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Commentary

The India–US Partnership on Sonobuoys

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Summary

The India–US partnership for the co-production of sonobuoys can positively contribute to augmenting India's naval capabilities in the Indian Ocean Region.

India and the US established the initiative on Critical and Emerging Technologies (iCET) on 24 May 2022. The iCET envisages the co-development and joint manufacture of technologies across a range of domains including Artificial Intelligence (AI), Quantum Computing, semiconductors, telecommunications, defence and space.[1] During the visit of the outgoing US National Security Advisor (NSA) Jake Sullivan to India in January 2025, a range of initiatives were announced for producing tangible deliverables under the iCET framework.

Among these initiatives is the first-of-its-kind partnership on co-production of sonobuoys for enhancing Undersea Domain Awareness (UDA) capabilities of both nations.[2] In December 2020, the then Chief of the Naval Staff Admiral Karambir Singh highlighted the strengthening of UDA and Anti-Submarine Warfare (ASW) capabilities as key focus areas of the Indian Navy, in response to a question on the growing Chinese presence in the Indian Ocean Region (IOR).[3]

Overview of the Partnership

Sonobuoys, expendable sonar devices used for subsea mapping of a designated area, play a critical role in UDA and ASW. They can be deployed on the ocean surface by aircraft or surface ships. They are mostly cylindrical-shaped devices that have four key components—a flotation device, a radio transmitter, a saltwater battery and a hydrophone.[4] Upon their deployment, the flotation device keeps the radio transmitter above the water level, while the hydrophone descends into a predetermined depth below the ocean surface. Akin to a microphone, the hyrdrophone detects and records acoustic signals underwater in its vicinity. These signals are then sent via the radio transmitter to aircraft, surface ships or satellites that are monitoring the designated area.

There are broadly three types of sonobouys which are classified as active, passive and special purpose. Active sonobouys operate by emitting a sound pulse (ping) at close intervals and detecting movements from the echo that is reflected back. On the other hand, passive sonars do not emit anything but capture sound waves from ships

[1] **"Fact Sheet: The United States and India Committed to Strengthening Strategic Technology Partnership"**, The White House, 6 January 2025.

[2] Ibid.

[3] Huma Siddiqui, **"Underwater Domain Awareness Main Focus of the Indian Navy: Chief"**, *Financial Express*, 3 December 2020.

[4] Raja Acharya, **"Sono Bouys"**, *Indian Journal of Geo-Marine Sciences*, Vol. 47, No. 9, September 2018, pp. 1723–1726.

and submarines in the vicinity.[5] Special purpose sonobouys are specially equipped for gathering bathythermograph (ocean temperature) and salinity related data. Such special purpose sonobouys are also deployed during Search and Rescue (SAR) operations to ascertain the position of crashed aircraft, sunken ships or survivors stranded in the sea. Mostly, an array of sonobouys are deployed together over a designated area for accurately mapping the undersea topography and monitoring subsurface movements.[6] These sonobouys, once deployed, can remain active for up to eight hours.

In the underwater domain, sonobuoys are used for a variety of military and non-military purposes. They have become an integral part of modern ASW operations, enabling navies to precisely detect and track submarine activity on the high seas. Also, sonobuoys are important for UDA as they can be used for oceanographic research and seafloor mapping. In recent years, the global demand for sonobuoys has witnessed a significant rise. At present, the total value of the global sonobuoy market is estimated to be at US$ 1.2 billion and it is expected to reach around US$ 2.92 billion by 2034.[7] This surge in demand for sonobouys can be mainly attributed to the growing international focus on maritime security that is a key enabler of global trade and economy. Factors like geopolitical tensions, maritime territorial disputes, naval modernisation programmes and undersea resource exploitation are driving factors behind this growing demand.

These factors have also compelled the Indian Navy to initiate efforts to not only procure advanced sonobuoys but also develop them indigenously. The sonobuoys are among the 29 items that the Indian Navy has earmarked for indigenous development in its indigenisation plan document (Swavlamban 2.0 & 3.0).[8] Defence Minister Rajnath Singh's visit to Washington DC in August 2024 laid the foundation for India's partnership with the US to co-produce sonobouys. During this visit, India made a request for the sale of three variants of US manufactured sonobuoys. These include two variants of High Altitude Anti-Submarine Warfare (HAASW) sonobouys which include the AN/SSQ-53G (Passive Sonobouy) and the AN/SSQ-62F (Active Sonobouy). The third variant is the AN/SSQ-36 bathythermal sonobuoy.

[5] Ibid.

[6] Chris Fox, **"Technologies for Ocean Acoustic Monitoring"**, National Oceanic and Atmospheric Administration, 26 August 2022.

[7] **"Sonobuoy Market"**, Fact.MR, Market Research Company.

[8] **"Indian Navy Swalamban 3.0 Document"**, Department of Defence Production, Ministry of Defence, Government of Indian, 29 October 2024.

