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Pralay's Promise — India's Quasi-Ballistic Precision Strike Missile and the New Deterrence Architecture

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CURATED & WRITTEN BY

Bharat Choudhary

UPSC Educator & Content Creator •

[linkedin.com/in/epicbharat](https://www.linkedin.com/in/epicbharat)

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WHY IN NEWS

DRDO conducted a salvo launch of two Pralay ballistic missiles simultaneously at the Integrated Test Range (ITR) in Chandipur, Odisha — a user evaluation trial for the Indian Army. The simultaneous dual-missile launch demonstrated Pralay's capability to overwhelm Anti-Ballistic Missile (ABM) defences by delivering multiple strikes simultaneously.

WHAT IS PRALAY?

Pralay (Sanskrit: Apocalypse/Deluge) is a **conventionally armed, quasi-ballistic, surface-to-surface missile** developed by **DRDO** (Defence Research and Development Organisation) and intended for induction into the **Indian Army** as its primary short-range precision strike system.

Key specifications:

Range: 150–500 km (adjustable; the full 500 km range covers most of Pakistan's strategically important cities from forward deployed positions)

Payload: 500–1,000 kg conventional warhead (can carry high-explosive, thermobaric, or penetrator warheads)

Guidance: INS (Inertial Navigation System) + GPS + **NavIC** (India's indigenous satellite navigation system — formerly IRNSS)

Accuracy: CEP (Circular Error Probable) of ~10 metres — precision that makes it a genuine counter-force rather than counter-value weapon

Trajectory: Quasi-ballistic — not a pure ballistic arc; the missile manoeuvres during the terminal phase, making interception harder

Propulsion: Solid-fuelled (faster preparation time than liquid-fuelled missiles; can be stored ready-to-launch)

Classification distinction:

Type	Pralay	BrahMos	Agni
Purpose	Short-range conventional strike	Supersonic cruise	Strategic deterrence (nuclear-capable)
Speed	~1-2 Mach	~3 Mach	Varies
Range	150-500 km	300-800 km	700-8,000 km
Guidance	INS+GPS+NavIC	Inertial+GPS	Inertial+GPS
Warhead	Conventional	Conventional	Nuclear-capable

THE SALVO LAUNCH — WHY IT MATTERS

The salvo launch of **two Pralay missiles simultaneously** is not merely a demonstration — it is a specific operational capability with strategic implications:

Anti-Ballistic Missile (ABM) systems:

Modern ABM systems — such as Israel’s Arrow, Russia’s S-400, and Pakistan’s HQ-9 (acquired from China) — are point-defence systems designed to intercept incoming ballistic missiles. However, they have finite interceptor magazines and limited simultaneous engagement envelopes. A single Pralay missile can theoretically be intercepted. Two Pralayas fired simultaneously from different angles/directions overwhelm these systems because:

The interceptor allocation problem: If a system has 2 active interceptors per target, it can defeat a single missile. If two missiles arrive simultaneously, the mathematics change.

Manoeuvring terminal phase: Pralay’s quasi-ballistic trajectory means it’s harder to track and intercept than a purely ballistic projectile like Prithvi.

Salvo launch vs. individual launch:

The ability to conduct salvo launches requires:

Command and control synchronisation between launch systems

Coordinated trajectory planning (to avoid mutual interference)

Rapid reload capabilities

This is significantly more complex than single launches and validates an important operational dimension of the Pralay system.

INDIA'S BALLISTIC MISSILE PROGRAMME — THE CONTEXT

Pralay fits into India's **layered missile arsenal**:

Surface-to-surface ballistic missiles (India):

Missile	Range	Status	Notes
Prithvi-I	150 km	Retired	India's first indigenously developed ballistic missile
Prithvi-II	350 km	Service	Liquid-fuelled; 500-1,000 kg payload; Army/Air Force
Agni-I	700-900 km	Service	Solid-fuelled; nuclear-capable
Agni-II	2,000+ km	Service	Solid-fuelled; nuclear-capable
Agni-III	3,000+ km	Service	Nuclear-capable; covers all of China
Agni-IV	3,500+ km	Service	Nuclear-capable; road-mobile
Agni-V	5,000+ km	Service	ICBM-class; nuclear-capable; MIRV tested 2024
Agni-Prime	1,000-2,000 km	Development	Compact, road-mobile replacement for Agni-I/II
Pralay	150-500 km	User trials	Conventionally armed; replaces Prithvi for conventional strike
Prahaar	150 km	Cancelled/modified	Earlier conventional strike missile

Why Pralay replaces Prithvi for conventional missions:

Prithvi is liquid-fuelled (slow to prepare, logistically complex)

Pralay is solid-fuelled (canister launch, ready in minutes)

Pralay has NavIC guidance for accuracy independent of GPS (which the US could deny in a conflict scenario)

Pralay can be launched from a mobile Transporter-Erector-Launcher (TEL), making it survivable in a first-strike scenario

NAVIC INTEGRATION — STRATEGIC SIGNIFICANCE

Pralay's guidance system incorporates **NavIC (Navigation with Indian Constellation)** — India's indigenous regional satellite navigation system (formerly IRNSS — Indian Regional Navigation Satellite System):

NavIC facts:

Coverage: Approximately 1,500 km around India (South Asia and Indian Ocean region)

Satellites: 7 operational satellites (3 GEO + 4 GSO)

Accuracy: ~5 metres (service user level); ~20 cm (encrypted military signal)

Significance for Pralay: If India and an adversary are in conflict, the adversary (particularly the US, in an India-China or India-Pakistan conflict) could selectively deny GPS accuracy. NavIC provides an independent guidance option that cannot be denied by a third party.

