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Institute for Defence Studies and Analyses

Thu, 24 Oct 2019

Make-II: need to prevent duplication of efforts and backdoor entry of import

By Laxman Kumar Behera

In a major boost to Make in India and private sector's participation in defence production in particular, the Defence Acquisition Council (DAC) on October 21 approved three capital procurement projects worth Rs. 3300 crore for indigenous design and development. [1] The first two projects pertain to Make-II category of the defence procurement procedure (DPP) and include third generation anti-tank guided missiles (ATGM) and auxiliary power units (APUs) for the T-72 and T-90 tanks. The third project relates to the design and development (D&D) of electronic warfare (EW) systems for mountain and high-altitude terrain by the Defence Research and Development Organisation (DRDO), and manufacturing of the same by a design-cum-production partner selected from the Indian industry.

The importance of DAC's October 21 decision is that it is the first time that the government has allowed the private sector to undertake D&D of complex defence equipment, a task which was hitherto reserved for the DRDO and, to a smaller extent, state-owned/controlled production entities. The government's bold decision to allow the private sector to undertake complex D&D is a step in the right direction to forge a larger innovation system to meet the diverse requirements of national security. However, caution may be required to avoid duplication of efforts and prevent indirect import which is otherwise not permitted directly.

It is significant to note that of the two projects approved by DAC under Make-II, the DRDO is already engaged in the development of ATGM. The R&D agency seems to have achieved a degree of success in the project. This is the reason why the government has twice ignored in the past an import option in favour of the home-grown project. However, permitting the private sector to undertake the development of ATGM has raised doubts about the status of the DRDO's project. More significantly, if the DRDO, India's premier defence R&D agency with a budget of more than Rs. 19,000 crore (in 2019-20), is not able to design and develop an ATGM, how could the private sector, which has little expertise in missile development, achieve the same and that too with no funding support from the government under Make-II?

The Make-II procedure was carved out as a separate sub-category of the 'Make' procedure as part of the revised DPP-2016 to give a boost to the Make in India initiative in defence production. The intention behind the sub-category was to leverage the industrial and financial powers of the Indian industry, particularly the private sector, for greater indigenisation through import substitution with some technical assistance from overseas, if required. Leveraging industry's financial power was, however, not meant to ask the industry to spend a huge sum on D&D efforts. Therefore, projects with a large developmental cost was meant to be executed through Make-I procedure in which the government bears up to 90 per cent of the prototype development cost, whereas all other projects with smaller financial implications were intended to be executed under Make-II through industry's self-funding.

The Make-II is undoubtedly a novel idea of the Ministry of Defence (MoD) to promote innovation within the industry. Its three distinct features – allowing the industry to submit *suo moto* proposals, MoD's willingness to entertain single bid, and assurance of time-bound and guaranteed order post successful development – are refreshingly different from the government's routine contractual norms that give prominence to tender-based bid solicitation, multi-vendor participation and uncertainty of order placement. The innovativeness of the sub-category and the government's zero financial liability

for prototype development has allowed the MoD to go the whole hog in embracing a large number of proposals under Make-II. In comparison to mere three projects under Make-I, the MoD has so far accorded acceptance-in-principle (AIP) to nearly five dozen proposals under Make-II.

Significantly, apart from ATGM, the AIP has also been given to a number of other big projects including the long range air-to-air beyond visual range (BVR) missile, on which the DRDO has been working for a long time and has achieved some major success in recent years. By allowing these projects to be executed through Make-II, the MoD not only runs the risks of forgoing the opportunity of deploying its home-grown technology but unwittingly gets into a trap of foreign suppliers who rarely pass on any key technology and whose only interest in India is to bind it with perpetual dependency.

The question, therefore, is whether the foreign original equipment manufacturers (OEMs) should be allowed to use Make-II to sell their hardware which they are otherwise denied to do directly. The question merits debate as it has a huge implication on India's own efforts in developing key defence technologies. Even though Make-II requires local design and development and a minimum 40 per cent indigenous content (IC), it nonetheless leaves a plenty of scope for technology assistance from external sources which allows foreign companies an opportunity to push their products, albeit indirectly, through Indian partners who are willing to play a second fiddle to their overseas collaborators. In their attempt to sell their products, the foreign companies also do not hesitate in exploiting the age-old turf wars between key stakeholders of the Indian defence establishment.

