

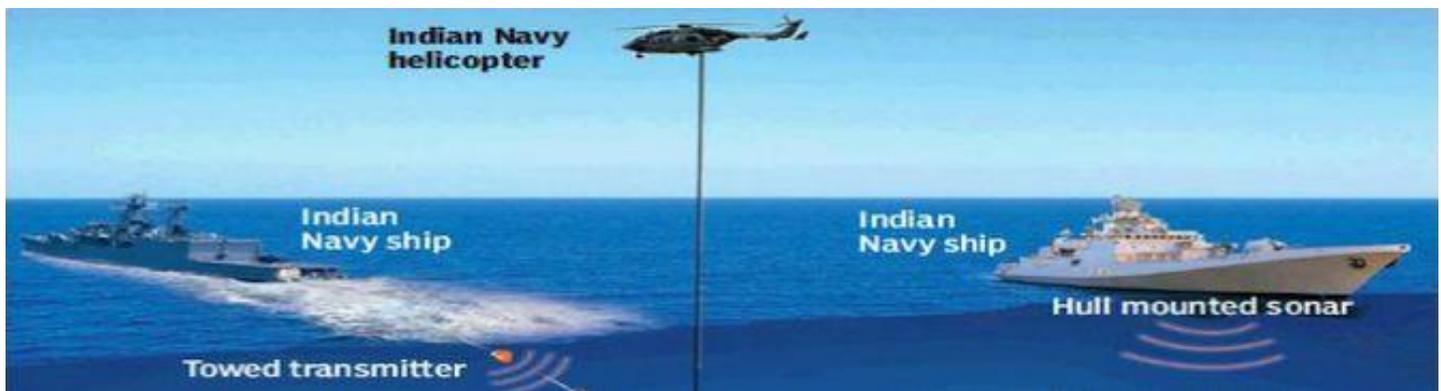
Wed, 07 March, 2018

25 industries from Kerala assisting Drdo in developing indigenous sonar

By Sudha Nambudiri

Kochi: Of the 100 industries, both large and small, that are playing a role in making navigation and communication systems as part of anti-submarine warfare for the Indian naval warships, 25 are from Kerala. And they are working with the scientists of defence research and development organization, (DRDO) to develop what is exclusively and uniquely Indian Sonar (sound navigation and ranging) system.

These industries get orders from the Kochi-based Naval physical and oceanographic laboratory (NPOL) under the DRDO which designs and develops the sonar systems exclusively for the navy's warships and submarines.



