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# समाचार पत्रों से चयित अंश
# Newspapers Clippings

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# CONTENTS

**DRDO News**

**DRDO Technology News**

THE NEW INDIAN EXPRESS

*Fri, 19 Feb 2021*

# All about India's 160 Km range Astra Mark-II missile, which could soon be tested for the first time

- ***India could test Astra Mark-II missile this week, reports say.***

India could test its Astra Mark-II Beyond Visual Range Air-to-Air missile (BVRAAM) for the first time as early as this week, the *New Indian Express* reports.

Astra Mark-II, a new version of the Astra missile, India's first indigenous beyond visual range air-to-air missile, has a range of around 160 km.

While the 110 km range Astra Mark-I has cleared all tests and ordered in large numbers — 248 missiles, including 48 for the Indian Navy — from state-owned Bharat Dynamics Limited, the Mark-II version of the missile, being developed by the Defence Research and Development Organisation (DRDO), is entering developmental trial.

This trial of the missile is likely to be conducted from a ground launcher being set up at Launch Complex III of Integrated Test Range, located in Balasore, Odisha. The trial is being carried out to test the missile's ballistic performance.

Astra Mark-II will be tested from a fighter only after the safe release of the missile from the ground launcher and its propulsion and navigation systems have been validated.

Sources quoted by the *New Indian Express* say the window for the test starts on 18 February and ends on 20 February, adding that the missile has been integrated with the launcher and final checks are being carried out.

The missile could be tested as early as today (18 February), the report adds.

However, other reports, including this by news agency *ANI*, say the missile, Astra Mark-II, is likely to be tested in the second half of 2021.

Astra Mark-II will have improved jammer resistance and an indigenous seeker. The missile will be equipped with a dual-pulse rocket motor, critical for its long range.

The development of Astra missile began in 2001. The Mark-I version of the missile was tested for the first time in May 2003. Since then, Astra Mark-I has been test-fired multiple times, and has been integrated with Su-30 MKI. In September 2019, the missile, test-fired from an Su-30MKI, hit a target 90 km away.

Apart from the Su-30 MKIs, it will be integrated with Tejas Mark-1A (deal for 83 signed earlier this month at Aero India) and upgraded MiG-29s of the Air Force.

In 2018, the DRDO informed Parliament that it had formally sanctioned the Astra Mark-II project, although work on it had began informally much earlier.

A solid fuel ducted ramjet or SFDR propulsion system, which will take the missile's performance to the next level, was tested in February 2019.

SFDR propulsion, being developed in partnership with Russia, is critical for the missile's performance in the terminal phase of its flight towards the target. Meteor missile, which India has procured with Rafale fighters, also depends on its ramjet propulsion for "more energy to maneuver during the endgame of the engagement".

DRDO plans to complete the development of the missile over the next two years.

While the DRDO's plan for Astra Mark-II is to mirror the performance of MBDA's Meteor missile, it may take a few more years to reach there, experts say.

*https://swarajyamag.com/news-brief/all-about-indias-160-km-range-astra-mark-ii-missile-which-could-soon-be-tested-for-the-first-time*

ThePrint

***Fri, 19 Feb 2021***

# L&T delivers last K9 Vajra howitzer to Army, firm in talks with DRDO to convert it into tank

***Indian Army is internally looking at the possibility and practicality of having a light tank, which could come handy in situations similar to Ladakh stand-off.***

***By Snehesh Alex Philip***

New Delhi: Leading Indian private defence major Larsen and Toubro (L&T) Thursday successfully completed delivery of the last and 100th K9 Vajra 155mm/52 calibre Tracked Self-Propelled Howitzer, which was flagged off by Army Chief General M.M. Naravane at Hazira near Surat in Gujarat.

With the company delivering ahead of schedule the massive Armoured Systems Complex (ASC) at Hazira, which has its own track, it is likely to go into hibernation mode with no new contract expected in the immediate future.

Army Chief General M.M. Naravane flags off the howitzer in Surat, Gujarat, on 18 February 2021 | Source: L&T

The ASC is spread over 40 acres within the L&T's 755-acre Hazira Manufacturing Complex.

Sources in the defence and security establishment said the Defence Research and Development Organisation (DRDO) and the L&T are in talks with each other to possibly convert the Tracked Self-Propelled Howitzer into a light or medium-weight tank that could be used in mountain regions like Ladakh.

Three of its howitzers have already reached Leh for high-altitude trials, which could eventually pave way for the Vajras to be converted into a tank.

While India currently operates the T-72 and T-90 tanks, it is felt that there is a need for lighter tanks, which can operate more easily in mountainous terrains.

The Army is internally looking at the possibility and the practicality of having a light tank, which could come handy in situations similar to the Ladakh stand-off.

But the Army, sources said, is unlikely to go in for the more formidable K9 Vajras as the plan was to have only five regiments, which are meant for the desert area.

L&T had in 2017 won the Rs 4,500-crore contract to supply 100 units of K9 Vajra under the 'Make in India' initiative for which they had signed a transfer of technology contract with South Korean company, Hanwha Corporation.

**'Vajra tank'**

Talking about the possible 'Vajra tank', defence sources said the idea is to replace the heavy 155 mm gun with a 105 mm or 120 mm gun.

