



India's submarines at 50

India requires effort, will and funding to bolster its submarine fleet

It was a red letter day for the Indian Navy, as it celebrated the 50th anniversary of its Submarine Arm on 8 December with the commissioning of the first indigenously-made Scorpene class submarine, INS Kalvari, by Prime Minister Narendra Modi. Named after the Tiger Shark, INS Kalvari is the first of the six 1,565-tonne Scorpene 2000 diesel-electric hunter/killer (SSK) submarines being built by the Mumbai-based defence public sector undertaking (DPSU), Mazagon Dock Ltd (MDL), under Transfer of Technology from French shipbuilder DCNS, now renamed Naval Group. Designated Project-75, this programme had begun as far back as December 2006 and Kalvari was launched nine years later, in October 2015. Thereafter, the fit-out and trials took over two more

years.

Kalvari's commissioning harks back 50 years when its original namesake was delivered to the Navy on 8 December 1967 as the first of the eight Soviet Foxtrot Class diesel-electric patrol submarines that established the navy's Submarine Arm. All eight have since been decommissioned. The second Scorpene to be delivered a year hence is christened Khanderi, also after the second of the Foxtrots. It was launched in January 2017 and is currently undergoing sea trials, while the third, Karanj, is being readied for launch shortly. The balance three submarines are in various stages of outfitting and will join the fleet by 2020.

The Indian Navy traditionally 'reincarnates' its decommissioned ships and submarines through their names.

The first INS Kalvari was decommissioned in May 1996 after almost 30 years of service.

The Golden Jubilee of the Submarine Arm was enhanced by the 'President's Colour' awarded to it by the President of India, Ram Nath Kovind. The President's Colour is the highest honour bestowable upon any military unit. The Indian Navy, which also celebrated 2017 as the 'Year of the Submarine', had been the first of the three services to have been so awarded, on 27 May 1951.

Cmde Rakesh Anand, CMD, MDL, viewed Kalvari's induction into the Indian Navy as a 'game changer in the field of underwater warfare due to its superiority in all operational aspects'. Commending the completion of all weapon firings prior to the commissioning, he noted that the state-of-the-art Scorpene had superior stealth features such as advanced acoustic silencing techniques, low radiated

noise levels, a hydro-dynamically optimised shape, and lethality through precision-guided torpedoes and anti-ship missiles, whilst underwater or on surface.

India's Ministry of Defence (MoD) and naval authorities have denied that the wide-ranging data leak on Project-75 by The Australian newspaper in August 2016 had undermined New Delhi's sensitive submarine programme or compromised national security. Downplaying the exposé, they contend that the leaked documents – 22,400 pages in all – largely comprised generic data and information dating back to 2011 and had since been modified. With Australia's award in April 2016 to DCNS (Naval Group) an AU\$50 billion (US\$38 billion) contract to design and build 12 submarines, it was suspected that the leak was a consequence of corporate espionage.

The Submarine Arm has been at the forefront of all offensive operations of the Indian Navy. It played a particularly stellar role in the 1971 India-Pakistan war when four of its submarines were deployed on both the Eastern and Western maritime theatres of operations in the Bay of Bengal and the Arabian Sea, restricting enemy operations at sea.

The 50 years of India's submarines have not all been plain sailing though. Project-75 itself is running five years behind schedule and its original contract cost of \$2.63 billion has spiralled to \$3.8 billion. INS Kalvari was to have been commissioned in 2012. Apart from the time and cost overruns, there is another major problem. The Scorpens were planned to be equipped with the Air Independent Propulsion (AIP) system under development since 2002 by the Defence Research and Development Organisation (DRDO).

The AIP was to have been ready in time for its induction into the Scorpens, especially with Project-75 already delayed. But it is nowhere near completion and may be retrofitted, if at all, through sectional implants at the time of the major overhauls of the six submarines. AIP technology enhances underwater endurance of non-nuclear submarines three-to-five times than that of one without an AIP that can remain underwater for only two-to-three weeks at a time. While



conventional submarines the world over now come equipped with AIP, the lack of this vital capability will pose a critical operational constraint to India's submarines.

History of mishaps

The Indian Navy today is beset with a depleted fleet of 15 submarines, including INS Kalvari, and INS Arihant, the first indigenously made ship, submersible ballistic missile nuclear-powered (SSBN) that was commissioned in August 2016. Some of the submarines are close to being retired and 10 or less are operational at any time. Apart from Kalvari, Arihant and a nuclear-powered submarine leased from Russia for 10 years in a \$900 million deal, the rest of the fleet comprises eight 3,100-tonne Sindhughosh Class (Russian-origin Kilo Class) submarines, down from 10, and four 1,850-tonne Shishumar Class German-origin HDW Type 209 submarines. While a submarine's prescribed operational life is around 25 years, the eight Kilos are already of 23 to 28 years' vintage and the HDWS, of 20-28 years'.