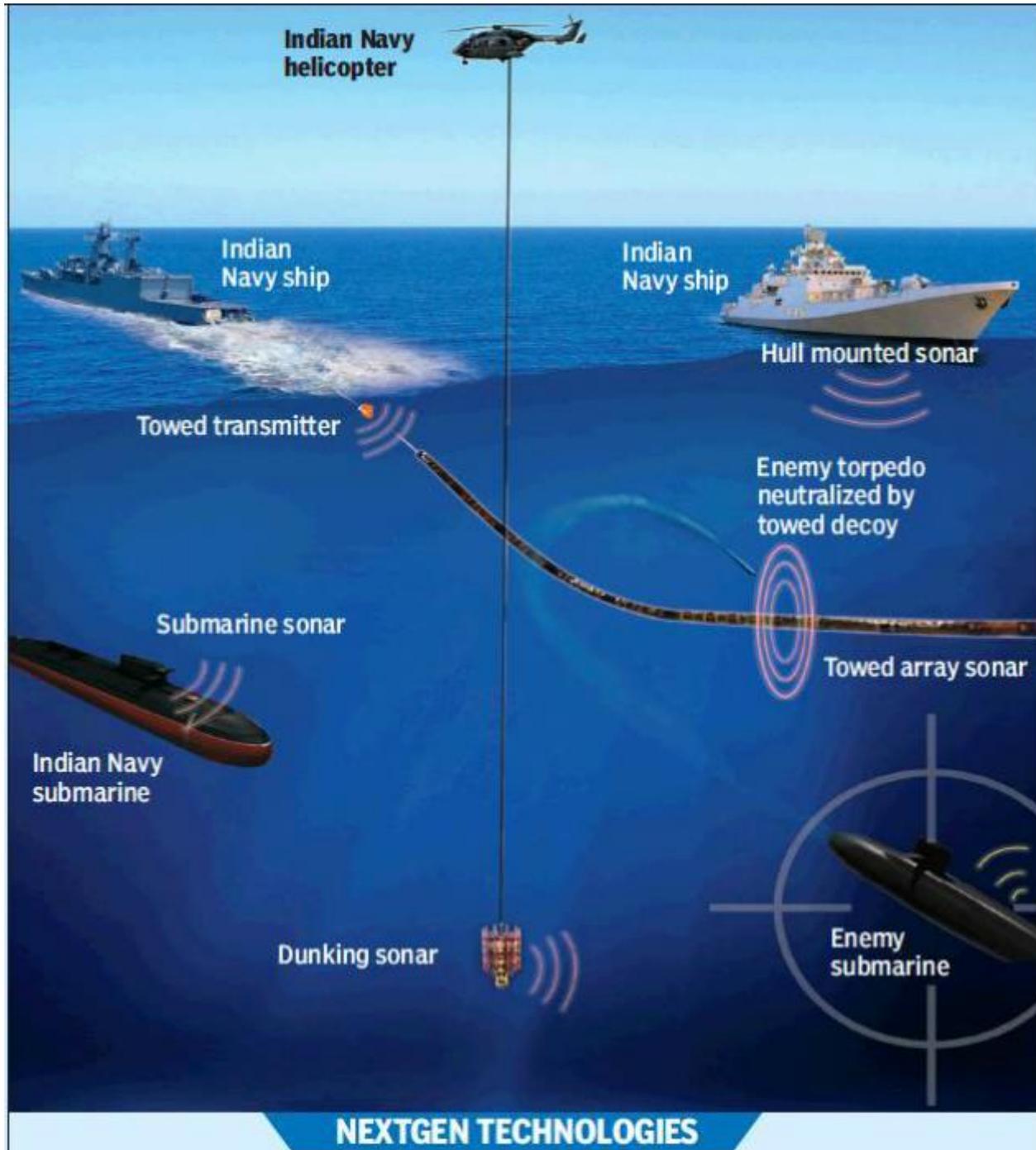
“The Indian Navy is our first user and a satisfied one too. Of the three services - Indian Navy is satisfied with the work being done here in NPOL and in the other two labs - Naval science and technological laboratory, Vishakhapatnam and Naval materials research laboratory, Maharashtra,” said S Christopher, secretary, defence (R&D). In the last five years, the sonar systems developed by NPOL have had takers from navies abroad. “Countries like Myanmar have already installed systems in their warships while discussions are on at various levels with other Indian ocean countries. Our advantage is that unlike other two services, Indian Navy is using only our sonars for its ships and submarines. This helps us immensely because when we scour abroad for vendors for our products, the first question is ‘are your services using this? Of course, we make the variants of what we give to our Navy,” said Christopher, who is also chairman, DRDO. Countries looking to import Indian sonars include Vietnam, Philippines, Indonesia, Thailand and Myanmar.

India has been witnessing debates on the economics of defense R&D but NPOL has been doubling the overall commercial worth of their products. In 2007, the cumulative product value was just above Rs500 cr. In the next five years, it touched Rs 1,280 cr and today it stands at over Rs 3,800 cr, out of which around Rs 1,400 cr worth of products have been delivered. Around Rs 2,400 cr worth of products are under various stages of production and delivery. The export product portfolio includes different kinds of sonars suitable for all kinds of ships and submarines, acoustic domes, directing gears etc.

“We have both public-sector units and small industries developing components for us. Even though it requires long periods of investment, all those who have joined us remain with us in our product development. They are making electronic items, sensors and several other components used in the final product that is fitted in the Indian naval ships and submarines,” said S Kedarnath Shenoy, director, NPOL. "No one knows our Indian oceans waters as we do and hence the sonars developed by NPOL are qualitatively much higher and better than many others in the world," Shenoy said.

Christopher said that understanding oceans had become more important in the wake of increase in trade and commercial activity, growing accidents and disasters involving vessels. "There is a growing demand for latest technologies and academicians, scientists and industries have started focusing on this sector," he said.

Sonars which play a crucial role in navigation and communication for warships and submarines is an important technology as far as defence is concerned. "With Chinese presence in the Indian waters, it has become important for the Navy to be more vigilant," officials said.



A Versatile Technology

SONAR It is a device that is used to detect underwater objects using sound waves. The acoustic frequencies used in sonar systems vary from very low (infrasonic) to extremely high (ultrasonic)

A sound pulse is generated and sent underwater through a transmitter. The sound waves are reflected by the underwater object which are received at receiver

The time taken by sound wave to come back is recorded. And by knowing the speed of sound wave in water, the distance is calculated

The challenge lies in ensuring that while your sonar detects a submarine lying hidden in the deep waters, it should also not radiate any waves that will expose you to the enemy.

