

Industrial Consultancy & Sponsored Research (IC&SR)

BUBBLE DIVERTER BOW FOR BOTTOM SONAR TRANSDUCER EQUIPPED OCEANOGRAPHIC AND RESEARCH VESSELS

IITM Technology Available for Licensing

Problem Statement

- ❑ Marine Vessels/Ships are fitted with bottom acoustic transducers that works **by projecting a sonar beam** into bottom space underwater below the ships for measurement purposes.
- ❑ The measurement quality is **affected by bubble streams in the flowing water** under the ship in the acoustic window around the transducer , thus there is a need of a device that can **eliminate the bubbles the region of the transducer.**

Intellectual Property

- IITM IDF Ref. 1465
- IN471384-Granted; PCT/IN2017/050548

Technology Category/ Market

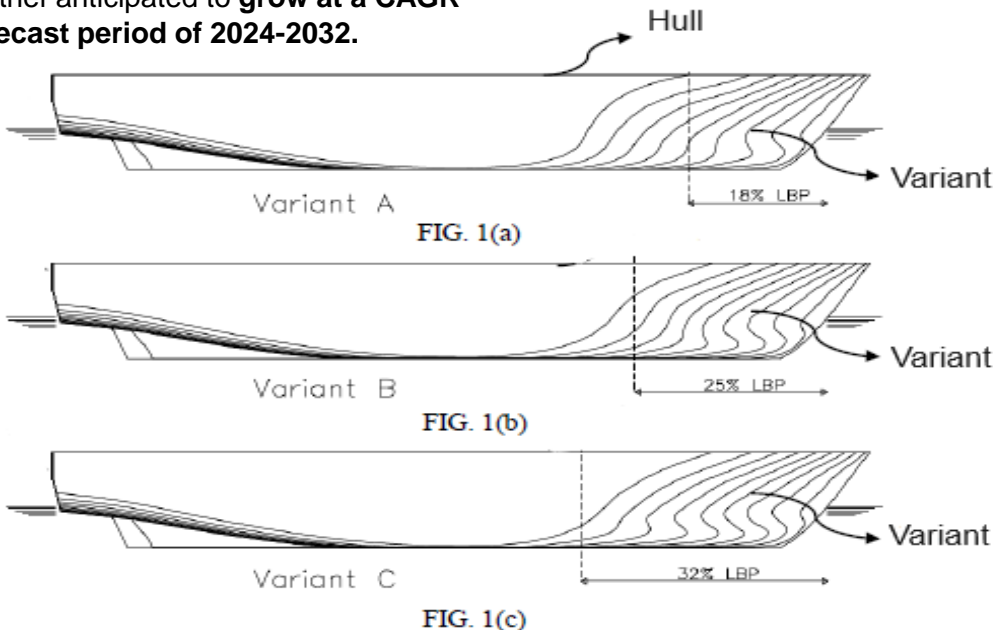
Category – Assistive devices, Manufacturing Applications –Ship spares, marine equipments Industry – Ocean technology Market -The global ship spares and equipment market size attained a value of USD 9.02 billion in 2023. The market value is further anticipated to **grow at a CAGR of 4.4% in the forecast period of 2024-2032.**

Technology

- ❑ The invention discloses bubble-diverter bow for a vessel that comprises a **bottom SONAR transducer equipped oceanographic and research vehicle.**
- ❑ It comprises a **plurality of variants, with predefined geometry parameters** wherein:

- Variants are introduced in a fore-body section of the hull
- Introduced to transform a bulbous bow of the vessel into one with a bulb-less bow.

- ❑ The bubble-diverter bow is designed for low drag in the vessel speed range of **9 knots to 12 knots.**



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Key Features / Value Proposition

Technical Perspective

- ❑ The invention discloses a **bubble diverter bow** in a vessel (ship) for diverting bubbles arising in a **path of transducer in vessel**
- ❑ Designed at **forward hull region (Bubble Diverter Bow)** rather than tweak the appendage shape **at the bottom housing the sonar transducer**
- ❑ Resolves **bubble sweep down** below the region of sonar transducer location by effectively diverting **the flow side-ways and not to the bottom**

User Perspective

- ❑ Capable of achieving both the desirable properties of **effective bubble diversion** combined with **reduced resistance** for the hull form .
- ❑ Useful for the design of research and **naval auxiliary vessels** employing bottom sonar transducers.
- ❑ The plurality of variants is introduced by **controlling the wetted surface of the hull and the total volume of displacement of the hull to maintain a favorable constant.**
- ❑ The said variants comprises an accentuated **U-section shape** with a controlled inflection at sections below under-water beam
- ❑ The **accentuated U-shape comprises a flattened section shape.**
- ❑ It further comprises a **bubble mitigation at the sonar device region.**

Geometry parameters for each variant include:

- ❖ Length parameter variation at each side of the hull.
- ❖ Cross-sectional area parameter variation at a pre-defined forward section.
- ❖ Wetted surface parameter of the bubble-diverter bow.
- ❖ Volume parameter variation of the bubble-diverter bow.

Images

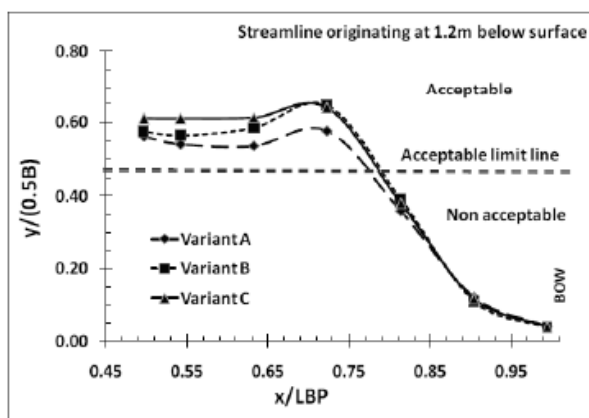


Fig 2. is an illustration of streamline traces for emanating depths of 1.2 m

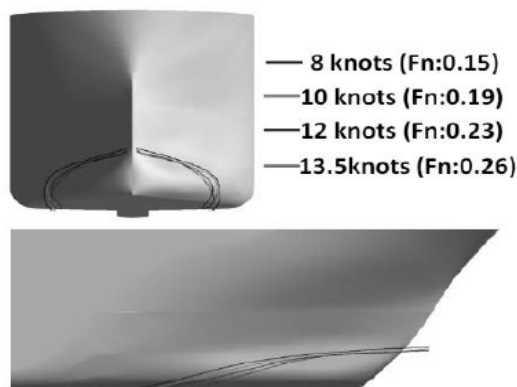


Fig 3 shows Stream-lines generated at 1.2m below free surface as function of different speeds for the bubble diverter bow

TRL (Technology Readiness Level)

TRL-3, Experimental Proof of Concept

Research Lab

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