समाचार पत्रों से चयित अंश
Newspapers Clippings

दैनिक सामयिक अभिज्ञता सेवा

A Daily Current Awareness Service

Vol. 44 No. 234 05 December 2019

रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केन्द्र
Defence Scientific Information & Documentation Centre
मैटकॉफ हाऊस, दिल्ली - 110 054
Metcalfe House, Delhi - 110 054

Stock Daily Dish

Thu, 05 Dec 2019

India test fires scramjet demonstrator aircraft

India successfully launched the indigenously-developed Hypersonic Technology Demonstrator Vehicle in its maiden test from a base off the Odisha coast on Wednesday.

The HSTDV was successfully test-fired by the Defence Research and Development Organisation from Launch Complex-4 of the Integrated Test Range on Dr Abdul Kalam Island in Bay of Bengal at 11.27 am, DRDO sources said.

A defence ministry statement said the DRDO launched the technology demonstrator vehicle to prove a number of critical technologies for futuristic missions.

“The missile was successfully launched. Various radars, telemetry stations and electro-optical tracking sensors tracked the vehicle through its course. The data has been collected and will be analysed to validate the critical technologies,” it added.

The HSTDV is an unmanned scramjet demonstration aircraft for hypersonic speed flight, it can cruise at a speed of mach 6 and move up to an altitude of 32.5 km (20 miles) in 20 seconds, the sources said.

Besides its utility for long-range cruise missiles of the future, the dual-use technology will have multiple civilian applications also. It can be used for launching satellites at low cost too, they added.

Describing the maiden trial of the HSTDV as successful, a DRDO scientist said, “The new technology demonstrator vehicle was tested and the observations made by the radars and tracking sensors showed that it was a success.”

The trial was carried out in the presence of senior scientists and defence officials, including DRDO Chairman G Satheesh Reddy and ITR Director B K Das.

The HSTDV can move up to an altitude of 32.5 km in 20 seconds and once it is achieved successfully, India will enter a select club of countries that have such technology.

“The HSTDV project, through which we want to demonstrate the performance of a scramjet engine at a low altitude of 15 to 20 km, was on for a couple of years.

“Under this project, we are developing a hypersonic vehicle to be powered by a scramjet engine,” a DRDO scientist associated with the programme said.

The initial trial seeks to validate the aerodynamics of the air vehicle as well as its thermal properties and scramjet engine performance.

The HSTDV cruise vehicle is mounted on a solid rocket motor, which will take it to a required altitude, and once it attains certain mach numbers for speed, the cruise vehicle will be ejected out of the launch vehicle. Subsequently, the scramjet engine will be ignited automatically.

A battery of tracking system was positioned to track the event, the sources said.

https://stockdailydish.com/india-test-fires-scramjet-demonstrator-aircraft/

THE|DIPLOMAT
Read The Diplomat, Know the Asia-Pacific

Thu, 05 Dec 2019

Naval version of India's Tejas Fighter to conduct maiden flight from carrier

The naval variant of India's Tejas fighter jet is being readied for its first take off from an aircraft carrier

By Franz-Stefan Gady

The premier Defence Research and Development Organisation (DRDO) is set to develop a new twin-engine deck-based fighter aircraft for the Indian Navy to serve on its aircraft carriers, one of which is already in active service, and another is presently under construction, reports *The Hindu.*

The naval version of the Hindustan Aeronautics Limited (HAL) Tejas Light Combat Aircraft (LCA) is being readied for its first-ever take off from the Indian Navy's *Kiev*-class aircraft carrier INS *Vikramaditya*, according to Indian defense industry officials.

"It [the carrier-based take-off] is not too far. Extra safety is being taken and hence time is being consumed," a source within the Defense Research and Development Organization (DRDO) was quoted as saying on December 2 by *The Print*.

The source did not reveal the exact date, but cautioned that more tests will be necessary before the aircraft's launch from the Indian Navy's flattop. In 2o18, DRDO and Aeronautical Development Agency (ADA) sources were still confident that the Tejas would conduct its first take-off and landing in 2019.

