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# Pinaka booster for Indian Army! What indigenous multi-barrel rocket system means for India's defence; watch

*While Pinaka Mark I has a range of 40 km, Pinaka Mark II can hit the target within a range of 70 to 80 km*

*By Debjit Sinha*

New Delhi: Five missiles of the next-generation version of the BrahMos could be integrated with the Indian Air Force's (IAF) Sukhoi 30-MKI fighters, reports *Financial Express*. The BrahMos NG is a lighter version of the supersonic missile, and will first be integrated with the Light Combat Aircraft (LCA) Tejas.

Pinaka multi-barrel rocket system boost! The Defence Research and Development Organisation (DRDO) has carried out back-to-back successful tests of the Pinaka multi-barrel rocket system, a fact that shows that the Indian Army has a high precision, reliable and capable weapons system to supplement artillery guns. On Monday, two successful trials were conducted following which another test was carried out by DRDO on Tuesday. The three successful trials have met DRDO's mission objectives, the Defence Ministry said in a statement. The trials were conducted in Rajasthan's Pokharan. The role of Guided Pinaka is key to avoiding any collateral damage. Pinaka is a rocket system has a capability to nullify the targeted area. The Indian Army used Pinaka Mark I in the 1999 Kargil war. The name of the rocket derives from Pinaka which is the bow of Lord Shiva.

## **All you want to know about Pinaka multi-barrel rocket system:**

The Pinaka guided rocket system was indigenously developed by the country's defence lab DRDO. The DRDO's weapon system, mounted on a Tatra truck, has state-of-the-art guidance kit. It is also equipped with an advanced navigation and control system. The indigenously developed guided Pinaka enhances the capability of the Indian Army to make precision hits.

Earlier, the Pinaka rocket system could launch 12 rockets in just 44 seconds. Then DRDO decided to develop it into a precision-guided missile. The range and accuracy of the Pinaka rocket system are being increased. The development process is ongoing and various reports suggest that a more lethal Pinaka system will be ready for the Indian Army's use by 2020.

While Pinaka Mark I has a range of 40 km, Pinaka Mark II can hit the target within a range of 70 to 80 km. Armament Research and Development Establishment (ARDE) and the High Energy Material Research Laboratory located in Pune and Hyderabad-based DRDO establishments have worked in tandem to come up with this potent weapon, as per IE report.

<https://www.financialexpress.com/defence/pinaka-booster-for-indian-army-what-indigenous-multi-barrel-rocket-system-means-for-indias-defence-watch/1514821/>

## India, US to conduct first tri-service drill towards year-end

*The tri-service exercise was discussed last September during the inaugural '2+2' dialogue*

*By Rahul Singh*

New Delhi: India and the United States are likely to conduct their first exercise involving their armies, navies and air forces towards the end of the year, two officials said on Wednesday on condition of anonymity. The tri-service exercise was discussed last September during the inaugural '2+2' dialogue between the foreign and defence ministers of the two countries. The two sides are about to begin the groundwork for the maiden exercise.

"The initial planning conference for the exercise will be held in April followed by a final planning conference. The scale and scope of the exercise will be discussed during these meetings," said one of the officials cited above. He said the exercise was likely to be conducted in Bay of Bengal around November. "US has a rich experience in joint operations in actual war conditions. It's good that a joint tri-service drill is being planned. India stands to gain a lot from the US experience in its drive towards jointness," said Air Vice Marshal Manmohan Bahadur (retd), additional director general, Centre for Air Power Studies.

The existing military exercises between India and the US are army-to-army, navy-to-navy and air force-to-air force. Russia is the only country with which India holds a joint tri-service exercise — the first of these was held in Vladivostok in October 2017.

<https://www.hindustantimes.com/india-news/india-us-to-conduct-first-tri-service-drill-towards-year-end/story-roR5HbGaXYjKoy5HtCo5NJ.html>

## Business Standard

## Pakistan successfully test-fires 'smart weapon' from JF-17 fighter jet

Islamabad: Amidst tensions with India, Pakistan Air Force has announced successfully test-firing an indigenously developed "smart weapon" from a JF-17 Thunder fighter jet to provide it a very potent day and night capability to engage a variety of targets with pinpoint accuracy.

The PAF also said that experiment marked a great milestone for the country as the weapon has been developed, integrated and qualified solely through indigenous efforts of Pakistani scientists and engineers.

"The successful trial has provided JF-17 Thunder a very potent and assured day and night capability to engage variety of targets with pinpoint accuracy," the PAF said on Tuesday on the fighter jet jointly manufactured by China and Pakistan.

Chief of the Air Staff Air Chief Marshal Mujahid Anwar Khan lauded the efforts of scientists and engineers. He also congratulated the PAF personnel on the achievement of this monumental indigenous capability.

"Pakistan is a peace loving nation but if subjected to aggression by adversary, we would respond with full force," the PAF statement quoted Anwar as saying.

The exact technical details of the weapon test-fired were not shared by the PAF.

The JF-17, which was previously referred as FC-1 Xiaolong, a single-engine multi-role light fighter was being jointly produced by Pakistan with China for several years with engines supplied by Russia.

