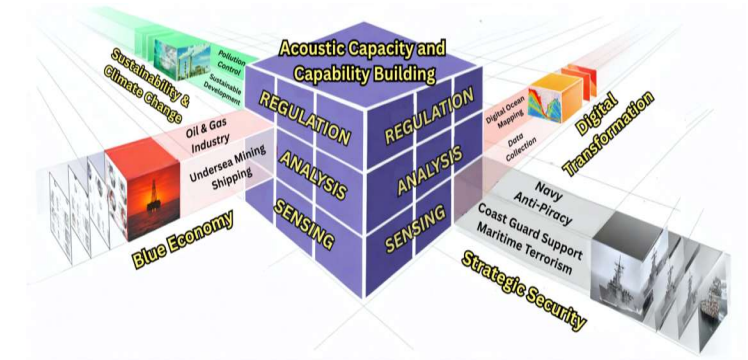




MARITIME
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FOUNDATION FOR UNDERWATER DOMAIN AWARENESS

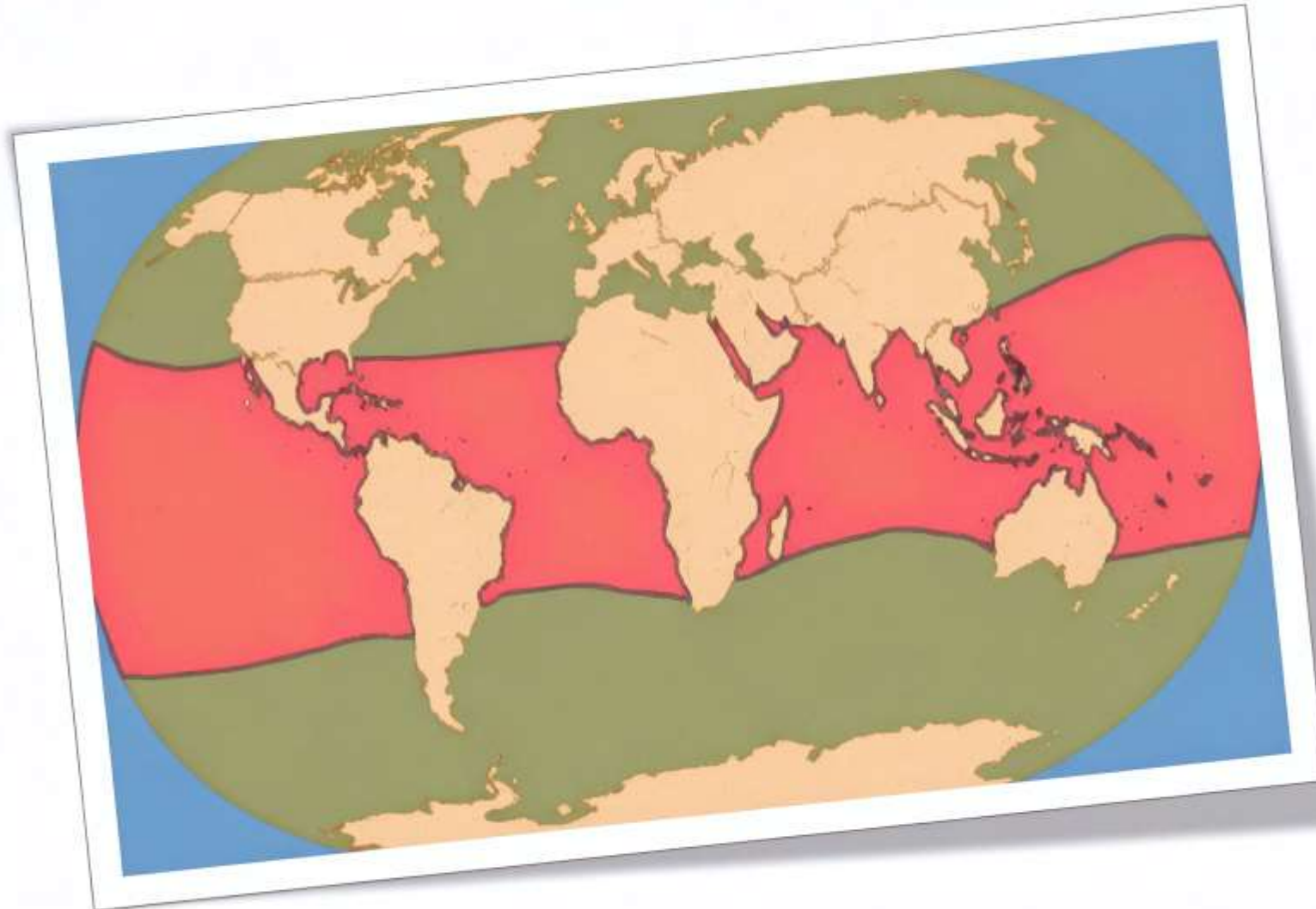


