

# समाचार पत्रों से चयित अंश Newspapers Clippings

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## Future India Army soldiers to turn into 'super warriors' as DRDO works on exoskeleton technology

Major countries all over the world are looking at the exoskeleton technology for their soldiers which will not only have built-in advanced technology at the disposal of the wearer but also reduce the weights of several equipment that a soldier has to carry with him, like helmets, radios, night vision goggles, body armour.

Exoskeletons or Exo-suits are dual-use technology gadgets worn as a harness by a soldier to increase the strength. A soldier with an exoskeleton is capable of faster movements and possesses the extra load-bearing capability.

Reportedly, the Defence Research and Development Organisation (DRDO)'s Defence Bioengineering and Electro-medical Laboratory (DEBEL) has been collating data for Simulation and Analysis of Musco-skeletal parts for a while, and defence ministry is already incurring expenditure on upgrading wearable gear on each soldier to meet the ever-changing combat environment challenges.

Several private sector companies too are doing research and development for the Exo-suit design for the conditions specific to Indian soldier.

Artificial Intelligence and C4I expert Milind Kulshreshtha states that each of the soldier's muscle micro-motion is measured for its correlated moment on the joints, so that a similar smooth response from the Exo-suit can be obtained.

For Military applications, an Exo-suit rigged up on a soldier is expected to enhance the soldier's additional load carrying capacity by 100 kg for a minimum of 8 hours of operational time and 3-5 hours of battery backup, he was quoted as saying by *Financial Express*.

Exo-suits can also help soldiers who have been disabled in the combat to live a close to normal life.

<https://swarajyamag.com/insta/future-india-army-soldiers-to-turn-into-super-warriors-as-drdo-works-on-exoskeleton-technology>



## भारतीय वायुसेना के पास अब दुनिया का सबसे खतरनाक हथियार अपाचे, जानें एयरफोर्स चीफ ने क्या कहा

नई दिल्ली: अमेरिका निर्मित आठ 'अपाचे एएच-64ई' लड़ाकू हेलीकॉप्टर (apache helicopter) मंगलवार को भारतीय वायुसेना में शामिल किए गए। इससे वायुसेना की युद्धक क्षमता में वृद्धि होगी। भारतीय वायुसेना में 8 अपाचे लड़ाकू हेलीकॉप्टर को शामिल करने से पहले उसे वाटर कैनन से सलामी दी गई। अधिकारियों ने बताया कि पठानकोट वायुसेना स्टेशन पर आयोजित समारोह में औपचारिक रूप से इन आठ अपाचे हेलीकॉप्टर को भारतीय वायुसेना में शामिल किया गया। इस समारोह में वायुसेना प्रमुख एयल चीफ मार्शल बीएस धनोआ बतौर मुख्य अतिथि शामिल हुए। बोइंग ने समारोह में हेलीकॉप्टर की प्रतीकात्मक चाबी वायुसेना को सौंपी।

### पाक के छूटेंगे पसीने: पूजा-पाठ के साथ 8 अपाचे भारतीय वायुसेना में शामिल

इस मौके पर भारतीय वायुसेना के प्रमुख बीएस धनोआ ने कहा कि अपाचे 64-ई लड़ाकू हेलीकॉप्टर पुराने हो रहे एमआई-35 बेड़े की जगह लेंगे। अपाचे हेलीकॉप्टरों की अंतिम खेप मार्च 2020 तक मिलेगी। अपाचे हेलीकॉप्टर भारतीय वायु सेना की अभियान और मारक क्षमताओं में वृद्धि करेंगे। साथ ही उन्होंने यह भी कहा कि अपाचे हेलीकॉप्टर का भारतीय वायु सेना के बेड़े में शामिल होना इसके आधुनिकीकरण की दिशा में महत्वपूर्ण कदम है। अपाचे हेलीकॉप्टर आधुनिक तकनीक से लैस है और यह सभी मौसमों में दिन रात तेजी से कार्रवाई करने में सक्षम है।

वायुसेना प्रमुख धनोआ ने समाचार एजेंसी एएनआई से कहा, 'यह दुनिया के सबसे भयंकर हमला करने वाले हेलीकॉप्टरों में से एक है। यह कई मिशनों को अंजाम देने में सक्षम है। आज अपाचे एएच -64 ई के शामिल होने के साथ भारतीय वायु सेना ने अपने लेटेस्ट जेनरेशन के लड़ाकू हेलीकॉप्टरों के बड़े अपडेट कर लिया है।