"The chassis or the hull remains the same. The massive 155 mm gun can be replaced by a 105 mm or even 120 mm gun, which will reduce its weight drastically as the design of the turret also changes," a source said.

"More weight reducing technology and material can be used, which will bring down the weight by at least 10 tonnes. This means that the Vajra tank can actually weigh around 30 tonnes or somewhere close, which can be deployed in the mountains," the source added.

Lt Gen. P.R. Shankar (retd), who is the former Director General of Artillery, had last year pitched for the Vajra to be turned into a light tank, saying the current China-Indian stand-off has highlighted the lack of a suitable tank for high altitudes.

**'Ready to indigenously develop India's future capabilities'**

Meanwhile, J.D. Patil, whole-time director and senior executive vice president (defence and smart technologies), L&T, said in a statement, "We hope and believe that under the Atma Nirbhar Bharat policies of the Government of India, the national asset created in the form of the Armoured Systems Complex to execute this ambitious contract, will provide sustenance to the painstakingly built supply chain of more than 1,000 MSME partners."

He added that the production of complex platforms like the K9 Vajra contributes to the Indian economy with a large multiplier effect, creates new job opportunities and plays a significant role in enhancing India's industrial ecosystem.

"With the experience, track-record, skills, capabilities and infrastructure that L&T has built, we are ready to indigenously develop, and build India's future capabilities," he said.

The company added that the K9 Vajra systems are delivered with more than 80 per cent indigenous work packages and above 50 per cent indigenisation (by value) at the programme level.

It added that L&T had started indigenisation, right from the inception of the programme by replacing 14 critical systems in the Korean 'K9 Thunder' with indigenously developed and produced systems for the trial gun fielded for user evaluation trials.

*https://theprint.in/defence/lt-delivers-last-k9-vajra-howitzer-to-army-firm-in-talks-with-drdo-to-convert-it-into-tank/607527/*

THE ECONOMIC TIMES

*Fri, 19 Feb 2021*

# Setting up demo unit for hyperloop would be good achievement for India: VK Saraswat

If India can set up a demonstration unit for the hyperloop technology for ultrahigh-speed travel in the next 4-5 years, then it would be a 'good achievement' for the country, Niti Aayog Member V K Saraswat said on Thursday.

Saraswat, who is heading a committee to explore the technological and commercial viability of the Virgin Hyperloop technology, further said the technology in the country has to be part of the Atmanirbhar Bharat initiative.

"In the next 4-5 years, if we can set up a demonstration unit (for hyperloop technology) in Maharashtra, it would be a good achievement for us to learn a lot before we scale it up," he told in an interview.

**Saraswat, former chief of the Defence Research and Development Organisation (DRDO), also noted that introduction of hyperloop technology would take time in India.**

The Virgin Hyperloop test run was conducted on November 9, 2020 on a 500-metre track in Las Vegas in the US with a pod, as the hyperloop vehicles are called, travelling with passengers, including an Indian, inside an enclosed tube at more than 100 mph or 161 kmph.

The Virgin Hyperloop is among a handful of companies which are currently trying to build such a system for passenger travel.

Maharashtra has deemed hyperloop a public infrastructure exercise and approved the Virgin Hyperloop-DP World Consortium as the original project proponent for the Mumbai-Pune hyperloop project.

"What we are planning today is only a demonstration kind of experiment. It is not that we are going to convert that straight away into a commercially viable city-wide project," he said.

Saraswat, former Chief of the Defence Research and Development Organisation (DRDO), also noted that introduction of Hyperloop technology would take time in India.

"The technology itself is not mature, there are safety issues, there are economic issues and there are some issues with respect to the atmanirbharta, how much of it can be done in the country," he observed.

Saraswat said he does not want it to be a technology which is 99 per cent imported.

"It has to be part of 'Atmanirbhar Bharat' and should be developed, designed and set up in India," he said.

Hyperloop is a technology proposed by inventor and businessman Elon Musk, who is behind the electric car company Tesla and the commercial space transport company SpaceX.

With hyperloop, vehicles accelerate gradually via electric propulsion through a low-pressure tube. The pod floats along the track using magnetic levitation and glides at airline speeds for long distances due to ultra-low aerodynamic drag.

Virgin Hyperloop had last month announced a partnership with the Bangalore International Airport to conduct a feasibility study for a proposed hyperloop corridor from the airport.

The committee has Sudhendu Jyoti Sinha, adviser - infrastructure connectivity, Niti Aayog, as its convener.

Other members include Railway Board Chairman and CEO VK Yadav; secretaries of the ministries of housing and urban affairs and road transport and highways; and the Maharashtra government's transport secretary.

DRDO's Chairman, Delhi Metro's managing director, IIT-Delhi director and chairman, Technology Information, Forecasting and Assessment Council are also its members

The mandate of the committee is to study Virgin Hyperloop technology and its commercial viability, safety, regulation and finalise the document within six months of its first meeting.

The committee may also invite domain experts and representatives from various organisations to its meetings.