Comprehensive Perspective of the UDA Framework

UDA Framework for Safe, Secure, Sustainable Growth for all in the New Global Order

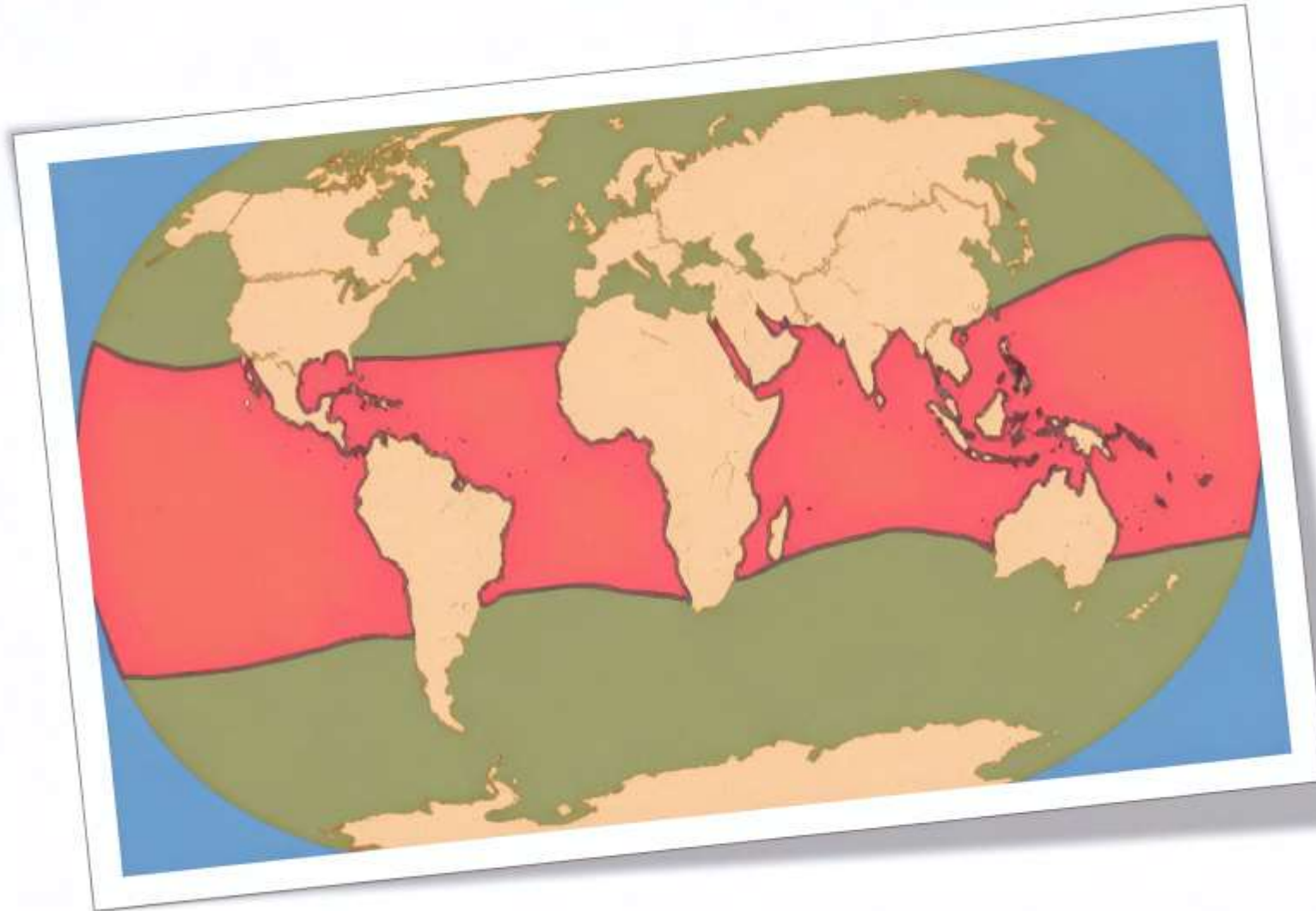
Dr. (Cdr.) Arnab Das, Founder & Director, MRC Pune

