

## पिनाक गाइडेड रॉकेट प्रणाली का सफल परीक्षण

बालासोर (ओडिशा), (भाषा): भारत के स्वदेश निर्मित पिनाक गाइडेड रॉकेट प्रणाली के उन्नत संस्करण का बृहस्पतिवार को ओडिशा के तट से सफलतापूर्वक प्रायोगिक परीक्षण किया गया, जिससे सेना की युद्धक क्षमता में इजाफा होगा। रक्षा सूत्रों ने यह जानकारी दी। उन्होंने बताया कि मल्टी बैरल रॉकेट लॉन्च प्रणाली को रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने विकसित किया है जिसका प्रक्षेपण आज दोपहर यहां पास के चांदीपुर में प्रूफ एवं प्रयोगात्मक स्थापना टेस्ट रेंज से किया गया। डीआरडीओ के सूत्रों ने बताया कि इस शस्त्र प्रणाली को टाट्टा ट्रक पर रखा गया था जो अत्याधुनिक गाइडेड क्वाइट से लैस है जिसमें उन्नत नौवहन और नियंत्रण

प्रणाली शामिल हैं। इससे पहले मार्च में पिनाक गाइडेड प्रणाली का राजस्थान में पोकरण टेस्ट रेंज से तीन बार सफल प्रायोगिक परीक्षण किया गया था।

सूत्रों ने बताया कि स्वदेश निर्मित गाइडेड पिनाक प्रणाली से सटीक निशाने के लिए सेना की युद्धक क्षमता में बहुत इजाफा होगा। उन्होंने बताया कि दिन में परीक्षण के दौरान शस्त्र प्रणाली ने सटीकता के साथ लक्ष्य का भेदन किया। उन्होंने बताया, “सभी परीक्षण के दौरान मिशन के सभी उद्देश्य पूरे हुए।” परिष्कृत प्रणाली में मार्क-I के लिए अधिकतम मारक क्षमता 40 किलोमीटर है जबकि मार्क-II के लिए 75 किलोमीटर है और यह 44 सेकंड में 12 रॉकेट दाग सकती है।

## Upgraded version of Pinaka guided rocket system successfully test-fired from base on Odisha coast

*The multi-barrel rocket launch system, developed by DRDO, was fired from the Proof and Experimental Establishment firing test range at Chandipur near here around noon, they said. The weapon system, mounted on a Tatra truck, is equipped with state-*

Balasore: An upgraded version of India's indigenously developed Pinaka guided rocket system was successfully test-fired from a base on Odisha coast on Thursday in a boost to the Army's artillery power, defence sources said.

The multi-barrel rocket launch system, developed by Defence Research and Development Organisation (DRDO), was fired from the Proof and Experimental Establishment firing test range at Chandipur near here around noon, they said.

The weapon system, mounted on a Tatra truck, is equipped with state-of-the-art guidance kit comprising an advanced navigation and control system, DRDO sources said.

Earlier in March, three successful trials of Pinaka guided rocket system were conducted from Pokhran test range in Rajasthan.

The indigenously developed guided Pinaka system is all set to significantly boost the capability of the artillery to hit the targets with precision and accuracy, the sources said.

During the trial carried out during the day, the weapon system achieved the desired accuracy by hitting the intended target with high degree of precision, they said.

"All mission objectives were met during the test," they said.

The sophisticated system has a maximum range of 40 km for Mark-I and 75 km for Mark-II variant, and can fire a salvo of 12 rockets in 44 seconds, the sources said.



<https://economictimes.indiatimes.com/news/defence/upgraded-version-of-pinaka-guided-rocket-system-successfully-test-fired-from-base-on-odisha-coast/articleshow/72883504.cms?from=mdr>

# Big success for DRDO! Made in India Pinaka missile system clears test again

*The system tested today has the capability of striking into the enemy territory with high precision and has a range of 75 km*

*By Huma Siddiqui*

Indigenous Pinaka Missile System which has been developed by Defence Research and Development Organisation (DRDO) was successfully flight-tested from the Integrated Test Range, Chandipur off the Odisha coast on Thursday.

For extending the range of Pinaka-II, a guidance system was fitted onboard in 2013, which to improve its accuracy is now using a new guided rocket with an Israeli designed Trajectory Control System (TCS). These were tested in 2013 and have a range of 65km in 2013 which has now been increased to up to 90km range system. The DRDO is working to have a rocket with a 120km range.