One of the newest Kilos – INS Sindhurakshak, commissioned in 1997 – was wrecked by explosions at its moorings in Mumbai in the Indian Navy's worst peacetime disaster that killed three officers and 15 crewmen in August 2013. It had been among

five Sindhughosh Class submarines that were completely modernised at Russia's Zvezdochka shipyard and had returned to India in January 2013 after the upgrade. This was among a series of accidents that had led to the resignation of the then naval chief, Adm D.K. Joshi.

In February 2014, two officers were asphyxiated to death by smoke on board sister ship INS Sindhuratna, commissioned in 1988, again off the coast of Mumbai. Within a month, one civilian worker was killed in a mishap on the under-construction Aridaman, the follow-on boat of Arihant, while pressure tests were being carried out. Yet another Sindhurakshak sister ship, INS Sindhukirti, commissioned in 1990, had been immobilised for over nine years until 2015 by interminable modernisation-cum-refit work by state-owned Hindustan Shipyard Ltd.

INS Arihant, developed and built at home at a cost of \$2.9 billion as the first of a series of three such nuclear-propelled boats, had been conceived way back in 1998, but launched only in July 2009 and commissioned over seven years later. Russian designers have assisted in the project that is based on a modified Akula I submarine design. Initiated as the secretive Advanced Technology Vessel (ATV) project, the 6,000-tonne INS Arihant

has been made through public private partnership (PPP), its 83 MW reactor having been designed by the Bhabha Atomic Research Centre (BARC), its hull crafted by Larsen & Toubro Ltd (L&T), at its heavy engineering facility in Hazira, in Gujarat, and the assembly undertaken by the Ship Building Centre (SBC) of the Directorate General Naval Projects at Visakhapatnam, where the Eastern Naval Command is based.

INS Arihant is armed with 12 of the indigenous Sagarika K-15 ship/ submarine-launched ballistic missiles that have a 700 km range and can carry one-tonne nuclear warheads. The 110-metre-long Arihant represents a giant stride for India to secure a seaborne nuclear deterrent that completes its nuclear triad. Its 100-strong crew has been trained by Russian specialists.

For experience in operating and training on a nuclear-powered attack submarine (SSN), the Indian Navy took delivery of the K 152 Nerpa, an Akula II class boat, from Russia in April 2012 on a 10-year lease. Manned by a crew of 73, the 8,140-tonne submarine has been rechristened INS Chakra II and deployed at Visakhapatnam, which is also the base of the Flag Officer Submarines (FOSM). While the boat has an endurance of 100 days and can attain 30 knots and dive to a depth of 600 metres, it cannot carry nuclear warheads as per the lease accord, though it is equipped with eight torpedo tubes. The USSR had similarly leased to the Indian Navy an Akula I class SSN, renamed INS Chakra, during 1988-91.

As a regional maritime power seeking to consolidate its reach across the seas from the Horn of Africa to the Malacca Strait and the South China Sea, India seeks to bolster its submarine force as much as expand its carrier battle groups. To ensure force levels, it had targeted the induction of 24 new submarines by 2030 under a 30-year plan approved by the Cabinet Committee on Security (CCS) in 1999. Half of them were to be constructed with foreign collaboration by 2012, with the balance 12 'built to indigenous design'.

The immense cost and time overruns that have plagued even the production of just the six Scorpenes show that the target is not only a long way



off, but appears unattainable. For the past many years, India's defence ministry seems to have lost direction, having been helmed by ministers wary of taking decisions and preferring instead to be micromanaged by the Prime Minister's Office (PMO) to avoid any political or personal fallout.

Such marred management and planning can have strategic implications for India that has a vast coastline of 7,615 km abutting onto the Arabian Sea, Bay of Bengal and the Indian Ocean Region, with one of its island enclaves, Andaman & Nicobar, lying closer to Myanmar, Thailand and Indonesia than to the Indian mainland. With more than 90 per cent of its international trade by volume and over 70 per cent by value carried over the seas, the country has tasked the Indian Navy with securing its vital Sea Lines of Communication.

Modernisation

India also finds a dire need to keep pace with developments in its littoral, with the steady build-up in undersea combat capabilities by Pakistan as well as China, both neighbours with which it has been at war in the past. With one of the largest fleets of attack submarines comprising four SSBNs, six SSNs and 53 SSKs, Beijing is deploying a powerful sea-based nuclear deterrent through long-range nuclear-armed submarines. According to the Pentagon, four Type

094 Jin Class SSBNs are currently operational and a fifth may eventually be built, each armed with 12 JL 2 missiles that can deliver one-tonne nuclear warheads at a range of 8,000 km.

China is also selling submarines to both Pakistan and Bangladesh. The eight being sold to Islamabad at a total cost estimated at \$4-5 billion are the S20 diesel-electric submarines based on the Yuan Class design. The first four will be built by the Wuhan-based China Shipbuilding Industry Corporation, which will also set up a training centre in Karachi, and will be delivered by 2023, while the remainder will be assembled at the Karachi Shipbuilding and Engineering Works by 2028. The Pakistan Navy already operates five French submarines, the three Agosta 90Bs (Khalid Class) purchased in the 1990s and two older Agosta 70s (Hashmat Class) dating from the late 1970s.