'अपाचे एएच-64ई दुनिया के सबसे उन्नत बहु-भूमिका वाले लड़ाकू हेलीकॉप्टर हैं और अमेरिकी सेना इनका इस्तेमाल करती है। वायुसेना के एक वरिष्ठ अधिकारी न बताया, " आठ अपाचे लड़ाकू हेलीकॉप्टर वायुसेना बल की लड़ाकू क्षमता को बढ़ाएंगे। भारतीय वायुसेना ने 22 'अपाचे हेलीकॉप्टर के लिए अमेरिकी सरकार और बोइंग लिमिटेड के साथ सितम्बर 2015 में कई अरब डॉलर का अनुबंध किया था।

# IAF gets firepower with 8 Apache attack copters

By Ravi Dhaliwal

Pathankot: A fleet of eight state-of the-art Apache helicopters was inducted into the Indian Air Force (IAF) at its forward base in Pathankot today. The event was marked by an impressive ceremony presided over by Air Chief Marshal Birender Singh Dhanoa. The 90-minute formal procedure commenced after representatives of Hindu, Sikh, Muslim and Christian faiths read out prayers from their respective scriptures.

Dhanoa and his colleagues got up to salute one of the Apaches as it flew in front of the dignitaries sitting on the dais. After it landed at the far end of the air base, it was accorded the traditional “water-cannon salute”. This type of a salute is a tradition being followed since ages to honour military veterans, foreign dignitaries and new planes and helicopters. It typically involves two firefighting engines spraying arcs of water once the plane starts taxiing to a halt after a flight.

Minutes after the water-cannon salute, the commentator announced that “the Apaches had been formally inducted into the IAF”. Fourteen more such helicopters will be placed at the disposal of the Air Force by March next year.

Boeing AH-64E helicopter is an American twin-turboshaft attack machine with a cockpit meant to seat two. The crew deployed to fly these underwent training at various places in the USA.

Salil Gupte, Boeing India president, and senior officers, including Pathankot Air Force station commander Air Commodore IT Kurien and Army and district administration officials, led by Deputy Commissioner Ramvir, were in attendance during the proceedings.

During his brief speech, Dhanoa said the helicopters were day/night, all-weather contraptions and were easily maintainable even in field conditions. “Apaches have been an integral part of several battle campaigns on foreign shores. These have been modified by Boeing to suit Indian conditions and as per the exacting standards of the IAF. These will replace the Russian Mi-35 helicopters that are nearing the end of their service life. “Today, the inventory of the IAF stands upgraded. The choppers also have a canon gun that can fire 1,200 rounds at a time and two pods carrying 19 missiles each. These helicopters are a big boost to the country’s combat capabilities,” Dhanoa said.

## **A Potent force equipped with advance weaponry**

**360** degree situational awareness provided to pilots by Longbow fire control radars. It will allow the Indian Air Force a rapid all-weather targeting capability

**16 km** range radar can pick targets and even small unmanned aerial vehicles. The ‘fire and forget’ Longbow Hellfire missile has the ability to detect and prioritise targets

**256** simultaneously moving and stationary targets on land, water and in the air can be automatically searched and located for precision targeting by radars

**300** mile is the combat radius of the helicopter which is equipped with advanced weaponry system, including Hydra rockets and a 30 mm chain gun with 1,200 rounds

## **‘Big boost to country’s combat capabilities’**

The (Apache) choppers have a canon gun that can fire 1,200 rounds at a time and two pods carrying 19 missiles each. These helicopters are a big boost to the country’s combat capabilities. These will replace the Russian Mi-35 helicopters. — Air Chief Marshal BS Dhanoa

<https://www.tribuneindia.com/news/nation/iaf-gets-firepower-with-8-apache-attack-copters/827281.html>

## Major component of the Apache attack helicopters will be made in India

*India on Tuesday became the 16th country to procure the Apache when the Indian Air Force (IAF) inducted eight of them at the Pathankot Air Base*

*By Shaurya Karanbir Gurung*

Pathankot: Giving a fillip to the Modi government's 'Make in India' initiative, a major component of the Apache attack helicopters for the Indian Army will be made indigenously.

The fuselage of the six Apaches for the army will be made at the Tata Boeing Aerospace Limited (TBAL) facility in Hyderabad, Salil Gupte, President, Boeing India told ET. He also said that the fuselages for a global demand of Apaches will also be made at the facility.

India on Tuesday became the 16th country to procure the Apache when the Indian Air Force (IAF) inducted eight of them at the Pathankot Air Base. The IAF is using the latest version of the Apache known as AH-64E. This variant is flown by the US Army. Other customers of the Apache are the UK, Israel and Japan. Since 1984, the US Army and other nations have received more than 2,200 AH-64 Apache helicopters.