*https://economictimes.indiatimes.com/news/economy/infrastructure/setting-up-demo-unit-for-hyperloop-would-be-good-achievement-for-india-vk-saraswat/articleshow/81091663.cms*

THE NEW INDIAN EXPRESS

***Fri, 19 Feb 2021***

# PES University will launch satellite to monitor ships

***This will be the second satellite being developed in the university to be launched into orbit.***

Bengaluru: Bengaluru-based PES University is set to launch a micro satellite - RSAT into a polar sun synchronous orbit of 500 km on February 28, with the support of Defence Research and Development Organisation (DRDO), as demonstration of proof of concept. RSAT is a 3-axis stabilized agile micro-satellite weighing 15 kg and measuring 300mm x 300 mm x 300mm with deployable solar panels, according to a release. This will be the second satellite being developed in the university to be launched into orbit.

The micro-satellite was configured and developed after the DRDO sanctioned a Contract for Acquiring Research Services to the university to carry a Satellite Based Automatic Identification System (SB-AIS) payload. SB-AIS will help monitor ships on high seas and provide information about their movement. The payload receives AIS signals transmitted by ships in VHF band, processes and transmits the information to a ground station.

*https://www.newindianexpress.com/states/karnataka/2021/feb/19/pes-university-will-launch-satellite-to-monitor-ships-2265937.html*

THE TIMES OF INDIA

*Fri, 19 Feb 2021*

# Uttarakhand: ITBP, DRDO team reaches lake formed near Rishiganga, to trek to its source on Friday

Dehradun: A joint team of Indo-Tibetan Border Police (ITBP) and Defence Research and Development Organisation (DRDO) has camped close to the lake, which was formed following the devastating flash flood on February 7. A team of SDRF, Uttarakhand Space Application Centre (USAC), Nehru Institute of Mountaineering and experts, which was expected to reach the spot on Thursday but could not leave, is now expected to inspect the lake on Friday to suggest ways to increase the outflow of water.

The ITBP has also identified a location to make a helipad near the lake.

A team of 20 ITBP personnel, headed by assistant commander Sher Singh Bahadur, along with a 5-member team of DRDO has camped close to the artificial lake and is scheduled to reach the head of the lake on Friday morning. The team would collect the details of the feed being provided to the lake by the glaciers.

The ITBP spokesperson, Vivek Pandey, told TOI, "The team reached the confluence of Rishiganga and Raunthi stream from Muranda axis on Thursday. The team will cross Raunthi on Friday morning to inspect the lake for further course of action. The team is camping on the spot for the night." He pointed out that the team would thereafter trek towards the head of the lake and collect the details on water being fed to it by the glaciers. "Thereafter, the required steps would be taken to speed up the flow of water coming out of the lake," said the ITBP official.

Pandey pointed out that the rescue operations were underway at Tapovan and rescue teams were successful in reaching up to 160 metres. "Two persons were found in the tunnel on Thursday and the efforts are on to find others," he added. Meanwhile, a 9-member team comprising USAC director MPS Bisht could not leave for Raini on Thursday. Sources said that the team is expected to visit the area on Friday and submit its report to the chief secretary. The report will primarily focus on having more openings for the lake to help the water to flow out from different sources.

*https://timesofindia.indiatimes.com/city/dehradun/itbp-drdo-team-reaches-lake-formed-near-rishiganga-to-trek-to-its-source-today/articleshow/81096582.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst&from=mdr*

# Defence News

## Defence Strategic: National/International

Press Information Bureau
Government of India

**Ministry of Defence**

***Thu, 18 Feb 2021 4:48PM***

# Software Defined Radio (SDR) for Indian Army under Aatmanirbhar Bharat Abhiyaan

1. Communication is vital and critical to all military operations. The Combat Net Radio (CNR) is the mainstay of communications for the Indian Army in the battlefield. The contemporary CNR equipment in the Indian Army supports voice communication only and has limited or no data transmission capability. To arm the soldiers with advantages offered by technology and equip him to fight a war in the Net–Centric battle space, present radios are to be replaced soon by indigenously developed Software Defined Radio (SDR), which have enhanced data transmission capability, enhanced voice clarity and data transmission accuracy in spectrally noisy environments, support multiple waveforms, greater system security and better communication survivability in clear and secure mode to meet the operational requirements of the Indian Army.

2. Indian Army is in the process to revamp its communication systems by procuring Very/Ultra High Frequency (V/UHF)Manpack SDRs under Make-II category. After successful evaluation of vendor responses, Project Sanction Order (PSO) has now been issued to 18 Indian vendors to start prototype development. The contract will be placed with one of the firms post successful development of prototype as per provisions of Buy (Indian-IDDM) category of DAP 2020.

3. Development of V/UHF Manpack SDR under Make-II will be a game changer for Indian Army. It is in sync with the "Aatmanirbhar Bharat" policy of the Government which will lead to "Self Reliance" in advanced communication systems.