This is the same logic that drove Russia (GLONASS), China (BeiDou), and the EU (Galileo) to build their own satellite navigation constellations.

STRATEGIC CONTEXT — INDIA'S TWO-FRONT DETERRENCE

Pralay's development and operational validation occurs in the context of India's **two-front threat perception** — the possibility of simultaneous conflict with both Pakistan and China:

Pakistan front: Pralay at 500 km range, deployed in Rajasthan or Punjab, can reach Lahore, Rawalpindi, Islamabad, and key Pakistani military installations without crossing into Pakistan. This is a conventional deterrent against Pakistan's military build-up.

China front (LAC): Pralay deployed in Ladakh, Himachal Pradesh, or Arunachal Pradesh can reach PLA logistics bases in Tibet — the Depsang, Demchok, and Galwan valley supply routes. This addresses a specific vulnerability in mountain warfare: India's inability to hold PLA supply lines at risk with conventional weapons.

China's asymmetric response concern: China has its own quasi-ballistic missiles (DF-11, DF-15, DF-16) and has deployed them in positions that can reach Indian cities. Pralay gives India a comparable capability at the conventional (non-nuclear) level, potentially strengthening deterrence without escalating to nuclear signalling.

UPSC RELEVANCE

Prelims: Pralay missile (DRDO; ITR Chandipur; 150-500 km; 500-1,000 kg; NavIC + GPS guidance; quasi-ballistic; solid-fuelled; salvo launch user trials); ITR Chandipur (Odisha; India's primary missile test range); NavIC/IRNSS (7 satellites; 1,500 km coverage; Indian navigation system); CEP (Circular Error Probable — accuracy measure); BrahMos (Indo-Russian; Mach 3+; 300-800 km; supersonic cruise).

Mains GS-3: India's ballistic missile programme — conventional vs nuclear divide | Pralay and the precision strike revolution in Indian military doctrine | Two-front deterrence — India's strategic challenges against simultaneous Pakistan and China threats | NavIC and India's satellite navigation sovereignty.

★ FACTS CORNER — KNOWLEDGEPEDIA

PRALAY MISSILE — KEY DATA:

Developer: DRDO (Defence Research and Development Organisation)
 Type: Conventionally armed, surface-to-surface, quasi-ballistic missile
 Range: 150–500 km
 Payload: 500–1,000 kg conventional warhead
 Guidance: INS + GPS + NavIC; CEP: ~10 metres
 Propulsion: Solid fuel (canister-launch; rapid deployment)
 Test site: Integrated Test Range (ITR), Chandipur-on-sea, Odisha
 Salvo: 2 missiles fired simultaneously; user evaluation trials (Dec 2025/Jan 2026)

ITR CHANDIPUR:

Location: Chandipur-on-sea, Balasore district, Odisha
 Operator: DRDO (under the Integrated Test Range project)
 Primary purpose: India's main missile test facility
 Missiles tested here: Prithvi, Agni (early versions), Pralay, Akash, Astra, Shourya

NAVIC (NAVIGATION WITH INDIAN CONSTELLATION):

Former name: IRNSS (Indian Regional Navigation Satellite System)
 Satellites: 7 (3 GEO + 4 GSO orbits)
 Coverage: 1,500 km around India (SPS — Standard Positioning Service: ~5m; RS — Restricted Service: encrypted, <1m for military)
 First satellite: IRNSS-1A (July 2013)
 Full constellation: Operational by 2018
 Authority: ISRO; managed by NAVIC Management Centre (NMC)

INDIA'S MISSILE ARSENAL:

Prithvi-II: 350 km; liquid; 500-1,000 kg; Army/Air Force
 Agni-V: 5,000+ km; solid; nuclear-capable; MIRV tested March 2024 (Operation Agneepath)
 BrahMos: Indo-Russian (DRDO + NPO Mashinostroyeniya); Mach 2.8-3.0; 300-800 km (extended range variant); air/sea/land-launched
 Shaurya: 700-1,900 km; hypersonic; comparable to China's DF-21; naval equivalent of Agni
 Astra Mk.1: Air-to-air; BVR (Beyond Visual Range); 70-110 km; IAF (Tejas, Su-30MKI)

ABM SYSTEMS (RELEVANT CONTEXT):

Pakistan: HQ-9 (China); LY-80 (China); IRIS-T (Germany, in process) — counter Indian Air Force
 China: HQ-9A/9B; S-400 (Russia); early warning radars — covers LAC region
 India: S-400 (3 squadrons delivered from Russia; 2 more pending); MRSAM (IAI Israel + DRDO); QRSAM (DRDO)

Sources: DRDO, PIB, AffairsCloud

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