"The fuselage being made in Hyderabad are for global orders and the six Apaches for Indian Army...This is a huge part of Make in India. We have just started the line and are moving into the phased production at the moment...We are quite excited about the new fuselage," said Gupte.

However, he declined to comment on when the Apaches for the army will be ready. In August 2017, the Defence Acquisition Council led by the then Defence Minister Arun Jaitley had cleared the procurement of the six Apaches for the army at a cost of Rs 4,168 crore.

Earlier during the IAF's Apache induction ceremony Gupte said, "Boeing is committed to supporting the modernization requirements of the Indian armed forces and maintaining them to be mission-ready."

"We are confident that the Apaches will be an indispensable asset to the Indian Air Force. We will continue our efforts to deliver advanced capabilities to India's defence forces," added Gupte.

In June last year, TBAL delivered its first AH-64 Apache helicopter fuselage from the Hyderabad facility. The fuselage was transported to Boeing's Apache manufacturing facility in Mesa, Arizona for integration into the final assembly line. The delivery came within a year of the aerospace joint venture facility becoming operational. The facility will be the sole global producer of fuselages for Apaches delivered by Boeing to its global customers including the US Army. TBAL is a joint venture between US aerospace giant, Boeing, and Tata Advanced Systems Limited.

<https://economictimes.indiatimes.com/news/defence/major-component-of-the-apache-attack-helicopters-will-be-made-in-india/articleshow/70964717.cms>

## Apache attack helicopters: what IAF's lethal new acquisition can achieve

*Among the Apache's modern capabilities are the ability to shoot fire-and-forget anti-tank missiles, air-to-air missiles, rockets, and other ammunition*

*By Man Aman Singh Chhina*

Chandigarh: Eight Apache AH-64E stealth attack helicopters, among the most advanced military flying machines in the world, joined the Indian Air Force on Tuesday, providing a significant boost to its combat capabilities at a time of complex security challenges.

**How do the Apaches enhance the attack helicopter capabilities of the IAF at this stage, since it already has the Russian Mi-24/Mi-35 gunships in its inventory?**

One of the major reasons why the IAF decided to go in for the Apaches is their ability to operate at much higher altitudes than the aging Russian attack helicopters and, of course, because of the advanced technical abilities that come with the American-made helicopter.

The Mi-35 could not operate in the Kargil conflict at the heights that the IAF wanted it to be used in support of the Army. While the primary task of the attack helicopter gunship is in support of mechanised armoured formations, yet the adaptability of the inventory to be used elsewhere is also important.

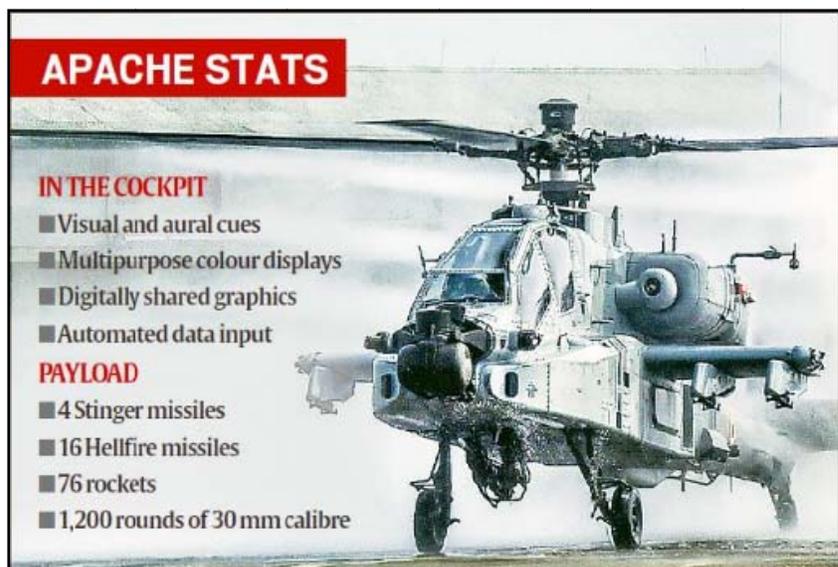
The Russian gunships were made for an era when a dual role was envisaged for them. Thus, in addition to their attack role, they have cabin space for eight soldiers, who can be speedily dropped behind enemy positions. The Apache does not have any cargo role, and is, in comparison, smaller and more nimble.

Among the Apache's modern capabilities are the ability to shoot fire-and-forget anti-tank missiles, air-to-air missiles, rockets, and other munitions. It also has modern electronic warfare capabilities to provide versatility in network-centric aerial warfare.

**So, how many Apaches will replace the IAF's Mi-35s?**

IAF had signed a contract with aerospace major Boeing and the United States government in 2015 for 22 Apache AH-64Es. The first eight of these attack helicopters have been delivered on schedule, and the last of the choppers is to be delivered by March 2020.