As of now, the Indian defence companies, especially the ones from the private sector have very little capability of designing and developing complex weapon systems, and that too in a period of 105 weeks, the maximum time allowed under Make-II for user trial of prototype. If a company claims it could do so, it is important for the MoD to decipher the real motives, examine what new technologies are being promised to be developed, and see to it that the company has the overall intellectual property rights (IPR), including for exports. Furthermore, when the government has already sanctioned a developmental project to the DRDO, or any other agency, which involves a significant investment of taxpayers' money, it is important for the MoD to ensure that such projects are delivered on time before a parallel development is sought outside.

This is not to suggest that the DRDO, or any other state-owned/controlled agencies, should have exclusive monopoly over all developmental projects approved under Make-II. In fact, the Make-II procedure categorically states that projects once approved would not be retracted just because India's premier defence R&D agency is developing such projects. However, such restraint on the DRDO appears to be based on the organisation's chequered past, and not on the organisation's stellar contribution especially to strategic programmes. Identifying the issues and concerns of DRDO's R&D projects, including in the post-developmental phase, and addressing them in a time bound manner is far more important than marginalising the organisation in favour of parallel development within the industry. Suffice to say that the DRDO is currently engaged with nearly 370 R&D projects (excluding strategic ones) with government making an investment commitment of over Rs. 78,000 crore.[2] The MoD could least afford to ignore its premier R&D agency and all the sanctioned projects and rely on an industry whose R&D effort is hardly anything.

The MoD has already taken a host of initiatives to contain India's arms import and enhance self-reliance. These initiatives have started paying dividend as is evident from the continuous increase in domestic arms production and phenomenal increase in defence exports. Further, the MoD is presently engaged in implementing a major plan for the defence public sector undertakings for the indigenisation of Rs. 15,000 crore worth of previously imported items by 2022-23.[3] The Make-II is ideally suited for import substitution of these types of items and all efforts need to be undertaken to make it a success. The MoD needs to send a strong signal that Make-II is not to kill India's own technology development but to supplement it.

(Laxman Kumar Behera is Research Fellow at Institute for Defence Studies and Analyses, New Delhi. Views expressed are of the author and do not necessarily reflect the views of the IDSA or of the Government of India.)

https://idsa.in/idsacomments/make-ii-need-to-prevent-duplication-lkbehera-231019

DECCAN HERALD

Thu, 24 Oct 2019

Military, handhold Indian designers

By Priyan R Naik

Indian designers have a reputation for 'frugal engineering'. Sensitive to a low-resource environment, yet oriented towards creating products and solutions uniquely suited to our needs, Indians are nely tuned to create cost-effective solutions to local problems. The world took notice of Indians' frugal innovation efforts aer the development of the Tata Nano, the ultra low-cost car designed and developed by Indian engineers, competent at combining low cost with high value, reassuring the very strong multinational R&D presence in India.

Yet, when it comes to military equipment, why do Indian efforts fall short? Why don't Indian designers' efforts throw up signicant successes instead of giving India the dubious distinction of being the world's largest importer of military hardware, importing more than 70% of its defence requirements?

Look at Tejas, the Light Combat Aircra sanctioned in 1986 to the Defence Research and Development Organization (DRDO). The prototype took ight in 2003, 17 years later, whereas design and development from basic stage to prototype ight takes 8-10 years the world over. The program management was assigned to the Aeronautical Development Agency (ADA) which, along with Hindustan Aeronautics Limited (HAL), National Aerospace Laboratories (NAL) and the Aeronautical Development Establishment (ADE), was expected to bring out the prototype. The design, weight consideration, mock-up, systems and evaluations, purchase of the avionic and hydraulic systems, conceptualizing the aircra and conguring it, incorporating the y-by-wire control systems, use of carbon-ber composites for the major structures were difcult and time-consuming. A technology demonstration ight in 2001 was followed by the prototype ight test at the National Flight Test Center (NFTC), ultimately leading to the 'Final Operational Clearance' and induction into the Air Force in mid-2018.

While all delays get attributed to HAL, the manufacturer, the government had taken its own time to allocate responsibilities between HAL, ADA, ADE and NAL. The delays in development was familiar with and design changes that required lots of 'Redo' work, resulting in cost and time overruns.