The naval variant of the Tejas LCA hit another development milestone last month when it took off for the first time with two beyond visual range (BVR) and two close combat air-to-air missiles (CCM) from the Navy's Shore Based Test Facility (SBTF) located at a naval air station near Dabolim in Goa.

Notably, the Indian Navy has repeatedly ruled out the operational deployment of the naval version of the Tejas LCA as a result a number of technical shortcomings as well as excessive weight, which would prevent the fighter jet from carrying an adequate payload when operating from a carrier.

For now the naval variant of the Tejas is used as a technology demonstrator. DRDO and ADA are already working on a twin-engine medium-weight fighter jet for the Navy's expanding carrier force.

"The Navy has been clear from the very beginning that it needs a twin-engine aircraft and not single-engine because even if an engine fails, the aircraft should be able to land on the carrier," a Navy source told *The Print.*

"[T]he Indian Navy has expressed that, with newly-emerging requirements, only a medium weight category twin-engine aircraft will be inducted for operations," a DRDO source said.

"Currently, the configuration design of a twin-engine naval aircraft as sought by the user has been initiated. The initial flight-testing of this aircraft is scheduled to be carried out by 2026."

The Tejas requires a short take-off but arrested recovery (STOBAR) configured carrier.

INS *Vikramaditya* and INS *Vikrant*, India's first indigenously built flattop, are both fitted with STOBAR systems for launching aircraft from a ski-jump, whereas the second carrier of the new *Vikrant*-class, the INS *Vishal*, will likely use a catapult assisted take-off but arrested recovery (CATOBAR) aircraft launch system, possibly incorporating the new electromagnetic aircraft launch system (EMALS) technology.

“About 50 ski jump take-offs have been carried out [by the Tejas LCA] so far with various possible combinations that are likely to be done by this aircraft on-board a carrier,” according to a DRDO source.

“Several combinations of aircraft recovery with Arresting Gear System (AGS) at SBTF have been successfully carried out by arresting the aircraft and bringing it to a halt within 90 metres,” another DRDO source said. “To date, 28 arrested landings have been successfully achieved without ever missing the arresting wire.”

https://thediplomat.com/2019/12/naval-version-of-indias-tejas-fighter-to-conduct-maiden-flight-from-carrier/

#SWARAJYA

Thu, 05 Dec 2019

After gaining LCA Tejas’ experience DRDO to build new deck-based fighter jet for Indian Navy

The premier Defence Research and Development Organisation (DRDO) is set to develop a new twin-engine deck-based fighter aircraft for the Indian Navy to serve on its aircraft carriers, one of which is already in active service, and another is presently under construction, reports *The Hindu.*

The development was made public by the Chief of Naval Staff, Admiral Karambir Singh who said that the new fighter jet platform would be ready for deployment by 2026 and will be based on the experience gained by the DRDO with the Naval Light Combat Aircraft (LCA) Tejas.

Admiral Singh also shared that he expected the country's first Indigenously-built Aircraft Carrier (IAC-1) Vikrant to be operational by 2022, which would provide a big boost to the nation's capabilities as a major maritime and naval power in the region.

Admiral Singh further added that the IAC-1 Vikrant has reached an advanced stage of construction in Kochi with all ship-building issues having been overcome. He said that the delivery of the carrier is certain by February-March 2021 post which trails would commence. "We should have a fully operational carrier by 2022," he said.

https://swarajyamag.com/insta/after-gaining-lca-tejas-experience-drdo-to-build-new-deck-based-fighter-jet-for-indian-navy

FlightGlobal

Thu, 05 Dec 2019

India funds P-8I top-up buy and AWACS acquisition

The purchase of additional Boeing P-8I maritime patrol aircraft for the Indian navy has received government approval – but only six aircraft are now planned to be acquired, instead of the 10 originally planned

By Mike Rajkumar

Bangalore: New Delhi has also revived its moribund Airborne Warning and Control System India (AWACS India) programme, which seeks to deliver an indigenous replacement for the Ilyushin Il-76-based A-50Is now in use.