*https://www.pib.gov.in/PressReleasePage.aspx?PRID=1699066*

पत्र सूचना कार्यालय
भारत सरकार

**रक्षा मंत्रालय**

***Thu, 18 Feb 2021 4:48PM***

# आत्मनिर्भर भारत अभियान के तहत भारतीय सेना के लिए सॉफ्टवेयर डिफाइंड रेडियो (एसडीआर)

1. संचार अहम है एवं सभी सैन्य अभियानों के लिए काफी महत्वपूर्ण है। युद्ध के मैदान में भारतीय सेना के लिए कॉम्बैट नेट रेडियो (सीएनआर) संचार का मुख्य आधार है। भारतीय सेना में समकालीन सीएनआर उपकरण केवल वॉयस कम्युनिकेशन को सपोर्ट करते हैं और इनमें डेटा ट्रांसमिशन क्षमता या तो

सीमित है या फिर नहीं है। **प्रौद्योगिकी** द्वारा प्रदान किए जाने वाले फायदों से **सैनिकों** को लैस करने के लिए एवं नेट-केंद्रित युद्ध में लड़ने हेतु सुसज्जित करने के लिए, मौजूदा रेडियोज़ को स्वदेश में विकसित सॉफ्टवेयर डिफाइंड रेडियो (एसडीआर) द्वारा जल्द ही प्रतिस्थापित किया जाना है। एसडीआर में शोरगुल भरे स्पेक्ट्रम के वातावरण में बेहतर डेटा ट्रांसमिशन क्षमता, अधिक सुस्पष्ट आवाज़ और डेटा ट्रांसमिशन सटीकता है। एसडीआर भारतीय सेना की सैन्य आवश्यकताओं को पूरा करने के **लिए** स्पष्ट और सुरक्षित मोड में अनेक वेवफॉर्म्स, सिस्टम **की** बेहतर सुरक्षा और बेहतर संचार को सपोर्ट करती है ।

2. भारतीय सेना मेक-2 **श्रेणी** के तहत वेरी/अल्ट्रा हाई फ्रीक्वेंसी (वी/यूएचएफ) मैनपैक एसडीआर खरीदकर अपनी संचार प्रणालियों को दुरुस्त करने की प्रक्रिया में है। विक्रेता प्रतिक्रियाओं के सफल मूल्यांकन के बाद, अब 18 भारतीय विक्रेताओं को प्रोटोटाइप विकास शुरू करने के लिए परियोजना मंजूरी आदेश (पीएसओ) जारी किया गया है। यह अनुबंध डीएपी 2020 की बाय (**इंडियन**-आईडीडीएम) श्रेणी के प्रावधानों के अनुसार प्रोटोटाइप के सफल विकास के बाद किसी एक फर्म के साथ रखा जाएगा।

3. मेक-2 के तहत वी/यूएचएफ मैनपैक एसडीआर का विकास भारतीय सेना के लिए गेम चेंजर होगा। यह सरकार की "आत्मनिर्भर भारत" नीति के अनुरूप है जो उन्नत संचार **प्रणालियों** में "आत्मनिर्भरता" की ओर ले जाएगा।

*https://pib.gov.in/PressReleasePage.aspx?PRID=1699162*

ThePrint

***Fri, 19 Feb 2021***

# Army to raise 3 new battalions with 3,000 troops, under Sikh, Kumaon, J&K regiments

***Army says move to raise 3 battalions part of ongoing reorganisation plan. Currently, there are over 400 infantry battalions in the Army.***

***By Amrita Nayak Dutta***

New Delhi: The Indian Army will be raising three additional battalions — with a total of about 3,000 troops — to add to its manpower as part of its larger reorganisation plan and options to raise more are open, ThePrint has learnt.

Defence sources told ThePrint the sanction for the move was accorded around 2013, when the raising of the 17 mountain corps was granted. However, the final nod to raise the battalions was received a few weeks ago, they added.

The 17 corps was supposed to have two divisions instead of the regular three, but only the 59 Division now based in Panagarh, West Bengal, was raised, while the other was shelved due to financial constraints.

The additional three battalions will be raised as part of the Sikh, Kumaon, and Jammu and Kashmir Rifles regiments.

The Army told ThePrint the move is part of an ongoing reorganisation plan and not a fallout of the India-China face-off in Ladakh.

“It is not possible to raise all the battalions in one go, so it is phased out,” a senior Army officer told ThePrint.

The decision comes amid a protracted standoff with China at the Line of Actual Control in eastern Ladakh and the subsequent disengagement of the troops, which is currently underway.

India’s defence establishment had time and again said a collusive threat of a two-front conflict with China and Pakistan cannot be ruled out in the future.

“While the disengagement is under way at eastern Ladakh, India will be reviewing the border management posture and there might be a necessity to keep additional troops available in case of any contingency in the region,” a source said.

While the raising of the three battalions are to be done now, sources said options are open for more raisings in future depending on operational requirements.

Currently, there are over 400 infantry battalions in the Army.

While there have been talks of the Army working on reducing overall manpower as part of a restructuring, the ultimate aim is to enhance the tooth to tail ratio, and provisioning fighting arms with additional manpower is one of the ways, Army officers explained.

**Other possible reasons**

A second defence source said there would also be a requirement of additional troops in the reorganised strike corps.

ThePrint was the first to report that the Army is looking to keep two strike corps for the mountains facing China and repurposing the Mathura-based 1 corps.

Senior officers said there is always a requirement of additional infantry — both to hold ground and to carry out offensive actions, especially in the mountains.

The second source explained that the increase in battalions will also cater to better management of the peace and field profile of the soldiers.

Due to the Ladakh standoff, a large number of units, which had moved to their peace locations after field positions, had to be deployed in Ladakh immediately, leaving them with little time in peace locations.