These helicopters will be deployed in the western regions of the country. In addition to these machines, another six helicopters are being procured for the Indian Army, which will enhance mechanised operations comprising tanks and infantry combat vehicles in desert and semi-desert regions.



### **Will all the Apaches be in flyaway condition, or does the deal involve local production?**

The Apaches are being received in a semi-flyaway condition, as were the Chinook heavy-lift helicopters, also manufactured by Boeing. After affixing their rotors, the aircraft are able to fly on their own.

There is an agreement between Boeing and Tata to manufacture the fuselage of the Apaches in India under the joint-venture Tata Boeing Aerospace Limited, Hyderabad. It is not known if any of these fuselages have been used in the eight Apaches delivered so far.

### **Who is supplying the firepower for the Apaches? What weaponry does an Apache carry?**

The firepower in the Apaches is being integrated with the helicopter by Boeing itself in the United States. The helicopter is capable of delivering a variety of weapons, which include air-to-ground Hellfire missiles, 70 mm Hydra rockets, and air-to-air Stinger missiles.

The Apaches also carry a 30 mm chain gun with 1,200 rounds as part of the area weapon subsystem. The helicopter carries the fire control Longbow radar, which has 360-degree coverage, and a nose-mounted sensor suite for target acquisition and night-vision systems.

The weapons and radar systems in the helicopter will enhance the capability of the IAF in providing integrated combat aviation cover to the Army strike corps. These tandem seating helicopters are day/night, all weather capable, and have high agility and survivability against battle damage. These are easily maintainable even in field conditions, and are capable of prolonged operations in tropical and desert regions.

### **When and where did IAF pilots train on the Apaches before the induction?**

The IAF pilots who were to fly the Apaches began their training on the helicopters in the United States in 2018. The US Army provided the training to the fleet's pilots and maintenance personnel at Fort Rucker, Alabama.

### **Which other countries fly these attack helicopters?**

Boeing's global customers for the Apache include Egypt, Greece, India, Indonesia, Israel, Japan, Korea, Kuwait, the Netherlands, Qatar, Saudi Arabia, Singapore, the United Arab Emirates and the United Kingdom, apart from the United States Army. The company said in a statement that India was the 16th nation to procure the helicopter, and that it was receiving the most advanced variant.

### **APACHE STATS**

#### **In the Cockpit**

- # Visual and aural cues
- # Multipurpose colour displays
- # Digitally shared graphics
- # Automated data input

#### **Payload**

- # 4 Stinger missiles
- # 16 Hellfire missiles
- # 76 rockets
- # 1,200 rounds of 30 mm caliber

<https://indianexpress.com/article/explained/explained-what-makes-the-iafs-new-apache-helicopters-so-lethal-5962956/>



Wed, 04 Sep 2019

## Countering gender bias, Indian Army will induct 100 women soldiers each year for next 17 years

By Shweta Sengar

For the next 17 years, Indian Army aims to induct 100 women soldiers each year to reach the mark of 17 women soldiers in the military police.

The selection process for the first 100 women soldiers is underway and their training is expected to start in December this year, said a report by India Today. Training for a period of 61 weeks will be exactly the same as male soldiers.

The report added that the women cadre will be maintained at 1700 unless reviewed.

India has taken an important step toward addressing gender bias in the armed forces.

In March, the government had announced its decision to allow women in newer areas, but awaited terms of reference before opening up the force for women.

Last year, Prime Minister Narendra Modi announced permanent commission for women.

Till now, women were part of the various establishments in the Army but only as officers. This is for the first time, women will be inducted in the ranks of soldiers. Presently, women are recruited for selected roles in medical, education, legal, signals and engineering wings and only as officers.

Ground-based combat like infantry or armoured in the Army will continue to be closed for women, said a report by Tribune India.

In the Indian Air Force, Shalija Dhama became the country's first woman officer to be appointed as flight commander of a unit. She flies helicopters and has been taken in as permanent commission officer.

In the Navy, all branches except the sea-going are open for the women.

<https://www.indiatimes.com/news/india/countering-gender-bias-indian-army-will-induct-100-women-soldiers-each-year-for-next-17-years-374911.html>

# hindustantimes

Wed, 04 Sep 2019

## India to get its first Rafale jet at France event on Sept 19

*The formal induction ceremony will be held in Merignac, France, and will be attended by IAF chief Air Chief Marshal BS Dhanoa, said one of the officials cited above*

New Delhi: France will formally hand over to the Indian Air Force (IAF) its first Rafale fighter jet on September 19, two people familiar with the move said on Tuesday.