These sonobuoys are being manufactured by a US-based company Ultra Maritime. This company is a world leader in ASW technologies with a sizable presence in the UK, Australia and Canada.[9] It must be noted that these three variants of sonobuoys are specially designed to be deployed from US origin ASW fixed and rotary wing aerial platforms like the Boeing P-8I Poseidon and the Sikorsky MH-60R. Both these aerial platforms are the mainstay of the Indian Navy's ASW capability. On 23 August 2024, the then US Secretary of State Antony Blinken approved the possible sale of these sonobuoys to India at a cost of US$ 52.8 million.[10]

In consonance with the 'Make in India' policy, these sonobuoys are to be manufactured under a transfer of technology (ToT) agreement between Ultra Maritime and its Indian Offset Partner (IOP) Bharat Dynamics Limited (BDL). These sonobuoys will be manufactured in BDL's production facility in Vishakhapatnam from 2027 onwards. Both companies have also agreed to jointly engage in R&D for advanced sonobuoy technology in line with the iCET.[11]

Adding Depth to India–US Defence Cooperation

As opposed to complex military platforms like submarines and fighter aircraft, sonobouys are relatively simplistic and less expensive technology. However, collaboration between the two nations in the manufacture and operation of sonobuoys implies a very high degree of mutual trust and strategic depth between them. This is because operationally, sonar information is regarded as highly sensitive and confidential. Sharing of operational details about sonobuoy deployment and other underwater surveillance systems may reveal the country's ability to gather information. As a result, nations normally do not share sonobuoy data even with their close allies or strategic partners.[12]

ASW operations broadly encompass four distinct phases, namely detection, classification, tracking and targeting the submarines.[13] Out of these four phases, detection is the most difficult and resource-intensive process. This is because once a submarine submerges into the depths of the ocean, it is very difficult to detect.

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[9] **"Our Operations"**, Ultra Maritime.

[10] **"India-Anti-Submarine Warfare Sonobuoys"**, Defense Security Cooperation Agency, US Department of Defense, 23 August 2024.

[11] Dalip Singh, **"Ultra Maritime & BDL to Co-Produce Sonobuoys for the Indian Navy"**, *The Hindu Business Line*, 7 January 2025.

[12] Ritu Sharma, **"US Pushes Out Indian Navy From P-8 Data Sharing Pact: Ex-Navy Boss Says Interoperability Still a Decade Away"**, *The Eurasian Times*, 22 January 2025.

[13] Allan N. Glennon, **"An Approach to ASW"**, U.S. Naval Institute, September 1964.

Despite the technological advancements after the Second World War, detection remains the most challenging aspect of ASW. This difficulty in detection makes even a crude or obsolete submarine a potent threat to any modern surface ship. The sinking of a South Korean Corvette by a North Korean submarine in 2010 is a testament to this fact.[14]

Detecting submarine activity in shallow waters or chokepoints is relatively easier due to geographic factors. This is because when submarines transit through such geographic areas, they are inevitably funnelled through narrow maritime stretches in proximity to land. Here it is easier to detect and monitor submarine activities through a network of undersea surveillance systems. Such networks may include shore-based listening stations along with arrays of hydrophones and Magnetic Anomaly Detectors (MAD) placed on the seabed.[15] The US Navy's Sound Surveillance System (SOSUS) that was established during the Cold War for monitoring the movement of Soviet Submarines through the GIUK Gap is a notable example of such a network. More recently, China has established such networks in the shallow waters of the East and the South China Sea.

However, detecting submarines in open seas is far more challenging considering the vast expanse of oceans and greater depths.[16] Fixed seabed sensors like SOSUS or mobile towed array sonar systems of surface ships are constrained by their lack of flexibility and limited range. On the other hand, airborne-ASW platforms are more capable of conducting wide-area searches and swiftly engaging submarines due to their speed, endurance and flexibility. The sonobuoys essentially act as the eyes and ears of airborne-ASW platforms. The precision and range of modern sonobuoys to detect submarines in the open seas has been further enhanced through advanced satellite networks and AI algorithms.

In spite of these technological advancements, detecting submarines in the open seas remains highly challenging. This is due to the limited availability of airborne-ASW platforms among navies and the high costs involved in constantly operating them. To some degree, this challenge can be addressed through the pooling of ASW assets and resources among close military allies and strategic partners. Interoperable sonobuoys with secure communication and information exchange systems can enable strategic partners to collaborate in ASW operations directed against a

[14] William J. Toti, **"The Hunt for Full-Spectrum ASW"**, Naval Institute, June 2014.

[15] Levina & the Watcher, **"Indian Submarine Surveillance Network Ready to Catch Chinese Submarines, Japan and America are Partners"**, *Resonant News*, 3 July 2020.

[16] William J. Toti, **"The Hunt for Full-Spectrum ASW"**, Naval Institute, June 2014.

common adversary.[17] In May 2024, the three AUKUS nations namely the US, UK and Australia entered into a trilateral agreement to share the data of their sonobuoys deployed from their respective P-8Is. Observers described this agreement as an indicator of the high level of trust among the AUKUS nations.[18] In this context, the India–US sonobuoy initiative must not only be regarded as another avenue of technical collaboration but also as an indicator of the high level of trust and strategic depth between the two nations.

Conclusion

As India endeavours to strengthen its capabilities in the UDA and ASW domains, the partnership with the US in co-developing sonobuoys is a major step forward in that direction. In the past, such a collaboration would have been difficult to operationalise because of technological incompatibilities. This is because until the recent past, India operated the Soviet-origin Tupolev TU-142 as its principal airborne-ASW platform. But at present, India is technically equipped to undertake this partnership with the US as both countries operate common airborne ASW platforms like the P-8Is and MH-60R. Overall, this partnership will be instrumental in strengthening the Indian Navy's capability to engage in ASW and anti-access/area-denial (A2/AD) operations. This is vital for deterring submarine activities of India's adversaries in the IOR.

[17] Sean R. Liedman, **"Taming Sea Dragons: Maintaining Undersea Superiority in the Indo-Asia-Pacific Region"**, Centre for a New American Security, 2016.

[18] Aaron Mehta, **"P-8 'Trilateral Algorithim' to Hit Field This Year, As AUKUS Pillar II Eyes Quantum Clocks, AI Projects"**, *Breaking Defense Indo-Pacific*, 29 May 2024.

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