Similarly, the design and development of the Main Battle Tank (MBT) Arjun, a multi-laboratory program of DRDO, led by the Combat Vehicles Research & Development Establishment (CVRDE), requiring the development of the transmission, hydro-pneumatic suspension, hull and turret, and the Gun Control System. Though the development of the tank began in 1972, it was only in 1996 that mass-production at the Ordnance Factory's Avadi facility began. Here too, cost and time overruns and repeated delays resulted in the Army requiring multiple revisits due to advances in technology and changes in the threat environment. The more the tank project dragged on, the more the tank needed to be redesigned to incorporate new technologies, major design decisions became obsolete, with delays causing the Army to order more Russian T–90 tanks, further undermining CVRDE's developmental efforts.

To the credit of the CVRDE designers, however, the Arjun held its own in the comparative trials held in 2010. On certain key operational parameters, like ammunition loading, tactical manoeuvres and ring, the Arjun was comparable to the T-90. On mobility and manoeuvrability parameters, it was better than the T–90! The ring system was able to achieve a superior accuracy and hit-rate due to the indigenously designed hydro-pneumatic suspension that allows the Arjun to glide over undulating cross-country terrain at full speed keeping the gun stable enough to re accurately.

CVRDE unveiled a Mark-2 version of the Arjun exhibiting qualities of a genuine world-beater, incorporating changes at the army's persuasion. Faced with an army long familiar with Russian tanks, logistic problems due to the Arjun's weight and dimensions were addressed through the Sarvatra system, an indigenously built bridge-layer, while the Indian Railways deployed a bogey called BFAT (Bogey Flat Arjun Type) designed to transport the tank to operational areas.

Both the indigenous Tejas LCA and the Arjun MBT have had protracted development phases, overcoming not just technical challenges in development but criticism from groups believing either in outright purchase or in licensed manufacturing through a technology partner. The indigenous development and production route, being relatively difcult, time-consuming and requiring vast coordination, remained the last choice, with even the government clamouring for the private sector and foreign wares to get "quick results"!

Criticism cannot be a reason to stie the growth of indigenously built platforms. The armed forces must play a pivotal role in indigenizing defence equipment by handholding the Indian designer. Motivation and encouragement at crucial junctures makes the designer take delight in delivering equipment as per specications. Remember, we are the same people who used home-grown technologies to send Mangalyaan to Mars successfully on the very first attempt, and at a cost less than the cost of producing a Hollywood movie!

(The writer is a former director on the Board of BEML)

https://www.deccanherald.com/opinion/in-perspective/military-handhold-indian-designers-770374.html

INDIA TODAY

Thu, 24 Oct 2019

Army Chief reviews war drills of newly formed combat formations close to LAC

Army Chief General Bipin Rawat has reviewed the first of its kind war games to test the readiness of the newly conceived Integrated Battle Groups (IBGs) held at Sela in Arunachal Pradesh

By Abhishek Bhalla

New Delhi: Army Chief General Bipin Rawat has reviewed the first of its kind war games to test the readiness of the newly conceived Integrated Battle Groups (IBGs) held at Sela in Arunachal Pradesh around 90 km from the Line of Actual Control.

The exercise took place at a height of close to 14,000 feet.

As the three-week exercise came to a close, the Army chief visited and interacted with troops and officers who were part of this all-important war drills to test the army's new tactics.

The aim of the exercise was to validate and synergise the activities of all arms and services in high altitude environment. Such exercises are routinely carried out by the Army to evaluate the operational efficiency of formations and units and also assess the leadership in exercising command and control which test their reactions to emerging situations, the Army said in a statement.

Earlier, similar collective training was undertaken by another formation of Eastern Command in the Along Sector.

The initial plan was to have the exercise in lower reaches of Arunachal Pradesh but that would defeat the purpose as the army needs to test the capabilities of these new assault formations in areas where the battle would be fought, sources said. These places are above 15,000 ft where the forward battalions and posts exist.

The IBGs are new formations that the Indian Army is in the process of setting up to enhance its combat capabilities by being swift and more potent while launching assaults on the enemy. IBGs will be armed with capabilities specific to terrain and threats.

The IBGs will do away with the army functioning in separate wings and will bring together all fighting capabilities like infantry, artillery, air defence under one command at the Corp level formations of the Army.