It takes approximately six months to raise a battalion, for which the manpower is contributed by other battalions of the regiment along with new recruits.

Once raised, the battalion moves for a peace station profile where they can train, before moving to field areas for their operational deployment.

**‘Rebalancing of formations in the western sectors’**

Experts said the need to raise new battalions could have stemmed from the requirement of additional commitments in eastern Ladakh in future.

“In future, there could be a requirement of additional battalions permanently stationed in the area,” Lt. Gen. Rakesh Sharma (retired), former 14 corps commander and adjutant general in the Army, who had handled manpower closely, told ThePrint.

“The decision could have also been taken in view of the rebalancing of formations in the western sectors and the strike corps, specially the 17 strike corps, which was partially raised with one division,” he said.

“However, it is also essential to direct the rebalancing methodology to combating new domains of warfare, such as cyber and space,” he added.

*https://theprint.in/defence/army-to-raise-3-new-battalions-with-3000-troops-under-sikh-kumaon-jk-regiments/606831/*

R. REPUBLICWORLD.COM

*Fri, 19 Feb 2021*

# Indian Navy and Indonesian Navy conducts PASSEX in Arabian Sea to enhance interoperability

***The Indian Navy and the Indonesian Navy on Thursday conducted bilateral military exercise PASSEX in the Arabian Sea to strengthen Bilateral Maritime Cooperation***

***By Pritesh Kamath***

The Indian Navy and the Indonesian Navy on Thursday conducted bilateral military exercise PASSEX in the Arabian Sea. The exercise was conducted with a view to enhancing interoperability & strengthening Bilateral Maritime Cooperation between the two navies. Indian Navy Ship INS Talwar and Indonesian Navy's multirole Corvette KRI Bung Tomo were part of the Passage Exercise.

**India's participation in Naval exercises**

The Indian Navy has participated in the Maritime Exercises with a number of countries recently including Japan, Russia, Australia and the US, despite the COVID-19 pandemic posing challenges. Indian Navy had conducted PASSEX with Russian Federation Navy (RuFN)in the Eastern Indian Ocean Region (IOR) in December 2020.

The PASSEX with RuFN involves the participation of RuFN guided-missile cruiser Varyag, the large anti-submarine ship Admiral Panteleyev and medium ocean tanker Pechenga while the Indian Navy was represented by indigenously constructed guided-missile frigate Shivalik and anti-submarine corvette Kadmatt along with integral helicopters.

PASSEXs are conducted regularly by Indian Navy with units of friendly foreign navies, whilst visiting each other's ports or during a rendezvous at sea.

In November 2020, India hosted the Malabar exercise, in which the navies of the US, Japan and Australia participated. India invited Australia for the exercise, effectively making it a drill by all the Quad member nations.

In September 2020, the PASSEX was conducted Royal Australian Navy in the east Indian Ocean region. It involved advanced surface and anti-air exercises including weapon firing, seamanship exercises, naval manoeuvres and Cross Deck Flying Operations. The exercise is usually conducted in the east Indian Ocean region. The PASSEX in September reflected the growing strength of Indo-Australian bilateral relations as comprehensive strategic partners, particularly in defence cooperation in the maritime domain.

*https://www.republicworld.com/india-news/general-news/indian-navy-and-indonesian-navy-conducts-passex-in-arabian-sea-to-enhance-interoperability.html*

THE TIMES OF INDIA

*Fri, 19 Feb 2021*

# Army testing new K-9 howitzers in Ladakh

New Delhi: The Army is now testing whether its new K-9 Vajra selfpropelled howitzers can be effectively deployed in Ladakh, even as General M M Naravane inducted the last of the 100 such artillery guns ordered for Rs 4,366 crore from a joint venture of L&T and South Korean Hanwha Defence on Thursday.

Three of the 155mm/52-calibre K-9 tracked guns, which have a strike range of 38-km, have been taken to a base up the hills in Ladakh to determine their suitability and efficacy for deployment in the high-altitude region.

Based on the performance of the howitzers, the Army could consider placing additional orders for them. “The guns were inducted for deserts and plains. Some additional kits would be required for high-altitude conditions where temperatures can dip well below minus 20 degree Celsius,” said a source.

The 100th gun, which is the Indian version of the South Korean K-9 'Thunder' howitzer, was flagged off by the Army chief from the Armoured System Complex (ASC) of L&T at Hazira, near Surat, in Gujarat.

“The production of complex platforms like the K-9 Vajra contributes to the Indian economy with a large multiplier effect, creates new job opportunities and plays a significant role in enhancing India’s Industrial ecosystem,” said J D Patil, director & senior executive vice president (defence & smart technologies) of L&T.

The order for the K-9 Vajra guns was placed in 2017, which along with the $737 million deal with the US government for 145 M777 ultra-light howitzers had finally broken the over 30-year-old Bofors jinx of the Indian Army.