A fleet of eight P-8Is are currently operational with the navy. These were acquired under a $2.14 billion Foreign Military Sales (FMS) contract signed in January 2009. Options for four more were taken in July 2016, in a deal worth approximately $1 billion, with deliveries due between July 2020 and December 2021.

In a report placed before parliament in August 2018, the Indian national audit agency said: "The critical role equipment offered by Boeing were not fully meeting the needs of the Indian navy. Owing to capability limitations of radars installed, the aircraft is not able to achieve the envisaged coverage area requirements."

The report also stated that the P-8I's anti-submarine warfare capability could only be partially fulfilled, as a contract for required weapons had not been concluded as of September 2017.

India's navy also currently operates upgraded Il-38SD maritime surveillance aircraft, which were first inducted in 1977. The five-strong fleet is slated for retirement from 2025.

Meanwhile, the revived AWACS India programme will use indigenously designed and developed mission systems, and subsystems provided and integrated by the nation's Defence Research and Development Organisation (DRDO).

The AWACS India programme got under way in February 2013 with approval from the Cabinet Committee on Security. This was followed by a March 2014 tender for procurement of six aircraft – an initial batch of two, plus options for four more.

Starting with the Aero India air show in 2015 and at successive events in 2017 and 2019, a scale model of an Airbus A330 with a rotodome was displayed by the DRDO, indicating its preference for the European airframer.

The AWACS India effort has its roots in the DRDO-led Airborne Early Warning and Control (AEW&C) system programme, which was conceived in 2002. Government approval was given in 2004 at a project cost of approximately $350 million, with project completion targeted for 2011.

However, the first 'Netra' AEW&C platform – based on Embraer's EMB-145 – was only delivered to the air force in an initial operational clearance configuration in February 2017, followed by a second in September 2019. Due to "non-achievement of certain operational requirements specified by IAF [the Indian air force], there was time overrun of 70%", an audit agency report stated last year, adding that the "selection of Embraer as [its] platform created design constraints and caused delay".

Separately, New Delhi has also approved the procurement of a new twin engine heavy helicopter fleet for the Indian Coast Guard.

https://www.flightglobal.com/news/articles/india-funds-p-8i-top-up-buy-and-awacs-acquisition-462684/

THE TIMES OF INDIA

Thu, 05 Dec 2019

Rafales must fly in with Meteor air-to-air missiles, India tells France

By Rajat Pandit

HIGHLIGHTS

- ***Meteor AAMs, with a strike range of 120 to 150-km, can outgun any missile that can be unleashed by Pakistani or Chinese jets***
- ***The request comes in the backdrop of the aerial skirmish between Indian and Pakistani fighters in Nowshera sector on Feb 27***
- ***India's Sukhoi-30MKIs and other jets, scrambled to intercept incoming Pak fighters, had found it difficult to engage F-16s at long ranges on that day***

New Delhi: India has asked France to arm the first four Rafale fighters with the top-notch Meteor air-to-air missiles, which, with a strike range of 120 to 150-km, can outgun any missile that can be unleashed by Pakistani or Chinese jets. The first Rafale fighters will touch down at the Ambala airbase in May next year.

The request for at least 8-10 Meteor beyond visual range (BVR) missiles to be delivered with the four Rafale jets was conveyed to France during defence minister Rajnath Singh's visit to the country to formally accept the first fighter at Merignac in the Bordeaux region on October 8.

"Earlier, as per the Rs 59,000 crore deal inked for 36 Rafale jets and their weapon packages in September 2016, the progressive deliveries of the Meteor and the over 300-km range Scalp air-to-ground cruise missiles were to begin several months later, " said a source.

"But given the current operational situation with Pakistan, India has asked for faster delivery of at least 8-10 Meteor missiles. France is examining the request," he added.