The combat strengths would be different as per the terrain and requirements, sources say. So in the mountains, it will be artillery that will need to be synergised with infantry battalions, in the deserts it would mean bringing armoured corp units armed with tanks with other wings.

https://www.indiatoday.in/india/story/army-chief-war-drills-lac-1612259-2019-10-23

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Thu, 24 Oct 2019

Indian Army wants more manpower for operations, plan to get troops from Service Corps

he supply company and the supply depot provide supplies to an army division and the brigades under it in both peace and field locations. The combined strength of the supply company and depot is about 200 troops, officials explained.

By Shaurya Karanbir Gurung

New Delhi: The Indian Army is working towards ensuring that it has more manpower available for operations and related tasks by picking out troops from one of its services.

The Indian army is working on a new model that involves combining the strength of the sole supply company of a second line transport battalion of the Army Service Corps under a division and a supply depot in peace stations. The supply company and the supply depot provide supplies to an army division and the brigades under it in both peace and field locations. The combined strength of the supply company and depot is about 200 troops, officials explained. While the supply work in a peace station requires about 100 men, the remaining 100 can be utilised in operational tasks, officials explained. This model is currently operational at the Mamun cantonment in Pathankot and in Kalimpong, West Bengal.

Army has ordered a study to examine if it can implement the model in all peace stations by reducing the combined strength of the supply companies and depots to 100 and optimise the remaining manpower for operational deployment. The study will be reviewed by Army Chief Gen Bipin Rawat in a month’s time.

The concept came up because in peace stations it is mainly the supply depot which carries out the task of providing supply cover to the division, and so a supply company has a lesser role to play. This leads to underutilisation of manpower and duplication of effort. The situation arises because the workload is less in peace stations as compared to in the field, where the same setup exists. In field locations, both the supply company and depots are used, because the formations are located at far-off places.

"So in peace stations, we are looking at combining the strength of a supply company and a supply depot, which comes up to about 200 personnel. But as only 100 men are needed to handle the work in a peace station, the remaining 100 can be used in other tasks. This will ensure that there is more manpower for operations," an official explained. Officials added that the study for this model is in line with other studies to restructure the army into a leaner and meaner force that is able to take on future challenges.

https://economictimes.indiatimes.com/news/defence/army-wants-more-manpower-for-operations-plans-to-get-troops-from-army-service-corps/articleshow/71692772.cms

नवभारत टाइम्स

Thu, 24 Oct 2019

असम राइफल्स पर कंट्रोल को लेकर रक्षा और गृह मंत्रालय में खींचतान

असम राइफल्स पर पूरा कंट्रोल किसका हो, इस बात पर गृह मंत्रालय और रक्षा मंत्रालय दोनों के बीच खींचतान जारी है। दरअसल अभी असम राइफल्स का प्रशासनिक कंट्रोल गृह मंत्रालय के पास जबकि ऑपरेशनल कंट्रोल इंडियन आर्मी देखती है।

हाइलाइट्स

- अगले हफ्ते गृहमंत्री से मुलाकात कर सकते हैं असम राइफल्स के डीजी
- नॉर्थ ईस्ट में काउंटर इंसर्जेंसी में असम राइफल्स की है अहम भूमिका
- अभी असम राइफल्स का ऑपरेशनल कंट्रोल इंडियन आर्मी देखती है
- असम राइफल्स की ट्रेनिंग नॉर्मल पैरा मिलिट्री से अलग आर्मी जैसी है

नई दिल्ली: असम राइफल्स का पूरा कंट्रोल किसे दिया जाए इसे लेकर गृह मंत्रालय और रक्षा मंत्रालय में विवाद चल रहा है। जहां गृह मंत्रालय चाहता है कि इसका पूरा कंट्रोल उनके के पास होना चाहिए वहीं इंडियन आर्मी इस प्रस्ताव के विरोध में हैं। सूत्रों के मुताबिक, इसे लेकर अगले हफ्ते असम राइफल्स के डीजी गृह मंत्री से मुलाकात भी कर सकते हैं। अभी नॉर्थ ईस्ट में तैनात असम राइफल्स का प्रशासनिक कंट्रोल गृह मंत्रालय के पास है जबकि ऑपरेशनल कंट्रोल आर्मी देखती है। 19 नवंबर को दिल्ली हाई कोर्ट में भी इस मसले पर सुनवाई होनी है। असम राइफल्स एक्स सर्विसमैन वेलफेयर असोसिएशन ने एक अपील दायर की है जिसमें कहा गया है कि असम राइफल्स से दोहरा कंट्रोल हटना चाहिए।