The formal induction ceremony will be held in Merignac, France, and will be attended by IAF chief Air Chief Marshal BS Dhanoa, said one of the officials cited above. Defence minister Rajnath Singh is also likely to travel to France for the ceremony, he added, requesting anonymity.

As reported by Hindustan Times on July 24, the IAF had told the French government that the formal induction ceremony of the first of the 36 jets on order should be held in the third week of September, within three years of the signing of the contract.

While the formal induction will happen on September 19, the first batch of four Rafale jets will fly to their home base in India only next April-May. All 36 fighter planes will arrive by September 2022, a small step on the long road towards building a stronger air force.

India ordered 36 Rafale jets from France in a deal worth Rs 59,000 crore on September 23, 2016 — a deal that was at the centre of a political controversy in the run-up to the 2019 Lok Sabha elections.

The 2016 Rafale deal was an emergency purchase to arrest the worrying slide in the IAF's combat capabilities. The count of the IAF's fighter squadrons has dropped to 31 compared to an optimum strength of 42-plus units required to fight a two-front war with China and Pakistan.

The Indian fighters will be equipped with Meteor missiles built by European defence equipment maker MBDA Missile Systems. The Meteor's no-escape zone is touted to be three times greater than that of current medium range air-to-air missiles.

The jets have been tailored for the IAF India-specific enhancements include helmet-mounted sight, radar warning receivers, flight data recorders with enough storage for 10 hours of data, infrared search and track systems, jammers, cold engine start capability to operate from high-altitude bases, and towed decoys to lure incoming missiles away.

Air Vice Manmohan Bahadur (retd), additional director general, Centre for Air Power Studies, said, "The induction

<https://www.hindustantimes.com/india-news/india-to-get-its-first-rafale-jet-at-france-event-on-sept-19/story-5ft2NeRCCGp3k8Oi1Z3e6IK.html>

*The Indian* **EXPRESS**

Wed, 04 Sep 2019

## **J&K: Wildlife board nod to Gulmarg defence project**

*The proposed project in J&K includes installation of air defence and weaponry along with helipad construction. "Only radar system would be set up in the sanctuary area and all other basic infrastructure will be outside the wildlife area," Gupta said*

*By Navjeevan Gopal*

The National Board for Wildlife (NBWL) has given its nod for an air defence and weaponry project in Jammu and Kashmir in which 1.18 hectares of Gulmarg Wildlife Sanctuary land will be used. The project will also cover 12.35 hectares of forest land outside Gulmarg Sanctuary.

The proposal, recommended by the then State Chief Wildlife Warden with 17 riders/conditions, was cleared at a July 18 meeting of the standing committee of NBWL. The meeting was chaired by Minister for Environment, Forest and Climate Change Prakash Javadekar.

Jammu and Kashmir Chief Wildlife Warden Suresh Kumar Gupta said that the proposal will be submitted for forest clearance once the wildlife clearance is formally received from NBWL. He added that environment clearance is not needed for all projects, and whether such clearance would be required for the project in question would be known after the forest clearance process.

The proposed project in J&K includes installation of air defence and weaponry along with helipad construction. "Only radar system would be set up in the sanctuary area and all other basic infrastructure will be outside the wildlife area," Gupta said.

“NBWL clears proposals of national interest with conditions,” said Gupta. “There are things which are in public interest, such as roads that pass through sanctuaries, and NBWL takes a call on such things.”

According to the website of the J&K Wildlife Protection Department, “To ensure survival of highly endangered Musk Deer (*Moschus Crysogater*), Gulmarg Wildlife Sanctuary was upgraded from Man and Bio-sphere Reserve in the year 1987. The area is one of the best world renowned tourist destinations for its famous meadows, rocky cliffs, dense birch forests and a home for bird watchers.” The website says the sanctuary has rich flora and fauna bio-diversity with variegated species like musk deer, common leopard, barking deer, Asiatic black bear, Himalayan black bear, Indian wolf, snow cock, chakoor.

In the proposal to the NWBL, the then State Chief Wildlife Warden recommended that the proprietary and legal status of the protected area shall remain unchanged, NPV (Net Present Value) shall be charged in accordance with Supreme Court orders, the user agency shall pay 5 per cent of the estimated cost of the project to the J&K Wildlife Protection Department for conservation and preservation of wildlife and habitat, among other conditions.

The standing committee decided to recommend the proposal subject to the condition that “the project proponent will comply with all the conditions imposed by the State Chief Wildlife Warden”.