Unique Tropical Opportunities



- **Rich Bio-Diversity**
- **High Population Density**
- **High Undersea Mineral Resources**
- **Civilizational Legacy**
- **Aspirational Young Demography**
- **Huge Potential for Growth**

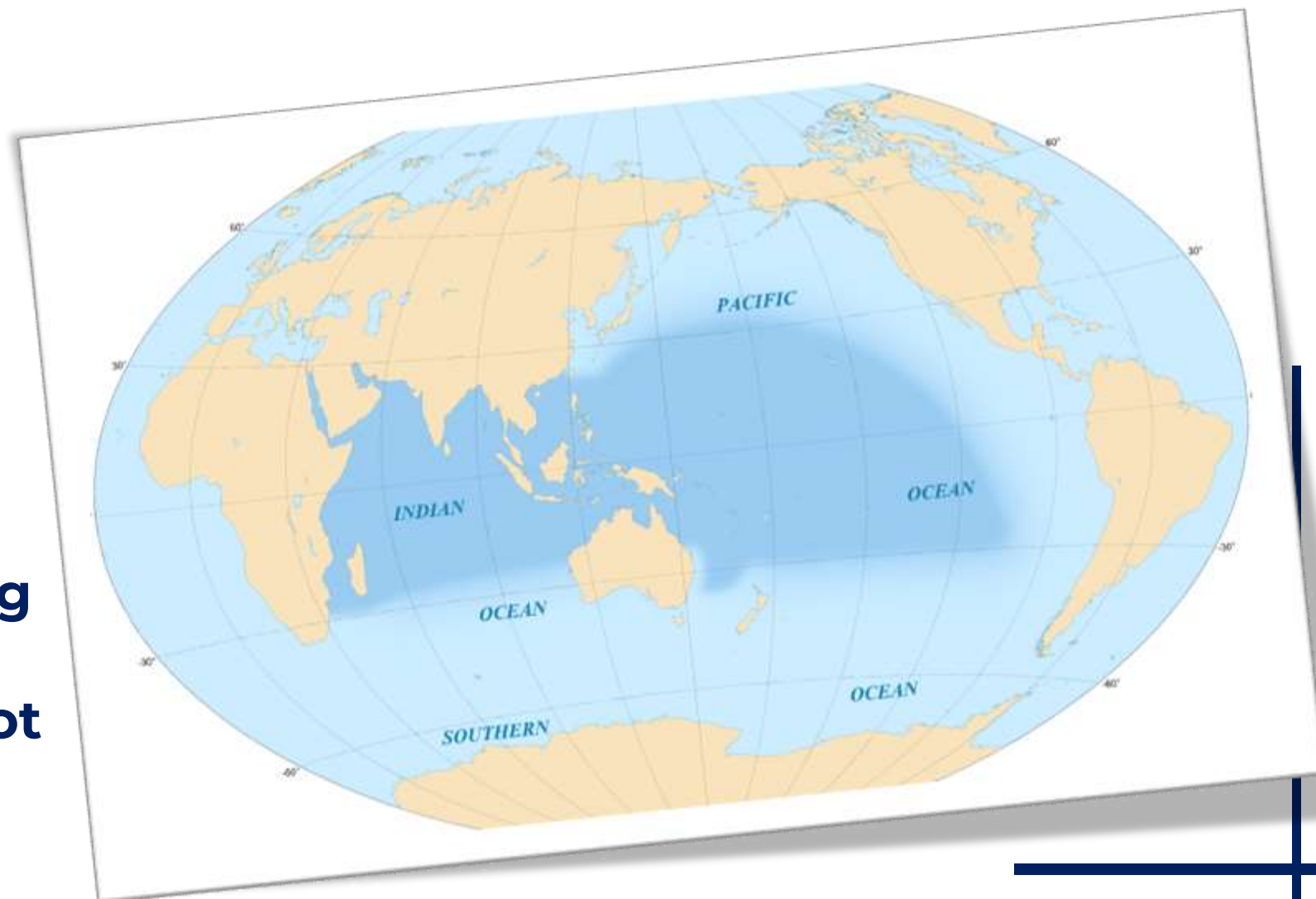
Unique Tropical Challenges



- **Situational Awareness is Poor**
- **Massive Sonar Performance Degradation**
- **Over Dependence on the West for Technology & Knowhow**
- **Civilizational Legacy Ignored**
- **Governance Challenges**