To Find

- *Actual depth of the sea*
- *Lost ships and submarines*
- *As an ocean surveillance system*
- *Locate enemy submarines*
- *For under water security*

Spin-Offs *Even as they develop defence systems for the services, DRDO's technologies have yielded interesting spin-offs including the artificial leg which came from the technology used in Agni. Similarly, R&D by NPOL scientists resulted in two major technology spin-offs that could be used for civil society needs*

Sanjivani *A gadget that can detect people trapped in debris in quake-hit areas. It was used during the Latur and Bhuj earthquakes to find survivors*

The equipment works on simple sonar technology. It sends signals that can direct you to a trapped life. An easy-to-handle gadget that looks like a mine- detector, it can capture minute decibels like scratching on the wall or feeble breathing. The main unit can be strapped onto the waist. A long handle with a sensor called probe, leads the search. It transmits low-decibel sounds to a headphone. The inability to track people trapped under debris has been one of the major reasons for loss of life in quake-hit areas

Taragini *Yet another hand-held device, it can understand depth and aid rescue during accidents in water-bodies. Can be recharged with a mobile charger and can be used by divers when searching when there is no diving gear. It provides information about depth in terms of feet, limited to an operational range of 100 feet. The information about bottom hardness is presented in qualitative terms*

Sonar Imaging

Tracking and detection of completely and partially-buried objects in coastal ocean is a major challenge. A paper presented at the recently concluded international conference on sonars and sensors (ICONS-2018) spoke of how objects can be tracked using sonar images. Autonomous surface tracking vehicle, autonomous underwater vehicle, advanced sonars for underwater unexploded ordnance can be used for this purpose. High-resolution sonar system provides acoustic images of high quality sonar images for underwater tracking and detection. Infrared sensors are also used to capture data.

Magnetorheological Fluid

Developed by NPOL scientists, MR (Magnetorheological Fluid) has got international patent in the USA, UK, Japan, France and India. It is a smart fluid which changes its viscosity. While this is already being used in Indian naval ships, it can also be used in automobiles. There are about two lakh kilometres of roads in India. Many of the roads are in bad conditions. Automotive shock-absorbers are mostly ineffective in accommodating these road conditions, since their performance are optimized in the factory based on ideal road conditions. This smart fluid can do wonders on the road, scientists said. Depending on the road conditions the damping values can be changed on the road as situation demands. Several automobile shock-absorber manufacturing companies have shown interest in this fluid and NPOL is negotiating with them for technology transfer and licensing.

<http://www.indiandefensenews.in/2018/03/25-industries-from-kerala-assisting.html>

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DRDO develops underwater drone prototype

Kochi: Even as the Indian Navy's ships and submarines are being equipped with different kinds of sonars, defence scientists are looking at newer technologies to equip services to protect the territorial and the exclusive economic zone waters.

Naval research has turned to development of unmanned vehicles for defence applications. "This will be for surveillance purposes. We have developed a low endurance prototype and it has been tested in many waters," said Samir V Kamat, director general, Naval systems and Materials, DRDO.

He said that the DRDO management council had given sanction for the project and was likely to commence in a few months. "Countries like the US and China are working on underwater drones which will fire torpedos. As of now, this is our immediate project. But it is not on a mission mode. It is being taken as a technology demonstrator which can then be tailor-made for the navy depending on their needs," he said.

The Autonomous Underwater Vehicles (AUV) can be used for different roles including working as a courier between the navy and the submarine, situation assessment for the subsea, surface and air units for coordinated action, defensive and offensive roles etc. The AUV can play an active role in the oil and gas industries for seabed surveys as well as in search and rescue operations.

"We are looking at the power and fueling options," he said.

Yet another technology that is being discussed is deploying sensors in the waters, along the coast and the deep sea. With the presence of the Chinese submarines which have become active off the Indian waters, a sensor network has become important. However, the logistics of powering the sensor and its communication with the warships or the ground control is being looked at.

The coastal surveillance following the 26/11 attacks is already in place which work as 'eyes' of the sea and help the coastal security agencies in keeping track of events

<https://timesofindia.indiatimes.com/city/kochi/drdo-develops-underwater-drone-prototype/articleshow/63195994.cms>

THE HINDU BusinessLine

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From manning missiles to HR, women power rising in defence R&D, production

By M Somasekhar

Women have been steadily rising in power in India's defence research sector. From the most prominent Agni missile project to manning human resources, women have surged ahead in a sector that was dominated for long by men.

If Tessy Thomas shot to popularity as the 'Agni Putri', or Missile Woman, after the successful launch of the long distance Agni-4 missile in 2011, nearly a dozen women today drive projects — from those of strategic importance to taking care of planning and coordination — at the Defence Research and Development Organisation (DRDO).