क्या है प्रस्ताव और सेना के विरोध की वजह

हाल ही में कैबिनेट कमिटी ऑन सिक्यॉरिटी (सीसीएस) का एक नया ड्राफ्ट आया है जिसमें गृह मंत्रालय का कहना है कि असम राइफल्स का पूरा कंट्रोल गृह मंत्रालय को दिया जाए। इस ड्राफ्ट में कहा गया है कि आर्मी कंपनी ऑपरेटिंग ग्रुप की तरह काम करती है यानी एक कंपनी बेस से ऑपरेट करती है जबकि बॉर्डर रखवाली के लिए नाका सिस्टम जैसा इंतजाम होना चाहिए। जबकि आर्मी का कहना है कि नॉर्थ ईस्ट में जिस तरीके की भौगोलिक स्थितियां हैं वहां नाका सिस्टम सही साबित नहीं होगा क्योंकि छोटे-छोटे ग्रुप होने पर इंसर्जेंट (उग्रवादी) उन पर हावी हो सकते हैं। एक सीनियर अधिकारी के मुताबिक, ड्राफ्ट में यह भी साफ नहीं किया गया है कि फिर काउंटर इंसर्जेंसी ग्रिड कैसे मैनेज होगा।

असम राइफल्स और आर्मी का साथ क्यों है अहम

आर्मी के एक सीनियर अधिकारी के मुताबिक, जिस तरह राष्ट्रीय राइफल (आरआर) का रोल कश्मीर में अहम है उसी तरह असम राइफल्स का रोल नॉर्थ ईस्ट में है। कंवेंशनल वॉर (पारंपरिक युद्ध) के लिए यह जरूरी है। जैसे कश्मीर में आरआर काउंटर इंसर्जेंसी ऑपरेशन में शामिल होती है लेकिन इसका स्ट्रक्चर ऐसा नहीं है कि यह पारंपरिक युद्ध लड़ सके। इसलिए

जब युद्ध की नौबत आती है तो आरआर डिफेंसिव फोर्स में तब्दील हो जाती है और दुश्मन से निपटने की पूरी जिम्मेदारी आर्मी देखती है। आरआर की तरह की ही भूमिका नॉर्थ ईस्ट में असम राइफल्स की है।

ट्रेनिंग भी आर्मी की तरह

असम राइफल्स के जवानों की अभी 44 हफ्तों की ट्रेनिंग होती है। इसमें 28 हफ्ते उन्हें बेसिक मिलिट्री ट्रेनिंग दी जाती है। यह आर्मी के इंफ्रेंटी (पैदल सेना) जवानों को दी जाने वाली ट्रेनिंग की तरह है। इसमें कन्वेंशनल ऑपरेशनल ट्रेनिंग होती है। जिसमें बताया जाता है कि कैसे डिफेंस की लड़ाई होगी और कैसे घात लगाकर हमला होता है। दो हफ्ते काउंटर इंसरजेंसी (सीआई) ऑपरेशन की और तीन हफ्ते का सीआई ऑपरेशनल कैंप भी होता है। जबकि पैरा मिलिट्री में इस तरह की ट्रेनिंग नहीं होती। उनकी ट्रेनिंग ज्यादातर पुलिस स्टाइल की होती है। आर्मी के एक अधिकारी के मुताबिक असम राइफल्स के ट्रेंड जवानों का पूरा इस्तेमाल आर्मी में ही हो सकता है।

https://navbharattimes.indiatimes.com/india/defence-and-home-ministry-both-wants-full-control-on-assam-rifles/articleshow/71730372.cms

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Thu, 24 Oct 2019

India, US plan to revitalise defence tech sharing pact

Defence secretaries from both US and India are set to meet for a discussion on the pact to share jet engine technology, on Thursday in Delhi. The government seeks affirmation in technology sharing, but there has been reluctance from US to take it up

By Manu Pubby

New Delhi: India and the US are planning to revitalise a defence technology sharing pact by putting several new ideas on the table, including a focus on startups, the possibility of exports to identified third nations and focusing on practical industry partnerships.

The India US Defence Technology and Trade Initiative (DTTI) signed in 2012 was aimed at identifying and promoting major joint development and manufacturing projects for the defence forces but hasn't yielded any major results.