The request comes in the backdrop of the aerial skirmish between Indian and Pakistani fighters in the Nowshera sector along the Line of Control on February 27, a day after the bombing of the JeM facility in Pakistan. The Sukhoi-30MKIs and other jets, scrambled to intercept the incoming Pakistani fighters, had found it difficult to engage the F-16s at long ranges on that day, which also saw Wing Commander Abhinandan Varthaman's MiG-21 being shot down, as was earlier reported by TOI.

The Pakistani F-16s were armed with the AIM-120C advanced medium-range air-to-air missiles (AMRAAMs), which have a range of about 100-km, and had let loose several of them at the Sukhoi-30MKIs before the latter could even get into their firing range.

IAF says the operational dynamics for achieving "air dominance" will change with the induction of the Rafales armed with the greater-range Meteor missiles powered by Ramjet engines to fly at Mach 4 speed. The Meteor missiles are arguably the best in the world for air combat duels, with "a greater no-escape zone" for hostile fighters than any comparable BVR weapon. Pakistan and China do not currently have any missile of this class in their combat inventories.

During the defence ministerial dialogue in October, France also offered Indian experts an opportunity to check the performance of the omni-role Rafale jets, which can also deliver nuclear weapons if required, "in an environment of high temperatures" at its military base in UAE.

An IAF induction team of pilots, engineers and technicians is currently undergoing training in France, which has so far handed over three Rafales to India. Once this training is over, the first four Rafales will head for India in May 2020. All the 36 jets will arrive in India by April 2022, with 18 each to be deployed at the Ambala and Hasimara airbases for the western and eastern fronts with Pakistan and China.

The Rafales, with a combat range of 780-km to 1,650-km depending on mission, come armed with a deadly weapons package, advanced avionics, radars and electronic warfare systems to prevent jamming by adversaries and ensure superior survivability in hostile contested airspace. Each Rafale, for instance, can also carry two fire-and-forget Scalp cruise missiles to hit high-value fortified targets well over 300-km away.

But the 13 India-Specific Enhancements (ISEs) or upgrades on the 36 Rafales will become fully operational only by October 2022 after undergoing “software certification” after all the jets have arrived in India. The upgrades range from radar enhancements, Israeli helmet-mounted displays and low-band jammers to towed decoy systems, 10-hour flight data recording and engine capability for "cold start" from high-altitude regions like Ladakh. They also include Israeli litening pods for target acquisition and guidance kits for Spice precision-guided munitions, which were used to bomb the JeM facility at Balakot on February 26.

https://timesofindia.indiatimes.com/india/rafales-must-fly-in-with-meteor-air-to-air-missiles-india-tells-france/articleshow/72375495.cms

Business Standard

Thu, 05 Dec 2019

UK pitches for designing Indian aircraft carriers

Choosing between US & UK 'a dilemma', says Navy chief

AJAI SHUKLA
New Delhi, 4 December

Battles are raging around the Navy's proposed third aircraft carrier, INS Vishal, even though it is still on the drawing board. There is a bitter inter-services debate over whether India can afford another carrier. The Navy is also weighing competing claims from the US and the UK over who should provide design expertise.

Since 2015, the US Navy has guided the design of INS Vishal. But now, the UK's Royal Navy is offering its partnership on the grounds that INS Vishal is more similar to a British aircraft carrier.

In January 2015, the Indian and US Navies established a joint working group (JWG) on aircraft carrier cooperation, with New Delhi reasoning that the US Navy had long been the world's pre-eminent builder and operator of aircraft carriers. America operates 11 of the world's 21 carriers and, by far, the most potent ones.

However, on November 28, in an Indo-UK meeting in New Delhi chaired by the two defence secretaries, London proposed British design consultancy for INS Vishal, given the recent induction of two new state-of-the-art aircraft carriers — Her Majesty's Ship (HMS) Queen Elizabeth II and HMS Prince of Wales — into the Royal Navy.

