So, every aspect was looked into very carefully so that no stone is unturned. They recreated the problem at the lab level.

Just to put this in context for us, India can showcase that it can attempt and successfully carry out a soft landing on the surface. How important is this?

First of all, demonstrating this, that India has acquired one more technology of landing on a celestial body, this technology we have gained…these are the big lessons we have, so it will have a future prospect of landing sometimes, a man landing on the moon like that. The second point is scientific measurements, science about the moon, observing from a particular orbit, etc. Now by landing, we can do experiments. The more scientific experiments we do, the more we will get to know about the moon, for future generations.

Chandrayaan 3 is the focus now, but I want to ask you about two other important projects of ISRO. One is Gaganyaan that's also in the works right now. What can we expect?

We wanted to ensure that the vehicle wherein they are travelling, the launch vehicle, that should be of human-rated level, reliability level. Otherwise, we are able to launch only spacecraft, now humans too are being launched, so obviously reliability level will be higher, so it will be human-rated. So that is one technology. Another one is the technology where we need to create an environment which is easy for the people to survive, that is a crew module and environment control life support system is another system. And also when we are launching them, in case there's some emergency and we ensure that these astronauts are back safely, escape from the system and brought back safely, then the fourth one is that is after the mission is over, this astronaut should be brought down, and ensuring that they are passing through a very adverse environment of heavy heat and land at the exact location. So here, a huge amount of technology development is required.

For the past five years, this is a huge amount of work has been carried out, and now that the project is in the testing phase where we need to do a lot of tests with the system…and once these tests are completed, then we will be going for the mission, Gaganyaan.

The other ambitious project of ISRO is NISAR, a joint effort with NASA. Probably one of the costliest projects we have ever seen in recent times. How important is it for the country and ISRO?

Actually, this particular programme is an excellent collaborative programme between NASA and ISRO for making a combined satellite, NISAR. The payload is from our side and the main part of the payload is from NASA and it will be launched by ISRO. This is the costliest observational satellite built so far, across the globe. And this particular satellite's special feature is that it can identify even a one-centimetre movement on the surface of the Earth from a height of around 700 km, and it will be giving so much information about climate change, earthquakes, and glacier melting. Such data will be available much before any major event and such events can be predicted using this information. So this satellite is not only going to give information to US or India. Once it is put into service, it will be useful globally, which is so important for humanity.

https://www.news18.com/india/chandrayaan-3-will-be-a-success-corrected-our-mistakes-lander-strengthened-ex-isro-chief-to-news18-8271091.html

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India's Space Startups Exploring Niche Markets, Global Collaborations

From aiming to re-fuel satellites in orbit to monitoring the Earth's health, Indian start-ups in the space sector are exploring niche markets with the hope of striking it big as opportunities for global commercial collaborations open up. India becoming a signatory to the Artemis Accords and the focus on the space sector, particularly on addressing issues related to export control and technology

transfer, during Prime Minister Narendra Modi's recent visit to the US will open up doors for private players, industry leaders believe.

Since India opened up its space sector in 2020, more than 150 start-ups have come up in areas such as building rockets and satellites, setting up astronaut training facilities and exploring possibilities for space tourism.

"It is a good start, because it was unheard of for the US to supply any space or defence-related technology 10-15 years ago. It was a taboo. Now, we are talking of working together in sunrise sectors," Manastu Space co-founder Tushar Jadhav told PTI.

Mumbai-based Manastu is developing green propulsion systems for satellites and hopes to validate its technology during a test flight in the coming year. It is also designing a fuel station in space to provide in-orbit refuelling service for satellites which otherwise have to be abandoned after the on-board fuel is exhausted.

Director General, Indian Space Association, Lt Gen A K Bhatt (retd), said, "Many technologies in the space sector are dual use technologies, but this is an indication that now there will be easing of processes for this."

In November last year, Hyderabad-based Skyroot Aerospace wrote its name in spacefaring history with the successful launch of its Vikram-S rocket, the first privately built space rocket in India, within four years of its founding.

The company, founded by former scientists and engineers from ISRO, is now developing three variants of the Vikram series of rockets to put small satellites in orbit.

"The kind of work that is being done by the private sector is not replicating what ISRO has done. The launch vehicles developed by Skyroot and Agnikul have their own uniqueness. The satellite applications are very niche and cutting edge in terms of technology," Indian National Space Promotion and Authorisation Centre (IN-SPACe) chairman Pawan Goenka told PTI.

Last year, Chennai-based Agnikul Cosmos inaugurated its own launchpad within the Satish Dhawan Space Centre at Sriharikota, from where ISRO carries out its space launches.

Since the demand for space technology and space data is very low in India, domestic private players are exploring global markets for their products.

"They are beginning to see some successes. Getting some orders from government agencies. That's another big thing that is happening," Goenka said, referring to the five-year contract Bengaluru-based Pixxel bagged from the US National Reconnaissance Office for supply of hyper-spectral imagery from its satellites.

The space economy in India is very small accounting for approximately 2.1 per cent of the global space economy in 2020 amounting to $9.6 billion, which was 0.4 per cent of the Gross Domestic Product (GDP) in the country.

"Prime Minister Narendra Modi broke the taboos of the past, and unlocked space technology to the private sector. Within three years we have more than 150 start-ups, some of them first of its kind. It is being acknowledged on world parameters," Union Minister for Science and Technology Jitendra Singh told PTI.

He said the US now considers India as an equal collaborator in the space sector, which is in contrast to what was 50 years ago when every country looked towards the US for cues in the space sector.

https://economictimes.indiatimes.com/tech/startups/indias-space-startups-exploring-niche-markets-global-collaborations/articleshow/101612685.cms