It also directed that “a wildlife conservation plan should be prepared by the Chief Wildlife Warden and implemented in cooperation with Army authorities to mitigate the impact of the project, the annual compliance certificate on the stipulated conditions should be submitted by the project proponent to the State Chief Wildlife Warden and an annual compliance certificate shall be submitted by the State Chief Wildlife Warden to Government of India.

#### **EXPLAINED**

#### **Boost to monitoring capability**

The radar system in the project is aimed at keeping an eye on aerial movements inside Pakistan-occupied Kashmir, and on attempts to cross the Line of Control. The defence forces lack such monitoring capability in this area. The proposal to construct this radar facility has been a long-pending request from the armed forces that finally started moving last year.

<https://indianexpress.com/article/india/jk-wildlife-board-nod-to-gulmarg-defence-project-5963364/>



Wed, 04 Sep 2019

## **PM Modi keen on jointly producing weapons with Russia in India for export**

*PM Modi, the first Prime Minister to visit Russia's Far Eastern city of Vladivostok, is due to hold wide-ranging talks with President Putin on Wednesday*

Vladivostok / New Delhi: On the eve of his summit talks with Vladimir Putin, Prime Minister Narendra Modi says he shared a "special chemistry" with the Russian President and is keen on technology transfers so that the two sides can make military equipment in India at cheaper rates for export to third countries.

PM Modi, the first Prime Minister to visit Russia's Far Eastern city of Vladivostok, is due to hold wide-ranging talks with President Putin on Wednesday ahead of his departure to the Russian port city.

"I am confident that this visit will give a new vector, new energy and a new impetus to the relations between our countries," PM Modi said in an interview with Russia's state-run TASS news agency.

Russia and India are set to sign about 15 documents, including some in the military-technical sectors, within the framework of the 20th Russian-Indian summit that will take place on the sidelines of the Eastern Economic Forum (EEF), a Tass report said.

The Russian-Indian partnership has gone beyond the framework of military and technical cooperation, PM Modi said.

"We are close friends. And as close friends, we should think about what we can do together in the future," he said.

"We don't want to be limited just to relations between the customer and the seller of military technologies. We are sure about the model of transferring technologies. I have said several times about this and we have even started moving in this direction," PM Modi said.

"Today, provided that technologies are transferred, the production of military equipment can be cheap in India. And we will be able to supply these weapons to third countries at very low prices. India and Russia need to take advantage of this opportunity," he noted.

He also spoke about India's manned space mission -- the Gaganyaan project -- and said that Russia will help train the country's astronauts.

Commenting on his personal relations with President Putin, the prime minister said he has "special chemistry" with him.

"We sit and talk, walk around and talk. There is a special chemistry in our relations, a special ease. We will have a lot of time during this forum. I hope that we will be able to discuss many issues," PM Modi said.

He stressed the importance of mutual trust in the relations between Russia and India, calling it a special achievement.

"I had the opportunity to meet President Putin for the first time in 2001. I came to Moscow with then-Prime Minister Atal Bihari Vajpayee. I was the Chief Minister of a state (Gujarat), and this was our first meeting. However, Putin did not make me feel like I was less important; that I was from a small state or that I am new. He treated me amicably, as a friend. This opened the doors of friendship," PM Modi said.

"We have discussed not only the issues related to our states; we have talked about various issues, our hobbies, global issues. We talked openly, as partners. He is a very interesting person to talk to, and I admit that we have very enlightening conversations."

Prime Minister Modi will take part in the 2019 Eastern Economic Forum (EEF) as the chief guest.

"This forum is not confined to a mere exchange of points of view. We have been gearing up for this forum for six months," PM Modi said.

He noted that a large delegation from Russia's Far East visited India and chief ministers from India, ministers, businessmen visited the Far East and saw it with their own eyes.

The prime minister also said he is ready to make efforts to ensure that the EEF will help boost and expand economic relations between India and Russia.

"That is why I think that the Eastern Forum is a very important event," he said.

<https://www.ndtv.com/india-news/prime-minister-narendra-modi-keen-on-jointly-producing-weapons-with-russia-in-india-for-export-2095207>

## India, Japan make progress on sharing military logistics

*Rajnath Singh meets Shinzo Abe; to carry on 2 annual trilateral naval exercises with US*

*By Manu Pubby*

New Delhi: India and Japan took forward talks on an agreement to share military logistics for greater interoperability and declared that the two sides conducted a rare discussion on the South China Sea situation during a high-level visit by defence minister Rajnath Singh.

In a sign of increasing maritime cooperation between India, Japan and the US, it has also been announced that two annual joint exercises would be carried out. Besides the Malabar series of complex naval war games, the trilateral mine-countermeasures exercise (MINEX) will also be conducted annually now.