In an India-UK meet held in November, which was chaired by the two defence secretaries, London proposed British design consultancy for INS Vishal, given the recent induction of two new state-of-the-art aircraft carriers — HMS Queen Elizabeth II (*pictured*) and HMS Prince of Wales – into the Royal Navy

Encouraged by the US, the Indian Navy has designed INS Vishal as a large, 65,000-tonne carrier, featuring a state-of-the-art American "electromagnetic aircraft launch system" (EMALS), and the ability to launch not just fighter aircraft but also the game-changing E2D Hawkeye airborne early warning (AEW) aircraft.

The US Navy's continuing influencing could lead India to buy not only Northrop Grumman's E2D Hawkeyes, but also Boeing's F/A-18E/F Super Hornet, in an ongoing purchase of 57 naval fighters.

However, the UK has pointed out that India's decision to have full-electric propulsion rather than a nuclear one for INS Vishal, makes it similar to the two Royal Navy carriers.

Further, the British have pointed out that INS Vishal will be of the same size — 65,000 tonnes — as the two Royal Navy carriers.

However, a standard US feature designed into INS Vishal will differentiate it from British carriers. Both HMS Queen Elizabeth II and HMS Prince of Wales incorporate "short take off but arrested landing" (STOBAR) systems.

Their on-board F-35C fighters take off from a ski-jump and land back by snagging their tail hooks on arrester wires laid across the deck, which then unspool, dragging the fighter to a halt on the 200-metre-long deck.

INS Vishal, however, like all US carriers, incorporates a "catapult take off but arrested landing" (CATOBAR) system. In its latest EMALS version, the aircraft is accelerated to the take-off speed with the help of an electromagnetic catapult (older US carriers use a steam catapult), while it lands the same way as on STOBAR vessels, using arrestor wires.

INS Vishal, which the Navy terms "Indigenous Aircraft Carrier – 2" (IAC-2), will therefore be a hybrid vessel, combining American and British features.

"The broad contours of IAC-2, to be constructed in India, will be a 65,000-tonne CATOBAR carrier with electric propulsion," stated navy chief Admiral Karambir Singh on Tuesday.

Queried by *Business Standard* on design consultancy, Singh admitted it was "a dilemma". "The issue about nuclear propulsion versus full electric propulsion [is one factor]. There are also other issues like EMALS and AAG (aircraft arrester gear), which only the Americans have. So this is going to be one of our dilemmas," said Singh.

Asked whether consultancy was possible with both the UK and US, Singh admitted: "I'm not sure of the answer; how you go about it?"

For London, this is a mouth-watering opportunity not just to enter a lucrative, multi-billion-dollar construction programme, but also to restore flagging defence relations. The Royal Navy shaped the Indian Navy in its formative years, with British admirals heading the Indian Navy until 1958. India's first two aircraft carriers — INS Vikrant and INS Viraat — were both purchased from the Royal Navy.

Last week, in the India-UK Defence Consultative Group, UK officials pressed for reviving the strategic relationship. They promised deeper technology transfer, unlike the straight-up US defence sales that have provided India with little high technology. "Partnering the UK in no way jeopardises the Indo-US relationship, or damages interoperability in the Indo-Pacific. Britain is America's closest ally," said a senior UK official, contrasting this with buying weaponry from Russia. The British side is also learned to have pitched strongly to participate in building India's next six submarines under Project 75-I. "We have not bid in that project, because the Royal Navy only operates nuclear subs. However, we can offer systems and niche technologies that greatly enhance a submarine's capabilities. And we will be willing to transfer real technology," said the official.

DefenceNews

Thu, 05 Dec 2019

Indonesian, Indian, Australian Navies hold trilateral security talks

The Indonesian, Indian and Australian navies held the three-day Trilateral Indian Ocean Maritime Security workshop in Fremantle in Western Australia last week.

The three-day workshop was held on Nov. 25-27 at the city's Maritime Museum. The Indonesian delegate was led by First Admiral Erwin Aldedharma, the deputy Navy chief for planning and budgeting, the Indonesian Navy said in a statement on Monday.

The Indian delegate was led by Commodore Ramakrishnan Kunnisery Mallath and the Australians by Commodore Robert Plath.

The speakers at the workshop included Dough Trappett from Australia's Department of Foreign Affairs and Trade and Capt. Sean Andrews, the director of the Sea Power Center of Australia.