## **What was tested today?**

The system tested today has the capability of striking into the enemy territory with high precision and has a range of 75 km. The Pinaka-II modified by the DRDO and has been integrated with the Navigation, Control and Guidance System which will help to improve the end accuracy and to enhance the range. The Navigation system of the missile is aided by the Indian Regional Navigation Satellite System (IRNSS).

All the objectives which included enhancing the range, accuracy and sub-system functionality was achieved during today's test and was fired from Pinaka launcher system in the deployment configuration. According to the DRDO, it was tracked by multiple range systems including Telemetry, Radars, Electro-optical targeting system (EOTS).

The Pinaka Missile System which is an indigenous weapon system and has gone through various modifications. And various DRDO laboratories have been part of this missile system like Armament Research & Development Establishment (ARDE), Research Centre Imarat (RCI), Defence Research and Development Laboratory (DRDL), Proof & Experimental Establishment (PXE) and High Energy Materials Research Laboratory (HEMRL).

## **What is the Pinaka system?**

It is a complete system, with a single battery comprising six launcher vehicles, each with 12 rockets.

There are six loader-replenishment vehicles.

Three replenishment vehicles and two Command Post vehicles with a fire control computer and DIGICORA radar.

A Pinaka regiment has three batteries plus reserves.

<https://www.financialexpress.com/defence/big-success-for-drdo-made-in-india-pinaka-missile-system-clears-test-again/1799010/>

*Fri, 20 Dec 2019*

## **QRSAM successfully test-fired off Odisha coast**

India on Thursday successfully test-fired a Quick Reaction Surface-to-Air Missile (QRSAM) off the coast of Balasore in Odisha

The missile was test-fired from the launch pad-3 at the Interim Test Range (ITR) at Chandipur at 4.20 pm.

Developed by the Defence Research and Development Organisation (DRDO), the missile has a strike range of 25 km to 30 km. It uses solid-fuel propellant and has the capability of engaging multiple targets.

The all-weather and all-terrain missile, which can be mounted on a truck and stored in a canister, is equipped with electronic counter measures against jamming by aircraft radars.

The first trial of the QRSAM was conducted on June 4, 2017.

<https://www.defencenews.in/article/QRSAM-Successfully-Test-Fired-Off-Odisha-Coast-808474>

## Why Mission Shakti may start a space tiff

*India's ASAT test can't be justified as a 'peaceful' exercise,  
given the global fears of an imminent arms race in outer space*

*By Nivedita Raju*

Prime Minister Narendra Modi's address on March 27, 2019 began with the declaration that India had "established itself as a global space power." This statement was premised on the notion that an anti-satellite (ASAT) test was "necessary" to demonstrate India's status as a space-faring nation. However, India has been internationally recognised for its space-faring prowess for decades, given its unique ability to manufacture innovative technology at economical rates evidenced by the increasing use of Indian launch services by foreign nations.

Some base this argument of 'necessity' on the need to prove Indian military capabilities. This, too, is untenable, as most space technology is dual-use, serving both military and civilian functions — such as space technology for surveillance and reconnaissance purposes.

The ASAT technology, on the contrary, was purely offensive in nature. It used "kinetic kill" technology, which employs the kinetic energy of the projectile to strike a target at high speeds and is solely intended to disrupt the functions of another space object (such as a satellite), or worse, destroy it entirely. India was not under any immediate threat, nor did the state have any urgency to exhibit offensive capabilities — except perhaps, the then upcoming elections.

Yet, Modi was quick to reassure that India's ASAT test "is not directed against anyone" and that "India has always been opposed to the weaponisation of space and an arms race in outer space...today's test does not violate any international law or treaty obligation to which India is a party."

### Legal perspective

This conclusion on the legality of India's ASAT test is inaccurate, as there is no global consensus on the status of ASAT weapons. Weapons in outer space can be broadly classified into two categories: nuclear and non-nuclear. Non-nuclear space weapons can be further classified into kinetic weapons and non-kinetic. A significant risk of ASATs is that their use would likely lead to indiscriminate consequences, as rendering the target temporarily or permanently dysfunctional may impact other objects in the vicinity. These include those belonging to the state that launched the ASAT. Naturally, the question that arises is, why is the law unclear about the use of such a destructive weapon?

