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INS Taragiri Commissioned and Large Cavitation Tunnel — India's Naval Expansion

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INS Taragiri Commissioned and Large Cavitation Tunnel — India's Naval Expansion

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WHY IN NEWS

INS Taragiri, the fourth ship of the **Nilgiri-class (Project 17A)** stealth frigates, was commissioned into the Indian Navy on **April 3, 2026** at Visakhapatnam by Defence Minister Rajnath Singh. On the same day, the Defence Minister laid the foundation stone for a **Large Cavitation Tunnel (LCT)** facility at the **Naval Science and Technological Laboratory (NSTL)**, a DRDO lab in Visakhapatnam.



INS TARAGIRI — KEY DETAILS

PARAMETER	DETAILS
Class	Nilgiri-class (Project 17A)
Type	Stealth guided-missile frigate
Ship number	Fourth (of seven planned)
Displacement	~6,670 tonnes
Builder	Mazagon Dock Shipbuilders Ltd (MDL), Mumbai
Steel supplier	SAIL — ~4,000 tonnes from Bokaro, Bhilai, and Rourkela plants
Commissioned	April 3, 2026, Visakhapatnam

Nilgiri-Class (Project 17A) Fleet

SHIP	STATUS
INS Nilgiri (F49)	Commissioned 2024
INS Udaygiri (F50)	Commissioned 2025
INS Dunagiri (F51)	Commissioned 2025
INS Taragiri (F52)	Commissioned April 2026
INS Vindhyagiri (F53)	Under construction (GRSE)
INS Mahendragiri (F54)	Under construction (MDL)
Ship 7	Under construction (GRSE)

The Nilgiri class is an evolution of the Shivalik-class (Project 17) frigates with enhanced stealth features, advanced radar systems, and BrahMos missile capability. They are designed by the **Warship Design Bureau** of the Indian Navy.



LARGE CAVITATION TUNNEL (LCT)

What is Cavitation?

Cavitation is a hydrodynamic phenomenon where rapid pressure changes in water create vapour bubbles that collapse violently, causing noise, vibration, and structural damage to propellers and hulls. For submarines, cavitation is the primary source of acoustic signature — **a noisy submarine is a detectable (and vulnerable) submarine.**

Why LCT Matters

FEATURE	SIGNIFICANCE
Closed-loop simulation	Submarine hull and propeller testing under deep-water conditions
Free-surface simulation	Surface ship hull and propeller testing
Combined capability	Globally unique: both modes in one facility
Aatmanirbhar value	Eliminates need for critical testing abroad
Applications	Next-gen submarine design, ship propulsion, underwater weapons, torpedo shapes

NSTL (Naval Science and Technological Laboratory)

- DRDO laboratory in Visakhapatnam
- Specialises in **underwater weapons and systems** — torpedoes, mines, underwater sensors
- Developed the **Varunastra** heavyweight torpedo (India's first indigenous torpedo)
- Key contributor to the **ATV (Advanced Technology Vessel)** programme for nuclear submarines

INDIA'S NAVAL INDIGENISATION

India's naval shipbuilding programme reflects the broadest defence indigenisation effort:



SHIP/PROGRAMME	BUILDER	STATUS
INS Vikrant (Aircraft Carrier)	Cochin Shipyard Ltd	Commissioned 2022
Arihant-class SSBNs (3 ships)	L&T, SBC Vizag	Operational
Nilgiri-class frigates (7 ships)	MDL + GRSE	4 commissioned
Kalvari-class SSKs (6 Scorpene)	MDL	6 delivered
Anti-Submarine Warfare Corvettes	GRSE	Under construction
Next-gen destroyers (Project 15B)	MDL	4 commissioned

SAIL's role: SAIL supplies specialised naval-grade steel (DMR-249A) from Bokaro, Bhilai, and Rourkela plants — a strategic capability since importing warship-grade steel is subject to export controls and sanctions.

UPSC RELEVANCE

GS Paper 3 — Security & Defence

- Aatmanirbhar Bharat in naval defence: indigenous shipbuilding
- Project 17A (Nilgiri-class): design and production timeline
- Cavitation in submarine design: noise signature and stealth
- DRDO labs: NSTL, NPOL, and their contributions

Prelims Fast Facts:

- INS Taragiri: **4th Nilgiri-class (Project 17A)** stealth frigate
- Commissioned: **April 3, 2026** at Visakhapatnam
- Project 17A total ships: 7 (4 MDL + 3 GRSE)
- LCT location: **NSTL (DRDO), Visakhapatnam**
- NSTL developed: **Varunastra** torpedo
- SAIL steel grade for warships: **DMR-249A**

FACTS CORNER

- **INS Taragiri** is named after a peak in the Western Ghats — following the mountain-naming tradition for Indian frigates (Nilgiri, Udaygiri, Dunagiri are all mountain peaks)

- **Project 17A** was sanctioned at an estimated cost of **Rs 45,000+ crore** for seven frigates — making it one of India's largest warship programmes
- **Cavitation noise** is what enemy sonar uses to detect submarines — reducing cavitation through better propeller design is the single most impactful stealth improvement for any submarine
- India now operates the **world's largest warship construction programme by number of ships** under simultaneous construction — over 60 ships and submarines are being built across Indian shipyards
- **GRSE (Garden Reach Shipbuilders and Engineers)**, Kolkata, builds 3 of the 7 Nilgiri-class ships — the split between MDL (Mumbai) and GRSE (Kolkata) reflects the strategy of developing multiple shipbuilding centres rather than concentrating capability

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