The Indian delegation presented a paper titled "Indian Ocean: Interests and Challenges in the Maritime Domain" at the workshop. The Indonesians delivered a paper titled "National Approaches to the Indian Ocean," and the host country presented a paper titled "Opportunities for Trilateral Cooperation at Sea Between Navies."

India, Indonesia and Australia all control territories in the Indian Ocean, which is passed by the international maritime line.

The Indonesian Navy in its presentation introduced the Indo-Pacific Concept that was agreed by the member countries of the Association of Southeast Asian Nations (Asean) this year during the regional bloc's summit in Bangkok.

The concept, also known as the Asean Indo-Pacific Outlook, was initiated by Indonesia.

The Indonesian Navy also briefed its Indian and Australian counterparts on the country’s naval activities in the Indian Ocean.

Indonesia is planning to establish the Indonesian Maritime Information Center that can be used to support a trilateral exchange of information with India and Australia.

Next year's Trilateral Indian Ocean Maritime Security workshop is slated to be held in India sometime in the third quarter.

The Indonesian delegation also made time during the workshop to visit the Austal Shipyard and check out a Guardian Class patrol boat being built for the Fijian Navy.

https://www.defencenews.in/article/Indonesian,-Indian,-Australian-Navies-Hold-Trilateral-Security-Talks-788297

DefenceNews

Thu, 05 Dec 2019

India gives patrol vessel to Maldives, Launches RuPay card as part of neighbourhood first policy

Taking forward its 'Neighbourhood First' policy, India today handed over a patrol vessel to Maldives and launched the RuPay card, during a video conference between Prime Minister Narendra Modi and Maldives President Ibrahim Mohamed Solih.

our bilateral grant projects as part of the development partnership between India and the Maldives were highlighted at the digital video conference.

India gifted a 'Made in India' patrol vessel named "KAAMIYAAB" to the Maldives National Defence Force (MNDF). The vessel will be manned by eight MNDF personnel trained in India and will be a valuable asset for the Maldives in enhancing its maritime security, fostering its blue economy and safeguarding its tourism industry.

The two sides exchanged Memorandum of understanding (MoU) for three grant projects for setting up neighbourhood fish plants in the southernmost atoll of Addu.

Mindful of the geographic spread of the Maldives and the development needs of its people, these High Impact Community Development Projects (HICDPs) will be implemented by the Addu City Council in Maldives.

These projects are being implemented under the MoU signed during then External Affairs Minister Sushma Swaraj's visit to Maldives in 2019 and will help support livelihoods of the island communities in Addu, a statement said.

Both sides exchanged an MoU between the National Payments Corporation of India (NPCI) and the Bank of Maldives (BML) to launch the RuPay Card in the Maldives.

In 2019, tourist arrivals from India to the Maldives have doubled and India has risen from 5th to the 2nd position in its tourism market. The launch of the Global RuPay Card in Maldives through the Bank of Maldives will pave the way for higher tourist arrivals from India and, eventually, stronger people-to-people contacts between the two countries, it said.

At least 2,500 LED streetlights donated by India were installed in Male recently. These streetlights save 80 per cent energy and will result in cost savings of approx. 8.35 lakh MVR per year for Male city. They will also add to the safety and security of the residents of Male, particularly women and children.

At the video conference, PM Modi spoke of India's steadfast commitment to the socio-economic development of Maldives in line with the priorities of the people and government of Maldives.

PM Modi underscored that the convergence of India's 'Neighbourhood First' and the Maldives's India First' policies have strengthened bilateral cooperation in all sectors, the statement said.

Expressing his deep appreciation to India for its support to the development aspirations and security of Maldives, President Ibrahim Mohamed Solih conveyed his commitment to deepen cooperation and partnership with India.

Both leaders agreed to work closely together to enhance cooperation for peace, prosperity and mutual security of India and Maldives and for the wider Indian Ocean region, it said.

Bilateral relations between the Maldives and India have strengthened significantly since President Solih was elected as President in 2018.