Indo-Pacific Strategic Space

The Indo-Pacific Strategic Space, pans out in the tropical littoral waters, thus they need local site-specific field experimental R&D efforts. The ongoing import of technology does not work in these waters.



Typical Challenges

Policy Intervention.

- **Lack of Awareness on the Challenges & Opportunities**
- **Fragmentation in Approach**
- **Over Dependence on the West for Knowhow**

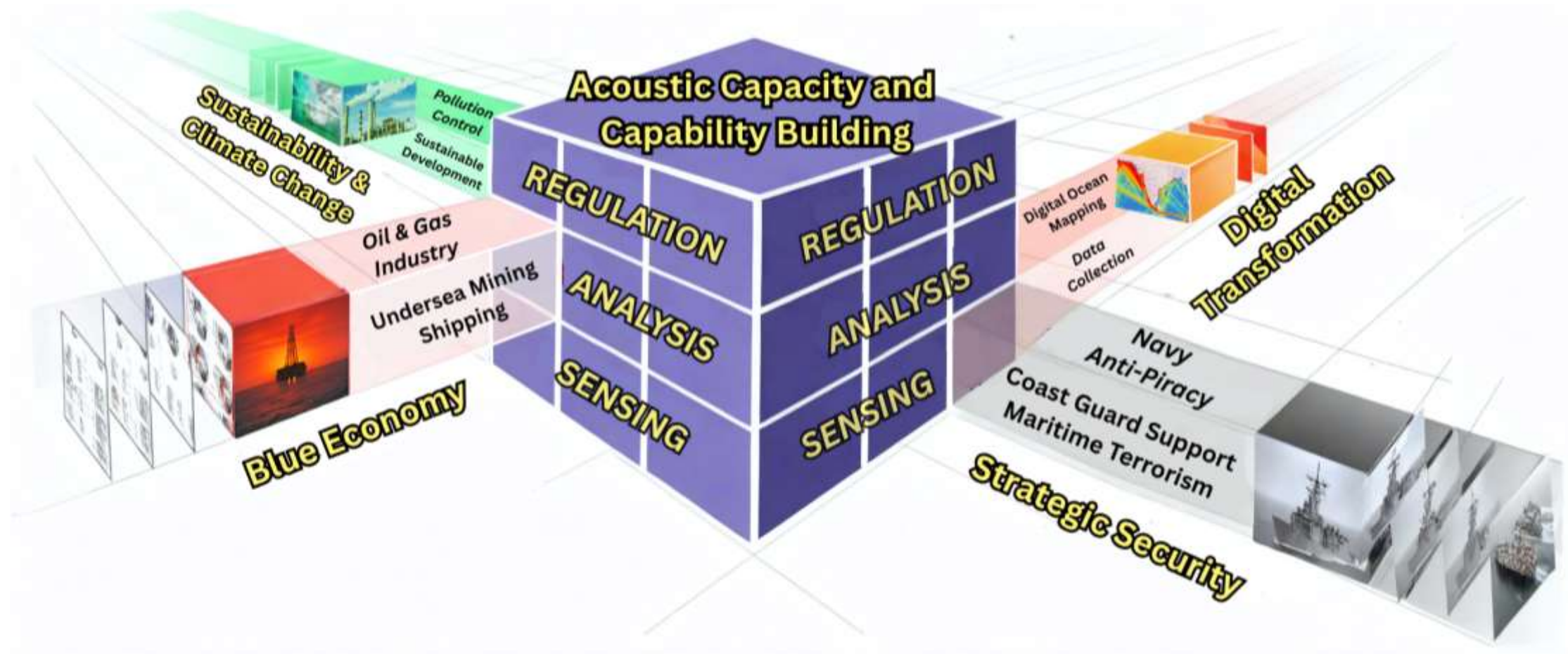
Technology Intervention.