*https://timesofindia.indiatimes.com/india/army-testing-new-k-9-howitzers-in-ladakh/articleshow/81094026.cms*

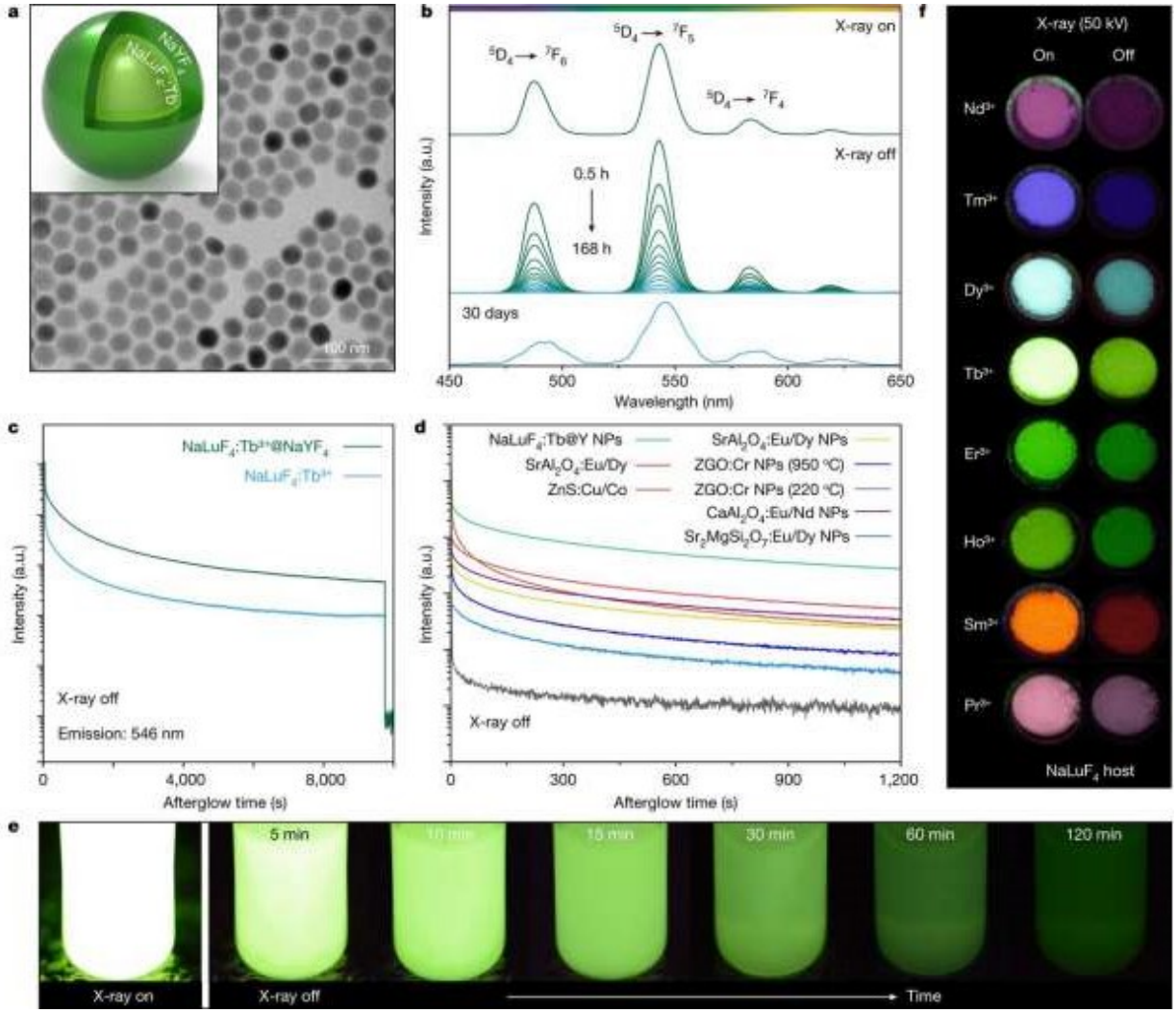
PHYS.ORG

*Fri, 19 Feb 2021*

# Using persistently luminescent nanocrystals to create 3-D X-rays

***By Bob Yirka***

A team of researchers with members from China and Singapore has found that it is possible to use persistently luminescent nanocrystals to create 3-D X-rays. In their paper published in the journal Nature, the group describes a means for creating nanocrystals that can hold onto excited charge carriers, and how they used those crystals to fashion a bendable sheet that could be used to create 3-D images using X-rays. Albano Carneiro Neto and Oscar Malta, with the University of Aveiro and the Federal University of Pernambuco, respectively, have published a News & Views piece in the same journal issue outlining the history of 3-D X-ray research and the work done by the team with this new effort.




**Characterization of lanthanide-doped persistent luminescent nanoscintillators. Credit: Nature (2021). DOI: 10.1038/s41586-021-03251-6**

As Carneiro Neto and Malta note, two-dimensional X-ray imaging has been around for over 100 years—3-D X-ray imaging, on the other hand, has remained elusive. In this new effort, the researchers have developed a method for creating 3-D X-ray images under certain conditions.

The work by the team started with the study of certain kinds of luminescent crystals, most of which contained phosphors; some of them have been used in bio-detectors and nanothermometry. Prior research has shown that under certain conditions, they can glow for a few seconds after they are struck by light. Prior research has also shown that it is likely such materials are able to retain their glow because of small defects that trap excited charge carriers. In their work, the researchers found that lanthanide-containing nanocrystals could hold excited charge carriers for several weeks—they embedded several of them in a flexible material to create a bendable X-ray detector. They then partially wrapped the detector around an object (a circuit board) and fired X-rays at it. Testing showed their device capable of producing 3-D images of the circuit board.