Among the ambitious projects identified under the pact was a plan to share jet engine technology, an initiative that has floundered given a strict export control regime in the US and the lack of a strong business case from the Indian side.

Sources told ET that the next meeting of the pact planned in the capital on Thursday between Ellen M Lord, undersecretary of Defense for Acquisition and Sustainment and Subhash Chandra, secretary Defence Production, will look at fresh ideas to take things forward, including setting up of an industry forum that can identify and suggest practical projects that can be taken up in the future.

There have been strong suggestions from the industry to set up a Defence Industry Advisory Committee (DIAC) under the pact that will be able to supplement government efforts to promote technology sharing, but there has been reluctance from the US to take it up. Sources said that a focus on startups is likely to enable US-based research labs to work in coordination with Indian companies for cutting edge defence technologies. In addition, the two sides will also discuss the possibility of jointly developing systems for approved third nations to pursue export opportunities.

The two sides are also likely to identify projects for cooperation in the field of space technology. As reported by ET, an industrial security pact between India and the US has been finalised and is set to be formally inked shortly – enabling US military manufacturers to share high-end technology with their Indian partners.

Before the meeting, Ellen M Lord described India as a major defence partner and said that bilateral military trade has reached an estimated $18 billion this year, starting from virtually zero in 2008. “The United States is committed to strengthening its partnership with India while furthering military-to-military relationships and cooperation… United States and India are working bilaterally and in cooperation with other like-minded partners to advance our shared vision for the Indo-Pacific,” Lord said.

https://economictimes.indiatimes.com/news/defence/india-us-plan-to-revitalise-defence-tech-sharing-pact/articleshow/71731690.cms

Thu, 24 Oct 2019

अमेरिकी मिशन को नहीं मिला विक्रम लैंडर का सुराग

वॉशिंगटन। अंतरिक्ष एजेंसी नासा ने कहा है कि चंद्रमा क्षेत्र के पास से हाल में गुजरे उसके चंद्रमा ऑर्बिटर द्वारा कैद की गई तस्वीरों में चंद्रयान-2 के विक्रम लैंडर का कोई सुराग नहीं मिला है। यह ऑर्बिटर चंद्रमा के उस क्षेत्र से गुजरा था जहां भारत के महत्वाकांक्षी मिशन ‘चंद्रयान-2’ ने सॉफ्ट लैंडिंग का प्रयास किया था।

भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) ने 7 सितंबर को चंद्रमा के दक्षिणी ध्रुव पर विक्रम की सॉफ्ट लैंडिंग कराने का प्रयास किया था, लेकिन लैंडर से संपर्क टूट जाने के बाद से उसका कुछ पता नहीं चल सका है।

लूनर रिकॉनसन्स ऑर्बिटर (एलआरओ) के परियोजना वैज्ञानिक नोआह एडवर्ड पेट्रो ने ई-मेल के जरिए विशेष बातचीत में बताया, एलआरओ मिशन ने 14 अक्टूबर को चंद्रयान-2 विक्रम लैंडर के उतरने वाले स्थान के क्षेत्र की तस्वीरों को कैद किया लेकिन उसे लैंडर का कोई सुराग नहीं मिला।

पेट्रो ने बताया कि कैमरा टीम ने बहुत ध्यान से इन तस्वीरों का अध्ययन किया और बदलाव का पता लगाने वाली तकनीक का इस्तेमाल किया जिसमें लैंडिंग की कोशिश से पहले की तस्वीर और 14 अक्टूबर को ली गई तस्वीर के बीच तुलना की गई।

एलआरओ मिशन परियोजना के उप वैज्ञानिक जॉन केलर ने बताया, यह संभव है कि विक्रम किसी छाया में छिपा हो या फिर जिस क्षेत्र में हमने उसे खोजा, वहां पर वह नहीं हो। यह क्षेत्र कभी भी छाया से पूरी तरह से मुक्त नहीं होता है। इससे पहले 17 अक्टूबर को किए गए एक मिशन में भी एलआरओ टीम को लैंडर की तस्वीर लेने या उसका पता लगाने में कामयाबी नहीं मिली थी।

https://hindi.webdunia.com/international-hindi-news/american-mission-did-not-get-the-clue-of-vikram-lander-119102300078_1.html