Beginning in 2010, when Shashi Bala Singh became the first woman to be appointed director of a major national defence laboratory — Defence Institute for Physiology and Applied Sciences (DIPAS) — women have silently and successfully grabbed key positions in the defence sector.

At present, four Director General (a dozen in DRDO), five directors of laboratories (network of more than 52 labs) and a couple of project director positions are held by women, according to information available.

To top it all, the country also has a woman Defence Minister in Nirmala Sitharaman.

The first to scale the highest position of DG R&D (Electronics & Communications Systems) was J Manjula in September 2015. A post graduate from the Osmania University and expert in electronic warfare, Manjula drives strategic indigenous developments in electronics and sensors, a sector where India falls short.

Manjula plays a catalytic role in synergising teams and their strength in different labs involved in electronics, radars and opto electronics. She draws on experience from her past stint at the public sector ECIL and Defence Electronics Laboratory, Hyderabad.

Playing a prominent role in the strategic areas are Shashikala Sinha, Project Director of the Interceptor Missile mission, Chitra Rajagopal, D-G in-charge of Systems Analysis and Modelling and Tessy Thomas, Agni IV Project Director and Director of Advanced Systems Laboratory.

Shashikala's team has accomplished significant strides in the development of the Advanced Air Defence Missile, part of the Ballistic Missile System, for the country. She has expertise in working with RF sensors, advanced coding and programming and has won several awards in her 20-year stint with the DRDO.

Chitra Rajagopal excels in design and development of heat transfer equipment and combustion. She has to her credit scores of scientific publications, 12 patents and two technologies transferred to industries. A doctorate from IIT, Delhi, Chitra is also associated with the Organisation for Prohibition of Chemical Weapons, UN.

Laboratory Directors

Among those heading national laboratories, Manimozhi Theodore, a Madras University Engineering graduate, heads the Centre for Artificial Intelligence and Robotics, Bengaluru since June 2017.

She makes significant contributions in the field of net Centric C3I Systems, Communications Systems and quality assurance. At another end of the spectrum is Madhubala who leads the Defence Institute of Bio-Energy Research), Haldwani in Uttarakhand.

While Anu Khosla, an expert in cryptology and speech technology, drives the developments at the Delhi-based Scientific Analysis Group, Alka Suri, Director of the Defence Scientific Documentation Centre, New Delhi, takes care of the publications and documentation of the work of thousands of scientists.

One of the early contributors to technologies in the Agni Missile was Rohini Devi, who was instrumental in establishing the Composite Production Centre, as part of the Advanced Systems Ltd, Hyderabad.

The backbone behind DRDO's human resources is Hina Gokhale, who assumed charge in July 2017. The organisation has been facing tough times both in attracting the best talent and also stemming attrition rate to drive its projects. With around 5,000 scientists and over 25,000 employees on its rolls, it is a major employer for careers in the country.

Planning and coordination

In the planning and coordination responsibilities, two women who don important roles are Nabanita Radhakrishnan, Director, since 2013 in Planning and coordination of all defence projects and Chandrika Kaushik, interacting with defence services.

‘Defence corridor in Salem will create business avenues for MSMEs’

Salem: An interaction session between representatives of micro, small and medium enterprises (MSMEs) from the city and senior officials of the ministry of defence and Defence Research and Development Organisation (DRDO), technical representatives from Hindustan Aeronautics Limited, Bharat Electronics Limited, Bharat Earth Movers Limited and Ordnance Factories will be held in the city on March 8.

Speaking to TOI, president of the Salem District Small Scale and Tiny Industries Association (SADISSTIA) K Mariappan said the session to promote the defence corridor in Salem will create opportunities for the MSMEs to manufacture various components and machineries for the defence sector.

On January 18, chief minister Edappadi K Palaniswami made a request to the central government and the defence ministry to set up a production facility of Hindustan Aeronautic Limited (HAL) in Salem. “The request is under the consideration of ministry of defence as they are in a process to set up a helicopter manufacturing plant in Salem,” Mariappan said.

He said a team of DRDO Officials, including M Yagaiah, CCE (Works), Lt Col. (Retd.,) S K Dubey, Wing Cdr R S Sangwan and K K J Ravichandran had visited Salem and inspected three areas with an extent of 1,000 acres each on February 6, 2018. They also had discussions with the revenue department officials.

The defence ministry had already conducted such interaction meeting to promote a defence hub at Hosur on February 26. Subsequently, a defence indigenization expo was conducted in Coimbatore on March 5. Collector Rohini R Bhajibhakare will inaugurate the interaction meeting in Salem.

<https://timesofindia.indiatimes.com/city/salem/defence-corridor-in-salem-will-create-biz-avenues-for-msmes/articleshow/63193104.cms>