The researchers acknowledge that several issues will have to be resolved before a device based on their work could make its way into medical applications—sensitivity must be improved, for example. And a better understanding of the means by which the defects hold the charge carriers is needed to ensure that such devices would be safe to use on people.

*https://phys.org/news/2021-02-persistently-luminescent-nanocrystals-d-x-rays.html*

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***Fri, 19 Feb 2021***

# NASA rover lands on Mars to look for signs of ancient life

***By Marcia Dunn***

A NASA rover streaked through the orange Martian sky and landed on the planet Thursday, accomplishing the riskiest step yet in an epic quest to bring back rocks that could answer whether life ever existed on Mars.

Ground controllers at the space agency's Jet Propulsion Laboratory in Pasadena, California, jumped to their feet, thrust their arms in the air and cheered in both triumph and relief on receiving confirmation that the six-wheeled Perseverance had touched down on the red planet, long a deathtrap for incoming spacecraft.

It took a tension-filled 11 1/2 minutes for the signal to reach Earth.

"Touchdown confirmed! Perseverance safely on the surface of Mars, ready to begin seeking signs of past life," flight controller Swati Mohan announced to back-slapping, fist-bumping colleagues wearing masks against the coronavirus.

The landing marks the third visit to Mars in just over a week. Two spacecraft from the United Arab Emirates and China swung into orbit around Mars on successive days last week. All three missions lifted off in July to take advantage of the close alignment of Earth and Mars, journeying some 300 million miles in nearly seven months.

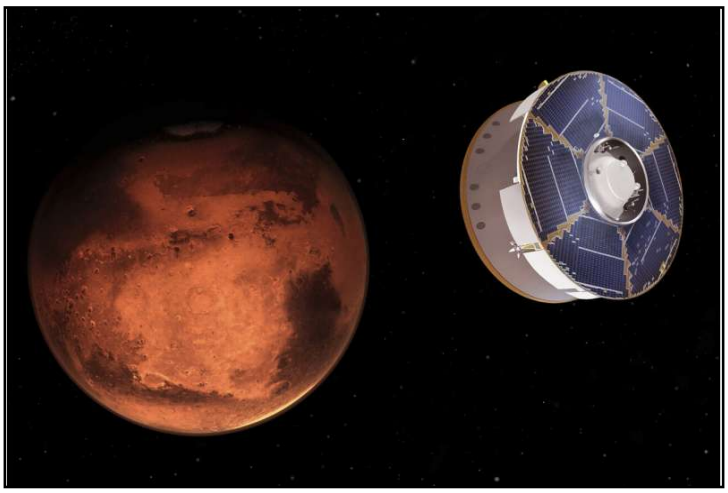
Perseverance, the biggest, most advanced rover ever sent by NASA, became the ninth spacecraft to successfully land on Mars, every one of them from the U.S., beginning in the 1970s.

The car-size, plutonium-powered vehicle arrived at Jezero Crater, hitting NASA's smallest and trickiest target yet: a 5—by-4-mile strip on an ancient river delta full of pits, cliffs and fields of rock. Scientists believe that if life ever flourished on Mars, it would have happened 3 billion to 4 billion years ago, when water still flowed on the planet.

In this photo provided by NASA, members of NASA's Perseverance rover team react in mission control after receiving confirmation the spacecraft successfully touched down on Mars, Thursday, Feb. 18, 2021, at NASA's Jet Propulsion Laboratory in Pasadena, Calif. The landing of the six-wheeled vehicle marks the third visit to Mars in just over a week. Two spacecraft from the United Arab Emirates and China swung into orbit around the planet on successive days last week. (Bill Ingalls/NASA via AP)

Over the next two years, Percy, as it is nicknamed, will use its 7-foot (2-meter) arm to drill down and collect rock samples with possible signs of bygone microscopic life. Three to four dozen chalk-size samples will be sealed in tubes and set aside on Mars to be retrieved by a fetch rover and brought homeward by another rocket ship. The goal is to get them back to Earth as early as 2031.

Scientists hope to answer one of the central questions of theology, philosophy and space exploration.



This photo made available by NASA shows the second image sent by the Perseverance rover showing the surface of Mars, just after landing in the Jezero crater, on Thursday, Feb. 18, 2021. (NASA via AP)

"Are we alone in this sort of vast cosmic desert, just flying through space, or is life much more common? Does it just emerge whenever and wherever the conditions are ripe?" said deputy project scientist Ken Williford. "We're really on the verge of being able to potentially answer these enormous questions."

China's spacecraft includes a smaller rover that also will be seeking evidence of life—if it makes it safely down from orbit in May or June.