Bangladesh is procuring two Type 035G Ming Class diesel-electric submarines from Beijing in a \$193 million deal. These will be the first submarines in the Bangladesh Navy and, as Prime Minister Sheikh Hasina mentions, will transform the service into a 'three-dimensional' force. "The issue of construction of a submarine base is under process," she has added.

Tardy decision-making also thwarted the build-up of India's expertise in submarine construction. In the

earlier programme concerning the four Shishumar HDW submarines, the first two, Shishumar and Shankush, were built by HDW (Howaldtswerke-Deutsche Werft) at Kiel and delivered to the Indian Navy in 1986, while the other two, Shalki and Shankul, were built at MDL and commissioned in 1992 and 1994. MDL had invested ₹110 crore on creating the submarine construction infrastructure, comprising three large workshops and a dry dock, which fell into disuse after 1994. Also lost over the years were the training and skills imparted to Indian personnel, many at the HDW facility in Germany, and to Indian naval architects and overseers. The yard had to begin anew after it secured the contract to build the Scorpene in 2005, and MDL fears a similar setback once Project-75 is concluded.

“In competitive bidding, sometimes we lose, at times we win, but will the skills be there always?” asks the previous Rear Adm. R.K. Shrawat (retd), CMD, MDL. “Britain has a policy to compensate its warship-builders that are bereft of orders with basic funding so as to retain skills.” To augment production capacities for integrated construction that reduces build periods, MDL’s ₹826 crore Mazdock Modernisation Project (MMP) of 2014 created an additional wet basin, a cradle assembly shop, stores, a modular workshop and a 300-tonne goliath crane. It additionally set up a ₹220 crore simultaneous construction of two lines of submarines.

Project-75 is said to fulfil the ‘Buy (Indian)’ category favoured by the MoD’s Defence Procurement Procedure. There is also the ‘Buy (Global)’ category that permits both Indian and foreign vendors, while ‘Buy (Indian)’ restricts it to Indian vendors and prescribes a minimum 30 per cent indigenous content of the total contract value. With the Indian Navy opting to buy as well as build both SSKs and SSBNs, it revived, in 2011, after many years the post of assistant chief of naval staff (submarines) – ACNS (S/M) – to look after perspective planning for, and acquisition of, submarines.

Foreign hand

Vice Adm. S.K.K. Krishnan (retd),



during whose tenure as CMD, MDL (2006-08) the Scorpene project and yard modernisation were initiated, finds building a submarine far more complex than fabricating even an aircraft. He remarks that though the software used for the 3D modelling of both their hull and fuselage is often the standard CATIA (Computer Aided Three-dimensional Interactive Application), submarines are strategic assets and require shipyards to specialise in integrating myriad systems. He thus deems it curious for the government to mandate ‘Make in India’ for submarines, when there is no such obligation for producing aircraft indigenously.

India’s defence industry is, however, energised by the impending Project-75 India, one of the country’s largest indigenous military contracts entailing the construction of six new generation stealth SSKs. Project-75 India is worth \$12 billion and its cost may climb higher depending upon the extent of offsets and transfer of technology from the foreign collaborator.

The Request for Information (RoI) issued by the Indian Navy has elicited a response from Naval Group, for a modified Scorpene, Germany’s ThyssenKrupp Marine Systems (TKMS) pushing for its Type 214, Sweden’s Saab Kockums ab, for its A26, and Russia’s Central Design Bureau for Marine Engineering ‘Rubin’, for its Amur 1650. Spain’s Navantia, which was expected to offer its S-80 class, and Japan’s Mitsubishi Heavy Industries and Kawasaki

Heavy Industries, which jointly produce the Soryu submarine, were initially considered contenders, but backed off subsequently.

Project-75 India requires the six SSKs to be constructed at a domestic public or private shipyard assessed to have the potential to build modern conventional submarines in collaboration with a foreign technology partner. They are to be equipped with AIP, armed with land-attack cruise missiles, and be compatible with indigenous weapons and sensors. Technical parameters will be defined, based on the responses of the four companies, which will need to then submit their technical and commercial bids after a formal Request for Proposal (RfP) is issued.

The whole selection process will take around two years, the first submarine expected to be launched eight months after the deal is finalised. The technology transferred is envisaged to augment indigenous design capabilities both at the Naval Design Bureau as well as at the shipyard. The submarines will, in all probability, be a derivative of existing designs while incorporating changes and modifications made to suit the Indian Navy’s operational requirements.

Though India is striving to regain its undersea reach, it will require much more effort, political will and the requisite funding to bolster its submarine fleet to the essential levels.

♦ SAROSH BANA

feedback@businessindiaigroup.com