Singh also met with Japanese Prime Minister Shinzo Abe and a joint statement after the visit referred to a discussion on the South China Sea.

Recent statements by India have avoided a reference to the South China Sea situation even as other stakeholders have raised the matter. France, the UK and Germany last week expressed concern and called for safeguarding Freedom of Navigation in the region after China entered Vietnam's exclusive economic zone to block exploration.

Singh, who is on a two nation visit to Japan and South Korea, discussed the upcoming Malabar exercise off the coast of Japan as well and took stock of the first Foreign and Defence Ministerial Dialogue (2+2) that is planned ahead of the Japan-India Annual Summit this year.

Significantly, talks were taken forward on a military logistics sharing pact, which will be on similar lines of agreements with the US and France. "The ministers welcomed that negotiations on the Acquisition and Cross-Servicing Agreement (ACSA) have shown progress," a joint statement issued after the talks said.

India has been in talks with friendly nations like Australia and Russia also for similar pacts that would allow warships and aircraft to take fuel and supplies from mutual military basis during operations, exercises and other deployments.

<https://economictimes.indiatimes.com/news/defence/india-japan-make-progress-on-sharing-military-logistics/articleshow/70969422.cms?from=mdr>

# Chandrayaan-2: Vikram-Pragyan get even closer to Moon

By Chethan Kumar

## HIGHLIGHTS

- **ISRO, on Wednesday took the Chandrayaan-2 landing module comprising lander Vikram and rover Pragyan — closer to Moon, putting it in a 35kmX101km Orbit**
- **With this maneuver, the required orbit for Vikram (with Pragyan inside) to commence its descent towards the surface of Moon is achieved**

Bengaluru: ISRO, on Wednesday (September 4) took the Chandrayaan-2 landing module — comprising lander Vikram and rover Pragyan — closer to Moon, putting it in a 35kmX101km Orbit. "The second de-orbiting maneuver for Chandrayaan-2 spacecraft was performed successfully beginning at 3.42am as planned, using the onboard propulsion system. The duration of the maneuver was 9 seconds," ISRO said.

#ISRO The second de-orbiting maneuver for #Chandrayaan spacecraft was performed successfully today (September 04, 2... <https://t.co/u6aO5KEvUe> — ISRO (@isro) 1567550835000

With this maneuver, the required orbit for Vikram (with Pragyan inside) to commence its descent towards the surface of Moon is achieved.

Vikram is scheduled to powered descent between 1am and 2am on September 07, which is then followed by touch down of Lander between 1.30am and 2.30am.

On Tuesday (September 3), operating independently for the first time since Chandrayaan-2 was launched on July 22, the landing module underwent its first manoeuvre around Moon on Tuesday.

ISRO successfully completed the first de-orbiting manoeuvre of the landing module at 8.50am Tuesday (September 3), using for the first time, the propulsion systems on Vikram. All these days all operations were carried out by systems on the orbiter, from which the landing module separated at 1.15pm Monday.

Further, ISRO also carried out another manoeuvre of the orbiter on Tuesday, which the space agency did not officially announce. Sources said that the orbiter's orbit was further reduced after a 36-second burn of the onboard propulsion systems. The orbiter reduced the distance closest to Moon to reach an orbit where the perigee was 96km. "This was done so that the orbiter is right on the head of the lander when the landing happens," a source added. Vikram is expected to touchdown on the lunar surface between 1.30am and 2.30am on September 7. ISRO had announced that it would be at 1.55am. "We are looking at starting the powered descent at 1.40am or 1.45am. The landing must happen 15 minutes after that," Sivan explained.

<https://timesofindia.indiatimes.com/india/chandrayaan-2s-second-de-orbiting-maneuver-executed-isro/articleshow/70969698.cms>