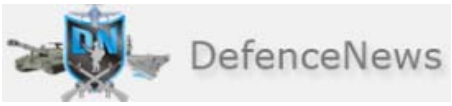
AAbdulla Shahid, the Foreign Minister of Maldives tweeted, "Bolstering Maldives India defence ties! Coast Guard Ship #Kaamiyaab, gifted today by #India, will be a valuable asset, bolstering Maldivian coast Guard's ability to protect our maritime borders!"

PM Modi said, "Today, an Indian-made fast-interceptor craft was officially handed over to the Maldivian coast guard. This advanced vessel has been constructed by L&T in my home state Gujarat. It will help enhance Maldives' maritime security and promote your blue economy & tourism."

"This week, three direct flights from Delhi, Mumbai and Bengaluru have also started. Rupay payment system will further ease the travel of Indians to Maldives," he added.

He said the RuPay Payment mechanism will further ease the travel of Indian to the Maldives. "I am glad that this has been launched through the Bank of Maldives," he added.

https://www.defencenews.in/article/India-Gives-Patrol-Vessel-To-Maldives,-Launches-RuPay-Card-As-Part-Of-Neighbourhood-First-Policy-788293



Thu, 05 Dec 2019

ISRO workhorse PSLV set to make history with 50th launch on December 11

December 11 will be a historic day for the Indian space programme when the Indian Space Research Organisation's (ISRO) ‘workhorse’, the Polar Satellite Launch Vehicle (PSLV), roars into the sky carrying satellites, in what will be its fiftieth launch.

In the last 26 years, the launch vehicle has proven its capability repeatedly, so much so that international clients have been queuing up to put their smaller satellites into orbit using the PSLV. This is not surprising, given that a PSLV trip is far more affordable than those on launch vehicles of other countries.

Indeed, in terms of numbers, if not in size, ISRO’s launch vehicles has carried more foreign satellites. Between 1994 and 2019, PSLV launched 50 Indian satellites and 222 foreign satellites for over 70 international customers from 20 countries. It also successfully launched two spacecraft – Chandrayaan-1 in 2008, which made its way to the moon and the Mars Orbiter in 2013, which travelled to Mars.

PSLV, which costs nearly ₹ 200 crore, is a third-generation launch vehicle for ISRO. It is the first Indian launch vehicle to be equipped with liquid stages. PSLV has three variants: PSLV-Core alone (PSLV-CA) without the solid strap-on motors; a PSLV with six solid strap-on boosters; and PSLV-XL, the top model, with six extended solid strap-on boosters.

Not an auspicious beginning ::

PSLV’s long journey began with a disaster. On September 20, 1993, PSLV-D1, the first such rocket, launched from the Satish Dhawan Space Centre, Sriharikota, failed to place the IRS-1E satellite into orbit. Thereafter it proved its credentials, with 39 consecutively successful missions till June 2017.

There was another disappointment on August 31, 2017, with the unsuccessful launch of the PSLV-C39. This was just a blip, though, and the PSLV continued to place satellites into orbit. The most recent launch was on November 27, when the PSLV-C47 successfully launched Cartosat-3 and 13 commercial nano-satellites after lift-off from the second launchpad of the Satish Dhawan Space Centre. PSLV-C46 was the 74th launch from the Satish Dhawan Space Centre, Sriharikota range (SDSC SHAR). This was the 21st flight of the PSLV in the 'XL' configuration (with six solid strap-on

motors). About 17 minutes and 38 seconds after lift-off, Cartosat-3 was injected into an orbit of 509 km at an inclination of 97.5 degrees to the equator.