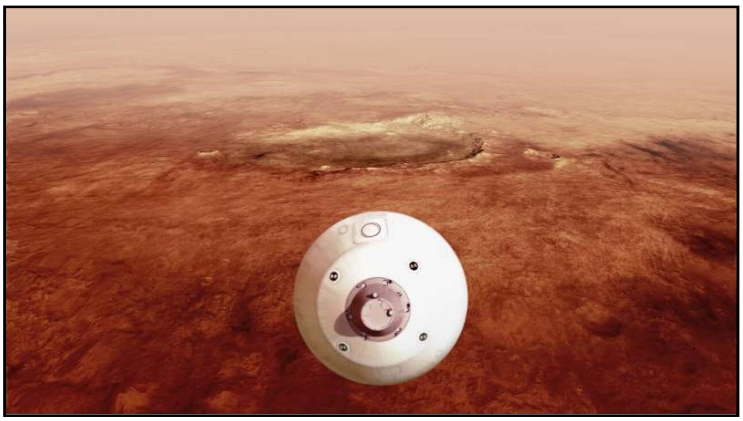
Perseverance was on its own during the NASA-described "seven minutes of terror" descent.

Flight controllers waited helplessly as the preprogrammed spacecraft hit the thin, 95% carbon dioxide Martian atmosphere at 12,100 mph (19,500 kph), or 16 times the speed of sound, slowing as it plummeted.

It released its 70-foot (21-meter) parachute, jettisoned its heat shield, and then used a rocket-steered platform known as a sky crane to lower the rover the final 60 or so feet (18 meters) to the surface.

**Photo provided by NASA, members of NASA's Perseverance rover team react in mission control after receiving confirmation the spacecraft successfully touched down on Mars, Thursday, Feb. 18, 2021, at NASA's Jet Propulsion Laboratory in Pasadena, Calif. Th**

Perseverance promptly sent back a grainy, black-and-white photo of Mars' pockmarked surface, the rover's shadow visible in the frame. The rover appeared to have touched down about 35 yards from the nearest rocks.



"Take that, Jezero!" a controller called out.

Mars has proved a treacherous place: In the span of less than three months in 1999, a U.S. spacecraft was destroyed upon entering orbit because engineers had mixed up metric and English units, and an American lander crashed on Mars after its engines cut out prematurely.

Perseverance will conduct an experiment in which it will convert small amounts of carbon dioxide in the atmosphere into oxygen, a process that could be a boon to future astronauts by providing breathable air and an ingredient for rocket fuel.

The rover is also equipped with a record 25 cameras and two microphones, many of them turned on during descent. Among the never-before-seen views NASA intends to send back in the next couple days: the enormous supersonic parachute billowing open and the ground getting closer.

"A feast for the eyes and ears. It's really going to be spectacular," observed Arizona State University's Jim Bell, lead scientist for a pair of mast cameras that will serve as the rover's eyes.

NASA is teaming up with the European Space Agency to bring the rocks home. Perseverance's mission alone costs nearly $3 billion.

The only way to confirm—or rule out—signs of past life is to analyze the samples in the world's best labs. Instruments small enough to be sent to Mars wouldn't have the necessary precision.

"It's really the most extraordinary, mind-boggingly complicated and will-be history-making exploration campaign," David Parker, the European Space Agency's director of human and robotic exploration, said on the eve of landing.

*https://phys.org/news/2021-02-nasa-rover-mars-ancient-life.html*

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# IIT Delhi Study Finds Lower Stress Among Yoga Practitioners During COVID-19 Lockdown

***Indian Institute of Technology Delhi researchers have conducted a study on the correlation between yoga and stress during the COVID-19 lockdown. They have concluded that the yoga practitioners experienced lower levels of stress, anxiety and depression during four to ten weeks of lockdown.***

***By Bhoomika Aggarwal***

Delhi: Indian Institute of Technology Delhi researchers have conducted a study on the correlation between yoga and stress during the COVID-19 lockdown. They have concluded that the yoga practitioners experienced lower levels of stress, anxiety and depression during four to ten weeks of lockdown.

A team of scientists from the National Resource Centre for Value Education in Engineering (NRCVEE), an academic centre at IIT Delhi, including Dr Pooja Sahni, NRCVEE, Mr Nitesh, NRCVEE, Dr Kamlesh Singh, Professor at Humanities and Social Sciences Department, IIT Delhi and Prof Rahul Garg, Head, NRCVEE.

The study has been titled as 'Yoga an effective strategy for self-management of stress-related problems and wellbeing during COVID-19 lockdown: A cross-sectional study' was published in a journal named PLOS ONE.

The study led by Dr Pooja Sahni was conducted on a total of 668 adults during COVID-19 lockdown, between April 26 and June 8, 2020. 2020.

The participants were grouped as; yoga practitioners, other spiritual practitioners, and non-practitioners based on their responses to daily practices that they follow. Yoga practitioners were further examined based on the duration of practice as; long-term, mid-term and beginners.

The longer term practitioners reported higher personal control and lower illness concern in contracting COVID-19 than the mid-term or beginner group. The long-term and mid-term practitioners reported lower emotional impact of COVID-19 and lower risk in contracting the virus.

Dr Pooja Sahni explained the results as she said, "Our study has mapped the effect of yoga on the cognitive and emotional problems of COVID-19, besides showing beneficial effects of yoga on general wellbeing during adversity".

"Evidence supports that yoga was found as an effective self- management strategy to cope with stress, anxiety and depression, and maintain wellbeing during COVID-19 lockdown", she added.

Another researcher said that yoga as a subject must be included in the higher education curriculum.

*https://www.ndtv.com/education/iit-delhi-study-finds-lower-stress-among-yoga-practitioners-during-covid-19-lockdown*