Concept Note
Webinar on Brahmaputra: UDA-Enabled River Governance for Regional Sustainability, Security and Cooperation
28 Jan 2026 at 1630 hrs IST

Background & Rationale

The Brahmaputra is one of Asia's most dynamic transboundary river systems, flowing across China (Tibet), India, and Bangladesh, and supporting millions of people through its ecological, economic, and cultural functions. Despite its importance, the river faces multiple emerging challenges — climate change-induced hydro-meteorological extremes, sediment dynamics, infrastructure interventions, ecosystem degradation, and growing geopolitical sensitivities.

In this context, emerging frameworks such as **Underwater Domain Awareness (UDA)** and **Marine Spatial Planning (MSP)** offer powerful lenses to re-imagine river governance beyond conventional hydrological or administrative approaches. Applying UDA in a riverine context enables a more holistic understanding of the underwater and sub-surface dynamics of the Brahmaputra — including sediment transport, acoustic regimes, riverbed morphology, habitat distribution, and human-induced underwater noise — which are critical yet often under-addressed dimensions of river management. Similarly, MSP principles, traditionally applied in marine environments, can be adapted to large river basins like the Brahmaputra to enable integrated spatial planning that balances ecological conservation, navigation, infrastructure development, fisheries, disaster management, and livelihood security across its stretches.

In the larger framework of regional sustainability, riverine governance, and climate resilience, the Brahmaputra represents more than just a water body; it is a living socio-ecological system that connects upstream–downstream communities, national development priorities, and transnational cooperation frameworks. There is an urgent need for interdisciplinary dialogue that brings together experts from policy, diplomacy, hydro-sciences, security studies, environmental science, UDA practitioners, MSP experts, and community development professionals.

This webinar intends to create such a platform by integrating perspectives from India, Bangladesh, and other stakeholders while connecting the Brahmaputra discourse to larger themes of **UDA-enabled river monitoring, MSP-informed spatial governance, regional cooperation, sustainable development, climate adaptation, and water diplomacy.**

Objectives

The webinar aims to:

- Highlight the **strategic, ecological, and socio-economic importance** of the Brahmaputra River.
- Discuss contemporary **challenges related to climate change, flooding, sediment, and riverbank erosion**.

- Explore the **geopolitical and diplomatic dimensions** of the Brahmaputra as a transboundary river system.
- Encourage regional cooperation frameworks for **sustainable river governance and resilience-building**.
- Connect riverine systems with broader concepts of **Blue Economy, water security, and regional stability**.

Expected Outcomes

- Enhanced understanding of Brahmaputra's multi-dimensional significance.
- Cross-border perspectives on cooperative river governance.
- Generation of policy-relevant insights and future collaboration pathways.
- Documentation of key discussions for further dissemination and research.

Proposed Schedule (2 hrs)

- **10 minutes** – *Inaugural Address* – **Dr (Cdr) Arnab Das**
- **30 minutes** – *Keynote Presentation* – **Ms. Tejaswini Kaktikar**
- **15 minutes each** – Expert Interventions by:
  - **Dr. Asit K Biswas**
  - **Dr. Emadul Islam**
  - **Dr. Anamika Barua**
  - **Amb Tariq A Karim (Retd)**
- **15 minutes** – *Concluding Remarks* – **Amb Jaideep Mazumdar (Retd)**
- **10 minutes** - *Closing Remarks* – **Mrs. Cathrine J**

Convenor

Dr(Cdr) Arnab Das, Founder & Director,
Maritime Research Center (MRC), Pune.
Mobile - +91-9665033463
Email – director@maritimeresearchcenter.com

Enclosure 1

Underwater Domain Awareness (UDA) Framework

Dr (Cdr) Arnab Das

The concept of Underwater Domain Awareness (UDA), in a more specific sense, will translate to our eagerness to know what is happening in the underwater realm of our maritime areas and the freshwater systems. This keenness for underwater awareness from the security perspective means defending our Sea Lines of Communication (SLOC), coastal waters, and varied maritime assets against the proliferation of submarines and mine capabilities intended to limit access to the seas and littoral waters. The freshwater systems, particularly the transboundary Rivers, are not defended by the Navy & the Coast Guard, but these waters are equally vulnerable and more complex to manage. However, military requirements may not be the only motivation for generating underwater domain awareness. The earth's underwater geophysical activities have a lot of relevance to the well-being of humankind, and monitoring them could provide vital clues to minimize the impact of devastating natural calamities. The commercial activities in the underwater realm need precise inputs on the availability of resources to effectively and efficiently explore and exploit them for economic gains. Underwater resources include fisheries, aquaculture, seaweeds, pharma ingredients, minerals, and others with significant market value. The regulators, on the other hand, need to know the pattern of exploitation to manage a sustainable plan. The connectivity through the water bodies has been recognized as the most effective and efficient mode of transportation, however, ensuring navigability in these water bodies requires a massive amount of UDA. With so many commercial and military activities, there is a significant impact on the environment. Any conservation initiative needs to precisely estimate the habitat degradation and species vulnerability caused by these activities and assess the ecosystem status and climate change risk. The scientific and research community needs to engage and continuously update our knowledge and access of the multiple aspects of the underwater domain. The global community is looking at the Indo-Pacific strategic space for their geopolitical and geostrategic engagements. The Indo-Pacific region, by definition, is the tropical waters of the Indian and Pacific Oceans. The tropical waters present unique challenges and opportunities regarding rich biodiversity and resource availability. However, the sub-optimal sonar performance is the biggest issue, limiting the UDA in these regions. The sonars that were designed for the temperate & polar waters of the Greenland, Iceland, United Kingdom (GIUK) gap during the Cold War era suffered 60% degradation when deployed in tropical waters. The developing nations in tropical waters need to customize these technologies to suit their conditions. The Western nations that are pushing this hardware do not have the manpower to deploy it. In contrast, the tropical nations, have the manpower but lack the appreciation of the technology and the know-how. The proposed UDA Framework, presented in the figure below, can optimize resource deployment and provide nuanced policy and technology intervention, along with acoustic capacity & capability building to manage the tropical challenges and opportunities. There is significant fragmentation among all four stakeholders, namely Strategic Security, Blue Economy, Sustainability & Climate Change Risk Management, and Science & Technology (Digital Transformation), and the UDA framework provides a comprehensive way forward for the stakeholders to engage and interact.