The Outer Space Treaty, to which India and most nations are party, stipulates that outer space and celestial bodies must be used "exclusively for peaceful purposes," and prohibits testing of weapons and conduct of military manoeuvres. The meaning of "peaceful purposes" here has been debated. Some interpret it as an outright ban on any form of military activity (thereby associating "peaceful" with "non-military"), while others interpret it as only excluding those military acts which are aggressive or contravene international law (equating "peaceful" with "non-aggressive").

Regardless, ASAT weapons are not expressly included within the purview of the Outer Space Treaty which, under Article IV, only bans states from "placing in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, installing such weapons on celestial bodies, or stationing such weapons in outer space in any other manner." This provision would not apply to ASAT weapons, since they only travel through outer space and are not fixed in a particular position. Additionally, they are not nuclear weapons, or weapons of mass destruction.

### Show of force

Based on this, one could conclude that ASAT weapons are permissible. However, Article III of the Treaty, which is a more general clause, obliges states to explore and use outer space “in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.” This reference to the UN Charter is significant because it prohibits states from the threat or use of force unless acting in self-defence. Given that there was no imminent threat to justify self-defence, and that Mission Shakti was directed against India’s own space object, the ASAT test would hardly constitute a legitimate use of force under international law.

Further, India’s launch arguably disrupted international peace and security under Article III. The ASAT test is a destabilising act in a climate of heightened global tension and several regional conflicts. This display of force, in the wake of US President Donald Trump’s promised Space Force and “American dominance” only contributes to the erroneous notion that the extension of conflict into space is unavoidable. It is a fact that no such dispute has occurred in over 60 years of the space age, and there is considerable scope for states to introduce measures to prevent one. But if India, with its advanced space capabilities, begins wanton testing of ASAT weapons, it could render conflict a self-fulfilling reality.

Numerous attempts at preventing an arms race in outer space have been made at the international level, beginning in 1981 with a United Nations General Assembly resolution addressing the very issue. Ironically, India too, has participated in these discussions. Instruments ranging from a draft code of conduct to a treaty preventing the placement of weapons in outer space the urgency with which other space-faring powers, including Russia and China, pursue this issue.

If legality of the ASAT itself is considered insufficient to demonstrate the errors of India’s actions, the consequences of the ASAT test arguably violated Article IX, which restricts activities that cause “potentially harmful interference with the activities of other states.” Furthermore, there is a general obligation to conduct activities, with “due regard to the corresponding interests of all other states.” Hence, there is scope for a legal claim that India’s actions resulted in creating debris that interfere with another state’s activities in outer space.

#### Damaging debris

Mission Shakti generated hundreds of pieces of debris; months later, approximately 50 fragments still remain in orbit. Every one of these fragments constitutes an individual space object over which India retains exclusive jurisdiction and control. These fragments are at great risk of colliding with each other, and possibly other satellites, which would result in the generation of even more debris. India was fully aware that the test would generate debris, and under Articles VI and VII, is responsible for the conduct of these fragments and liable for any damage caused. A separate treaty titled the Liability Convention, to which India is also a party, applies in two possible scenarios: either the space debris from Mission Shakti causes damage to an aircraft in flight or to the Earth’s surface, or it damages another state’s satellite.

The standard of liability differs in these two scenarios. The first imposes “absolute liability,” which means there is no need for the affected state to prove damage. The second enforces “fault-based liability,” in which the affected state would have to prove India was responsible for any damage. Neither of these two cases absolves India of liability, as Mission Shakti was an intentional launch. Therefore, if one of these fragments of debris collide with another state’s space object in the future, that state is entitled to bring a claim for compensation against India under the Liability Convention.

Until an affected state brings such a claim, however, the intentional generating of debris continues to have unclear status in international law. Non-binding instruments, such as the Space Debris Mitigation Guidelines and the approved Guidelines for the Long-term Sustainability of Outer Space Activities, indicate there is growing consensus on the avoidance of intentional debris generation. Although these instruments are non-binding, they have the potential to develop into sources of customary international law.

If we consider India's act as genuinely intended to avoid conflict in space, rather than encourage it, then fervent commitments to stabilise international security are needed, beginning with enhanced transparency and confidence-building measures. A step further would be a concrete commitment to binding measures that prevent an arms race in space alongside other nations.

<https://www.thehindubusinessline.com/opinion/columns/why-mission-shakti-may-start-a-space-tiff/article30331853.ece#>