The trial comes amid tensions between India and Pakistan after a suicide bomber of Pakistan-based Jaish-e-Muhammed (JeM) killed 40 CRPF personnel in Kashmir's Pulwama district on February 14.

Amid mounting global outrage, the Indian Air Force carried out a counter-terror operation, hitting the biggest JeM training camp in Balakot, deep inside Pakistan on February 26.

The next day, Pakistan Air Force retaliated and downed a MiG-21 in an aerial combat and captured Indian pilot, who was handed over to India on March 1.

*(This story has not been edited by Business Standard staff and is auto-generated from a syndicated feed.)*

[https://www.business-standard.com/article/pti-stories/pakistan-successfully-test-fires-smart-weapon-from-jf-17-fighter-jet-119031300959\\_1.html](https://www.business-standard.com/article/pti-stories/pakistan-successfully-test-fires-smart-weapon-from-jf-17-fighter-jet-119031300959_1.html)

## Business Standard

Wed, 13 Mar 2019

# China, Pakistan to upgrade their jointly produced fighter jet: Report

Beijing: China and Pakistan plan to upgrade their jointly-produced JF-17 Thunder fighter jet to enhance its "informatised warfare capability and weapons which experts say could effectively defend against strong opponents like India.

The development and production of the JF-17 Block 3 are underway, Yang Wei, a Chinese legislator and chief designer of the China-Pakistan co-developed fighter jet, said.

The Pakistan media claimed that JF-17 aircraft was used to carry out an attack along the Line Of Control (LOC) on February 27. The Indian Air Force, however said a US-made F-16 has been shot down during the attack.

The up-gradation of JF-17 is aimed to enhance the jet's "informatised warfare" capability and weapons, the state-run Global Times reported on Tuesday.

"Informatised warfare is often used by the Chinese military which broadly refer to use of information and communication technology in modern wars.

The JF-17, which was previously referred as FC-1 Xiaolong, a single-engine multi-role light fighter was being jointly produced by the two countries for several years with engines supplied by Russia.

It is mostly used by Pakistan than by China as the Chinese Air Force has acquired new generation aircraft like Russia's Sukhoi as well as array of home-grown new planes including stealth aircraft.

The JF-17 is currently contending with India's Tejas and South Korea's FA-50, the Global Times report said.

"All related work is being carried out," for JF-17 Block 3 Yang was quoted as saying by the daily.

"The third block will see the JF-17's informatised warfare capability and weapons upgraded," Yang said.

Wei Dongxu, a Beijing-based military analyst, told the Global Times that the JF-17 Block 3 is expected to be fitted with an active electronically scanned array radar, which can gather more information in combat, enabling the fighter jet to engage from a farther range and attack multiple targets at the same time.

A helmet-mounted display and sight system could also allow pilots to aim whatever he sees.

Pakistan, the main user of the JF-17, could further share information between the fighter and other platforms, taking advantage of the whole combat system to effectively defend against strong opponents like India, Wei said.

With the new upgrade, Wei expects the JF-17 Block 3 to match an improved version of the F-16 fighter jet.

Yang said that the development and batch production for the JF-17 Block 3 are going simultaneously, thanks to the broad experience.

Wei said this probably means while the upgrades like the new AESA radar are still in development, the airframe, which remains roughly the same, can be manufactured without waiting.

Once new developments are complete, they can be fitted on the airframe very fast, ensuring a quick delivery time, Wei said.

When asked about which countries have inquired about the JF-17 Block 3, Yang said "A lot of countries have come to buy. You sign [a contract for the JF-17], you benefit," he said.

*(This story has not been edited by Business Standard staff and is auto-generated from a syndicated feed.)*

[https://www.business-standard.com/article/pti-stories/china-pakistan-to-upgrade-their-jointly-produced-fighter-jet-report-119031200792\\_1.html](https://www.business-standard.com/article/pti-stories/china-pakistan-to-upgrade-their-jointly-produced-fighter-jet-report-119031200792_1.html)



*Thu, 14 Mar 2019*

## **Boeing is developing a fleet of massive robo-submarines for the US Navy that could hit the sea by 2022 under \$43 million new contract**

*Navy selected Boeing to develop Orca Extra Large Unmanned Undersea Vehicles*

*Boeing's winning design was based on its Echo Voyager drone submarine*

*Under the \$43 million contract, the firm will develop and test four of the subs*

*By Cheyenne Macdonald*

The US Navy has selected Boeing to develop a fleet of massive drone submarines under a \$43 million new contract.

Over the next few years, the firm will design and test four Orca Extra Large Unmanned Undersea Vehicles (XLUUVs) based on its autonomous Echo Voyager, which can operate at sea for months at a time.

The robotic submarines will be modular, meaning they can easily adapted in the future to implement 'cost-effective upgrades' and support a variety of missions. Boeing is expected to complete the vehicles by June 2022.

The Navy revealed its decision in a contract announcement last month, a little over a year after granting design phase awards to Lockheed Martin and Boeing.