The New York Times

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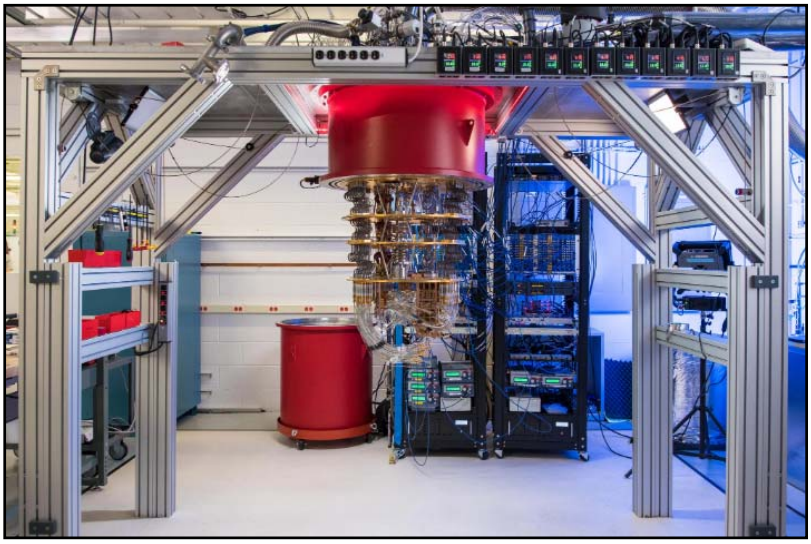
Google claims a quantum breakthrough that could change computing

The company said in a paper published on Wednesday that the machine needed only a few minutes to perform a task that would take a supercomputer at least 10,000 years.

By Cade Metz

Santa Barbara, Calif. — Google said on Wednesday that it had achieved a long-sought breakthrough called "quantum supremacy," which could allow new kinds of computers to do calculations at speeds that are inconceivable with today's technology.

The Silicon Valley giant's research lab in Santa Barbara, Calif., reached a milestone that scientists had been working toward since the 1980s: Its quantum computer performed a task that isn't possible with traditional computers, according to a paper published in the science journal Nature.



A quantum machine could one day drive big advances in areas like artificial intelligence and make even the most powerful supercomputers look like toys. The Google device did in 3 minutes 20 seconds a mathematical calculation that supercomputers could not complete in under 10,000 years, the company said in its paper.

Scientists likened Google's announcement to the Wright brothers' first plane flight in 1903 — proof that something is really possible even though it may be years before it can fulfill its potential.

"The original Wright flyer was not a useful airplane," said Scott Aaronson, a computer scientist at the University of Texas at Austin who reviewed Google's paper before publication. "But it was designed to prove a point. And it proved the point."

Still, some researchers cautioned against getting too excited about Google's achievement since so much more work needs to be done before quantum computers can migrate out of the research lab. Right now, a single quantum machine costs millions of dollars to build.

Many of the tech industry's biggest names, including Microsoft, Intel and IBM as well as Google, are jockeying for a position in quantum computing. And venture capitalists have invested more than $450 million into start-ups exploring the technology, according to a recent study.

China is spending $400 million on a national quantum lab and has filed almost twice as many quantum patents as the United States in recent years. The Trump administration followed suit this year with its own National Quantum Initiative, promising to spend $1.2 billion on quantum research, including computers.

A quantum machine, the result of more than a century's worth of research into a type of physics called quantum mechanics, operates in a completely different manner from regular computers. It relies

on the mind-bending ways some objects act at the subatomic level or when exposed to extreme cold, like the metal chilled to nearly 460 degrees below zero inside Google's machine.

One day, researchers believe, these devices could power advances in artificial intelligence or easily overwhelm the encryption that protects computers vital to national security. Because of that, the governments of the United States and China consider quantum computing a national security priority.

But first, scientists must prove such a machine can become more than a project that hints at what could eventually be possible.

Traditional computers perform calculations by processing "bits" of information, with each bit holding either a 1 or a 0. That has been the case for decades.

Understanding how a quantum computer is different requires a philosophical leap: accepting the notion that a single object can behave like two separate objects at the same time when it is either extremely small or extremely cold.

By harnessing that odd behavior, scientists can instead build a quantum bit, or qubit, which stores a combination of 1 and 0. Two qubits can hold four values at once. And as the number of qubits grows, a quantum computer becomes exponentially more powerful.

https://www.nytimes.com/2019/10/23/technology/quantum-computing-google.html