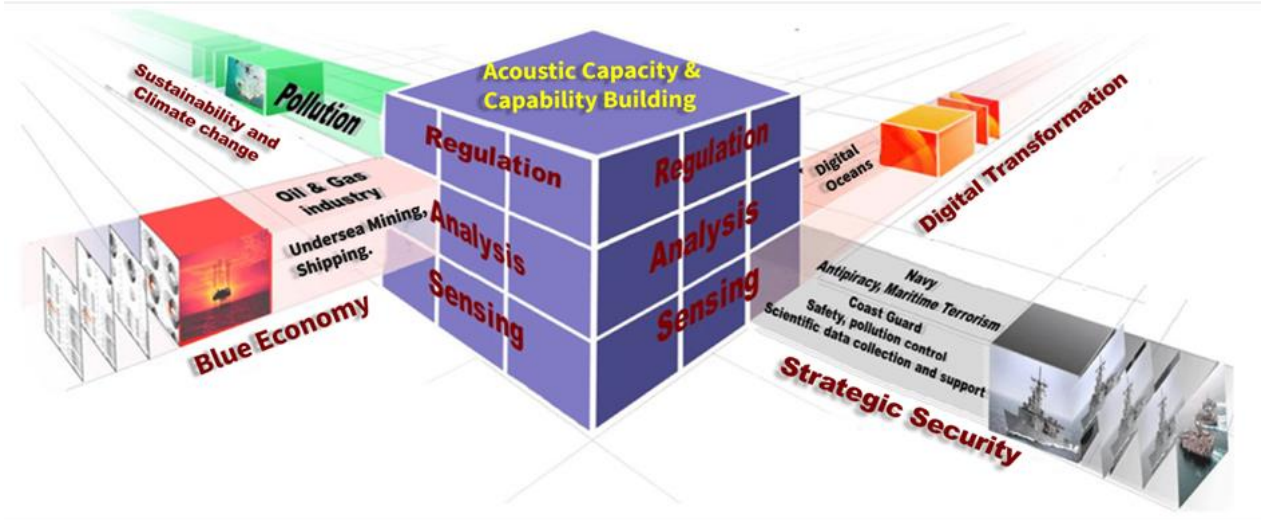

Figure. Comprehensive Perspective of the UDA Framework

On a comprehensive scale, the UDA Framework needs to be understood in terms of its horizontal and vertical construct. The horizontal construct would be the resource availability in terms of technology, infrastructure, capability, and capacity specific to the stakeholders or otherwise. The stakeholders represented by the four faces of the cube will have their specific requirements, however, the core will remain the acoustic capacity and capability. The vertical construct is the hierarchy of establishing a comprehensive UDA. The first level, or the ground level, would be the sensing of the underwater domain for threats, resources, and activities. The second level would be making sense of the data generated to plan security, conservation, and resource utilization strategies. The next level would be to formulate and monitor regulatory framework at the local, national, and global levels. The individual cubes represent specific aspects that need to be addressed. The 'User-Academia-Industry' partnership can be seamlessly formulated based on the user requirement, academic inputs, and the industry interface represented by the specific cube. It will enable a more focused approach and a well-defined interactive framework. Given the appropriate impetus, the UDA Framework can address multiple challenges being faced by the global community today. Meaningful engagement of the young and aspirational population is probably the most critical aspect that deserves attention. Multi-disciplinary and multi-functional entities can interact and contribute to synergize their efforts towards a larger goal seamlessly.

The UDA Framework is a structured, comprehensive, and inclusive framework to drive the underwater domain effectively and efficiently. The structured approach will minimize the fragmentation among the stakeholders, regional players, national authorities, and local bodies. The multiple entities will have divergent interests and priorities, thus, converging them into one single and focused governance mechanism will be a challenge. The governance mechanism must be comprehensive and recognize all dimensions of the stakeholder requirement. The

dimensions include varied layers that are instrumental in building a strong governance mechanism. The first layer would be five pillars: research, skilling, academia, innovation, and policy. The second layer is its translation into policy & technology intervention, along with acoustic capacity & capability building. The inclusive aspects include varied socio-economic, socio-political, and socio-cultural native groups in the larger governance framework. The varied socio-economic strata of the society, particularly the coastal & riverine communities, get excluded in the conventional development models. The students need to prepare for real-world challenges and get very late before they get exposed to the nuances of real-world issues. The political spectrum is always driven by the social structure, based on left or right leanings. The governance mechanism has to address the concerns and aspirations of both sides. The cultural divide translates to the traditional practices and beliefs that drive their livelihoods and social structure. The governance mechanism has to address these divides and integrate everyone into one national, regional, or global framework.

The global community is also professing the triad of people, economy, and nature for enhanced governance mechanisms. The people component includes the livelihood, well-being of the native communities, social dynamics, and more. The economic component is the growth and prosperity associated with the activities. The nature component addresses sustainability and climate change risk management. This is also measured in terms of the Environmental, Social, and Governance (ESG) formulation. The UDA Framework is consciously addressing all these varied measures of global good parameters.