Boeing will now move forward with the fabrication, test, and delivery of four Orca XLUUVs based on the Navy's stipulations. And, an adaptable design is crucial, according to the contract.

'The Orca XLUUV will be modular in construction with the core vehicle providing guidance and control, navigation, autonomy, situational awareness, core communications, power distribution, energy and power, propulsion and maneuvering, and mission sensors,' the Navy said.

'The Orca XLUUV will have well-defined interfaces for the potential of implementing cost-effective upgrades in future increments to leverage advances in technology and respond to threat changes.

'The Orca XLUUV will have a modular payload bay, with defined interfaces to support current and future payloads for employment from the vehicle.'

### **What is boeing's echo voyager?**

Boeing has been chosen to develop four drone submarines, called Orca Extra Large Unmanned Undersea Vehicles (XLUUVs), for the US Navy. The design will be based on that of its Echo Voyager unmanned sub.

The Echo Voyager is a 51-foot-long drone submarine that can achieve a range of roughly 6,500 nautical miles – or the equivalent of one fuel module. It's built to incorporate a modular payload section, which will allow it to take on a variety of different missions.

This modular payload is up to 34 feet long and 2000 cubic feet in volume.

According to Boeing, it can 'perform at sea for months at a time,' and does not require launch or recovery by a support vehicle.

It runs on a hybrid system that combines battery and marine diesel.

<https://www.dailymail.co.uk/sciencetech/article-6799989/Boeing-developing-fleet-massive-robo-submarines-Navy-hit-seas-2022.html>



Thu, 14 Mar 2019

## **First person on Mars likely to be a woman: NASA**

*The NASA administrator did not identify a specific person but said women are at the forefront of the agency's upcoming plans*

Washington: The first person on Mars is 'likely to be a woman', NASA Administrator Jim Bridenstine has said.

"It's likely to be a woman, the first next person on the Moon. It's also true that the first person on Mars is likely to be a woman," CNN cited Bridenstine as saying on a science and technology radio talk show "Science Friday".

The NASA administrator did not identify a specific person but said women are at the forefront of the agency's upcoming plans.

NASA will also have its first all-female spacewalk at the end of the month, when astronauts Anne McClain and Christina Koch will get to float around in space. The spacewalk will last about seven hours, according to the US space agency.

"So these are great days. We have the first all-female spacewalk happening this month at the end of March, which is of course, National Women's Month," Bridenstine said.

Both McClain and Koch were part of the 2013 astronaut class, half of which were women. They came from the second largest applicant pool NASA has ever received -- more than 6,100. The most recent class of flight directors was also 50 per cent women, NASA said.

NASA has come a long way since 1978, when the first six women joined NASA's astronaut corps. Currently, women comprise 34 per cent of its active astronauts, according to the agency.

"NASA is committed to making sure we have a broad and diverse set of talent and we're looking forward to the first woman on the moon," Bridenstine said.

<https://www.hindustantimes.com/world-news/first-person-on-mars-likely-to-be-a-woman-nasa/story-1FfjOjVtVAVC7RzBSy3R5K.html>

## Business Standard

*Thu, 14 Mar 2019*

# NASA to study untouched Moon samples from Apollo missions for first time

Washington: NASA has awarded USD eight million to nine science teams to study the untouched samples collected from the Moon by Apollo missions in the 1970s and carefully stored for nearly 50 years, the US space agency said.

"By studying these precious lunar samples for the first time, a new generation of scientists will help advance our understanding of our lunar neighbour and prepare for the next era of exploration of the Moon and beyond," said Thomas Zurbuchen, Associate Administrator for NASA's Science Mission Directorate here.

"This exploration will bring with it new and unique samples into the best labs right here on Earth," Zurbuchen said in a statement.

Six of the nine teams will look at one of the three remaining lunar samples, from Apollo missions 15, 16, and 17, which have never been exposed to Earth's atmosphere, NASA said.

The particular sample these teams will study came to Earth vacuum-sealed on the Moon by the Apollo 17 astronauts Harrison Schmitt and Gene Cernan in 1972.

The Apollo 17 sample comprises about 800 grammes of material, still encased in a "drive tube" that was pounded into the lunar regolith to collect a core of material.

That core preserves not just the rocks themselves but also the stratigraphy from below the surface so today's scientists can, in a laboratory, study the rock layers exactly as they existed on the Moon.

The core has been carefully stored at NASA's Johnson Space Center in Houston since December 1972.

Other teams will be studying samples that have also been specially curated, some from Apollo 17 that were brought to Earth and then kept frozen, and samples from the Apollo 15 mission which have been stored in helium since 1971.

NASA has only collected samples from a few places on the Moon so far, but the US space agency knows from the remote sensing data that the Moon is a complex geologic body.

From orbit, the agency has identified types of rocks and minerals that are not present in the Apollo sample collection.

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[https://www.business-standard.com/article/pti-stories/nasa-to-study-untouched-moon-samples-from-apollo-missions-for-first-time-119031300585\\_1.html](https://www.business-standard.com/article/pti-stories/nasa-to-study-untouched-moon-samples-from-apollo-missions-for-first-time-119031300585_1.html)