

INS ARIHANT - FIRST NUCLEAR SUBMARINE MADE IN INDIA

Trials of India's first indigenous nuclear submarine are set to begin on Sunday off Visakhapatnam

HOW THE SUB WILL BE LAUNCHED AT SEA

- 1 Covered pool 50 m deep & 200 m long serves as dry dock, with a lock opening to the sea
- 2 The nuclear submarine is assembled on the dry pool bed.
- 3 The pool is flooded. The submarine rises. The lock is opened. The nuclear submarine floats out to the sea

NEW DELHI is head quarters of the project. The hull of the nuclear submarine was fabricated at **HAZIRA**

The 85 MW prototype nuclear reactor was built at **KALPAKKAM**. The submarine was assembled at **VISAKHAPATNAM**

Specifications:

Crew	95
Displacement	6,000 tonnes
Surface speed	12-15 knots**
Submerged speed	24 knots**
Nuclear reactor	85 MW
Armament	30 (12 SLBM)

FROM BABY TO BOOMER

- 1967] Navy and BARC officials moot concept of nuclear propulsion for naval systems
- 1979] The Indira Gandhi government asks BARC and DRDO teams to start work on a nuclear submarine
- 1976] Raja Ramanna and BARC scientists devise a nuclear submarine reactor design. But the
- 1987] India gets Charlie-II class submarine from the Soviet Union on a three-year lease
- 1990] The hull of the ATV is laid down, Larsen & Toubro begins construction
- 2007] An 85-MW nuclear reactor is fitted into the hull
- 2009] INS Arihant, India's first

SIZE COMPARED TO RUSSIAN SUBMARINES

SOVIET DESIGNATION	Length (m)	Displacement (tonnes)
667 BDRM	130	2,500
941 Akula	170	7,700
955 Borci	175	12,000



INS Arihant (S-73) is the first nuclear-powered ballistic missile submarine of India. It is indigenously developed and built, under the Advanced Technology Vessel (ATV) Project of India. It has made India the 'Second Strike' capable. It counters a first-strike nuclear threat. We now can support the 'no first use' nuclear strategy. The reciprocating second-strike capability happens to be a good defence strategy as Mutual Assured Destruction or MAD. It is believed though one side may have a lower level minimal deterrence response, the Mutual-Assured-Destruction (MAD) Doctrine is a pointer to total annihilation of both, attacker and defender.

As per the Theory of Deterrence, any threat of use of a strong weapon deters enemy using the same weapon. Therefore, if a pre-emptive nuclear strike by one party can be reciprocated by a counter strike of the same intensity Second-Strike, it will be the deterrent. This is the corner stone of Mutually-Assured-Destruction (MAD) doctrine of military strategy. India has achieved this with induction of INS Arihant in Indian Navy Submarine Arm. I am proud of having served as a Submariner from 1973 to 1982.

From apprenticeship days as EAR, I developed fantasy for Sonar technology and submarine detection techniques. I made up my mind then to be a submariner. The selection process was very tough. It involved stamina checking, Diving Chamber test, doing tasks in Pressure chamber with limited oxygen, psychological test etc. I passed all that and came closer to getting my dolphins. The Class-room training program was tough, the tests were too difficult. The sea-going period was even tougher.

Almost each day I sailed. Going out as a trainee in an operational submarine, I had no bunk to sleep, no place to keep my things. I slept on a Torpedo. Hardly there was free time for a trainee doing diving, surfacing, control room watch, plotting in Navigation chart. The constrained living under constant work stress during long periods at sea calls on one's nerves.

Foxtrot Class submarines are now faded out of our navy. USSR discontinued them in 2000 and last of Indian Submarine, INS Vela was decommissioned in 2010. Since 1996, India's attack submarine fleet has dwindled to 13 diesel-electric vessels from 21. The entire fleet -- a mixture of Russian-origin Kilo

class vessels and German HDW submarines - is at least 20 years old. All have been refitted to extend their operational lives until at least 2025.

In 2005, the Indian Navy ordered six Scorpène-class, to be built in India, with collaboration of France's Naval Group, formerly known as DCNS Group. The last two will be fitted with an Indian Fuel cell AIP module. INS Kalvari is the first of six Scorpene submarines, with the surface speed of 12 knots and submerged speed 20 knots with a maximum range about 6000 Nautical miles. These are Diesel Electric- Battery -AIP (Air Independent Propulsion) type submarines. Modern non-nuclear submarines are potentially stealthier than nuclear submarines. A nuclear ship's reactor constantly pumps coolant, generating some amount of detectable noise, sea acoustic signature. Non-nuclear submarines running on battery power or AIP, on the other hand, can be virtually silent.

Nevertheless, the second-strike capabilities causing a Mutual Assured Destruction (MAD) defence strategy depends on long duration underwater endurance of Arihant class submarines. Government of India has cleared six nuclear-powered submarines at a cost of about Rs.1 lakh crore in February 2015, which will give the Navy much-needed teeth. These developments made our submarine arm to celebrate its Golden Jubilee in 2017 December with grand enthusiasm.



To know more about INS Kalvari visit: <https://www.youtube.com/watch?v=YnjhCjypM7k>

JAI HIND.