Cartosat-3 satellite is a third-generation agile advanced satellite with high-resolution imaging capability. The 13 commercial nano-satellites from the US were also successfully injected into their designated orbit. These satellites were launched under commercial arrangements with NewSpace India Limited, the commercial arm of ISRO.

https://www.defencenews.in/article/ISRO-workhorse-PSLV-set-to-make-history-with-50th-launch-on-December-11-788296

hindustantimes

Thu, 05 Dec 2019

Chandrayaan 2: After NASA shares Vikram lander's image, ISRO Chief K Sivan claims 'our own orbiter had located it'

Nasa on Tuesday said its satellite orbiting the Moon has found Vikram lander of Chandrayaan-2 which crashed on the lunar surface in September. The US space agency also released an image showing the impact site of the lander

New Delhi: A day after NASA announced it had located the debris of Chandrayaan-2 lander, Indian Space Research Organisation (ISRO) Chief K Sivan said the Indian space agency had already located it earlier.

"Our own orbiter had located Vikram Lander, we had already declared that on our website, you can go back and see," Sivan was quoted as saying by news agency ANI.

ISRO'S website has an entry dated September 10 that reads: "Vikram lander has been located by the orbiter of Chandrayaan-2, but no communication with it yet. All possible efforts are being made to establish communication with lander."

ISRO, however, hadn't made the images public.

The #Chandrayaan2 Vikram lander has been found by our @NASAMoon mission, the Lunar Reconnaissance Orbiter. See the first mosaic of the impact

site https://t.co/GA3JspCNuh pic.twitter.com/jaW5a63sAf

— NASA (@NASA) December 2, 2019

US space agency NASA had Tuesday said that it had located the lander Vikram of India's second moon mission Chandrayaan-2, around three months after ISRO lost contact with it.

NASA released an image acquired by its Lunar Reconnaissance Orbiter Camera (LROC) on November 11, marking pieces of debris close to the proposed landing site of the Chandrayaan-2 lander.

NASA said it was able to locate the debris after a tip-off by Shanmuga Subramanian, a 33-year-old mechanical engineer and app developer from Chennai.

NASA'S LROC had captured imaged of the landing site during a fly-by. The space agency said it couldn't locate the lander based on the image due to the large shadows that covered the area.

The images were uploaded on September 26 and Subramanian was the first person to achieve a positive identification of the Chandrayaan-2 lander. The first debris spotted by the Indian engineer was located 750 metres northwest of the impact site.

Subramanian spent many a sleepless nights over the next 45-odd days trying to locate the debris.

"I used to return from work at 8 pm. After dinner, I would start comparing the NASA images till 2 am. I would again scan the photos till 8 am," he said.

Early on October, Subramanian located a tiny spot which he believed was part of the Vikram lander's debris. He tweeted about it and informed ISRO and NASA. On Tuesday, NASA tweeted confirming that Subramanian was spot on.

https://www.hindustantimes.com/india-news/chandrayaan-2-after-nasa-shares-vikram-lander-s-image-isro-chief-k-sivan-claims-our-own-orbiter-had-located-it/story-tPVOd1rLZKYzZcF06d94HP.html

THE TIMES OF INDIA

Thu, 05 Dec 2019

NASA to attach a 'robot hotel' to space station

Washington: NASA is attaching a "robot hotel" to the outside of the International Space Station with the upcoming launch of the Robotic Tool Stowage (RiTS), a protective storage unit for critical robotic tools.

RiTS is set to launch on Wednesday aboard the 19th SpaceX commercial resupply mission.

Its first residents will be two Robotic External Leak Locators (RELL). Outfitted with mass spectrometers capable of "sniffing" out the presence of gases such as ammonia, these robotic tools are used to detect leaks from the station.

Two RELL units are on board the station right now: the first RELL launched in 2015, and a second RELL was launched as a backup earlier this year.

"For each of its stored tools, RiTS will provide heat and physical protection from radiation and micrometeroids, or tiny, highspeed objects hurtling through space," RiTS hardware manager Mark Neuman said in a statement.

"Its thermal system maintains ideal temperatures for the instruments, helping them stay functional, " Neuman said. Having this housing unit in place will also help the space station's robotic arm, Dextre, to easily locate, grab and put back these important tools, NASA said.

https://timesofindia.indiatimes.com/world/us/nasa-to-attach-a-robot-hotel-to-space-station/articleshow/72377486.cms