## चंद्रयान-2 के लैंडर को निचली कक्षा में उतारा गया, चंद्रमा के और करीब पहुंचे

बेंगलुरु, तीन सितंबर (भाषा) चंद्रयान-2 के ऑर्बिटर से लैंडर 'विक्रम' के अलग होने के एक दिन बाद इसरो ने मंगलवार को बताया कि उसने यान को चंद्रमा की निचली कक्षा में उतारने का पहला चरण सफलतापूर्वक पूरा कर लिया है इसके साथ ही शनिवार को चांद की सतह पर ऐतिहासिक सॉफ्ट लैंडिंग के लिये लैंडर को कक्षा से नीचे उतारने की एक अंतिम प्रक्रिया ही शेष है। इसरो ने कहा कि लैंडर पर लगी प्रणोदक प्रणाली को पहली बार इसे नीचे की कक्षा में लाने के लिये सक्रिय किया गया। इससे पहले इसने स्वतंत्र रूप से चंद्रमा की कक्षा में परिक्रमा शुरू कर दी थी। भू-तुल्यकालिक उपग्रह प्रक्षेपण यान, जीएसएलवी मैक-थ्री एम1 द्वारा 22 जुलाई को पृथ्वी की कक्षा में प्रक्षेपित 3,840 किलोग्राम के चंद्रयान-दो अंतरिक्ष यान के मुख्य ऑर्बिटर द्वारा चंद्रमा की यात्रा के सभी अभियानों को अंजाम दिया गया है। भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) सात सितंबर को लैंडर विक्रम को चंद्रमा के दक्षिणी ध्रुव पर उतारने से पहले बुधवार को एक बार फिर यान को और निचली कक्षा में ले जाएगा। इस सफल लैंडिंग के साथ भारत रूस, अमेरिका और चीन के बाद ऐसा चौथा देश हो जाएगा जो चंद्रमा की सतह पर सॉफ्ट लैंडिंग कराने में सफल होगा। चंद्रमा के दक्षिणी ध्रुव के रहस्यों का पता लगाने के लिये लॉन्च होने वाला यह पहला मिशन है। इसरो ने बताया, “चंद्रयान को निचली कक्षा में ले जाने का कार्य मंगलवार सुबह भारतीय समयानुसार 8 बजकर 50 मिनट पर सफलतापूर्वक और पूर्व निर्धारित योजना के तहत किया गया। यह प्रक्रिया कुल चार सेकेंड की रही।” एजेंसी के बताया, “विक्रम लैंडर की कक्षा 104 किलोमीटर गुना 128 किलोमीटर है। चंद्रयान-2 ऑर्बिटर चंद्रमा की मौजूदा कक्षा में लगातार चक्कर काट रहा है और ऑर्बिटर एवं लैंडर पूरी तरह से ठीक हैं। एक बार फिर चार सितंबर को भारतीय समयानुसार तड़के तीन बजकर 30 मिनट से लेकर चार बजकर 30 मिनट के बीच इसकी कक्षा में कमी की जाएगी।” भारत के दूसरे चंद्रमा मिशन 'चंद्रयान-2' के एक अहम पड़ाव पर सोमवार को लैंडर विक्रम ऑर्बिटर से सफलतापूर्वक अलग हुआ। योजना के तहत 'विक्रम' और उसके भीतर मौजूद रोवर 'प्रज्ञान' के सात सितंबर को देर रात एक बज कर 30 मिनट से दो बज कर 30 मिनट के बीच चंद्रमा की सतह पर उतरने की उम्मीद है। इसरो के अध्यक्ष के. सिवन ने कहा कि चंद्रमा पर लैंडर के उतरने का क्षण 'दिल की धड़कनों को रोकने वाला' होगा क्योंकि एजेंसी ने पहले ऐसा कभी नहीं किया है। चंद्रमा की सतह पर उतरने के बाद 'विक्रम' से रोवर 'प्रज्ञान' उसी दिन सुबह पांच बज कर 30 मिनट से छह बज कर 30 मिनट के बीच निकलेगा और एक चंद्र दिवस के बराबर चंद्रमा की सतह पर रहकर परीक्षण करेगा। चंद्रमा का एक दिन पृथ्वी के 14 दिनों के बराबर है। लैंडर का भी मिशन जीवनकाल एक चंद्र दिवस ही होगा जबकि ऑर्बिटर एक साल तक काम करेगा। लैंडर विक्रम की कक्षा में दो बार कमी से यह चंद्रमा के और करीब पहुंच जाएगा। उल्लेखनीय है कि 3,840 किलोग्राम वजनी चंद्रयान-2 को 22 जुलाई को जीएसएलवी मैक-3 एम1 रॉकेट से प्रक्षेपित किया गया था। इस योजना पर 978 करोड़ रुपये की लागत आई है। चंद्रयान-2 उपग्रह ने धरती की कक्षा छोड़कर चंद्रमा की तरफ अपनी यात्रा 14 अगस्त को इसरो द्वारा 'ट्रांस लूनर इंसर्शन' नाम की प्रक्रिया को

अंजाम दिये जाने के बाद शुरू की थी। ये प्रक्रिया अंतरिक्ष यान को “लूनर ट्रांसफर ट्रेजेक्ट्री” में पहुंचाने के लिये अपनाई गई। भारतीय अंतरिक्ष कार्यक्रम में एक अहम मील के पत्थर के तहत अंतरिक्ष यान 20 अगस्त को चंद्रमा की कक्षा में पहुंच गया था। बेंगलुरु स्थित इसरो के कमांड सेंटर से इस अभियान पर लगातार नजर रखी जा रही है।