- **MSP needs Whole of Nation Approach**
- **Indigenous Effort, Customized to the Tropical Waters**
- **Good Governance through Digital Transformation**

Capacity & Capability Building.

- **Research, Innovation, Skilling, Knowledge & Strategy**
- **Field Experimental R&D driven**
- **Comprehensive, Structured and Inclusive**

UDA Framework



UDA Framework

Policy Intervention

Global Policy

Regional Policy

National & Local Policy

Technology Intervention

Acoustic Signal Processing

Data Analytics

Marine Spatial Planning

Capacity & Capability Building

Research & Innovation

Knowledge & Skilling

Strategy & Policy

Strategic Perspective

People

Coastal/Riverine Communities
Inclusive Governance
Livelihood Potential

Economy

Connectivity through Water
Vast Underwater Resources
Energy Security

Nature

Climate Change Risk
Sustainable Blue Economy
Acoustic Habitat Degradation

Marine Spatial Planning Toolkit



Marine Spatial Planning Indian Ocean Region



Acoustic Capacity & Capability Building

To See.

- Sensors of appropriate specifications
- Platform to carry the sensors
- AUVs and Surface Platforms

To Understand.

- Pre-processing (noise, channel, equipment)
- Processing (application specific)
- Post Processing (acquisition & processing)

To Share.

- Real-time Sharing of Inputs
- User Friendly Format of Inputs
- Displays and Portable Devices

Indigenous Effort

Modelling & Simulation (M&S) in tropical waters

- **Underwater Channel Condition**
 - **Diurnal**
 - **Seasonal**
- **Ambient Noise in the Region**
 - **Across the Spectrum**
 - **Varied Sources**

Source-Path-Receiver Model

- **Source Across Applications**
- **Tropical Path in varied Conditions**
- **Receiver Characterization**

Shallow Water Acoustic Measurement (SWAMs)

Way Forward

Outreach

Webinars/Seminars

Workshops

Round Tables/Panel Discussions

Engage

Internships/Fellowships

Corporate Training Programs

Partnerships/Collaborations

Sustain

Academic/Skilling Programs

Technology/Policy Projects

Consultancies

100 Coastal River/Water Warriors

High End Data Analytics.

- Hardware
- Artificial Intelligence (AI)
- Computational Infrastructure

Domain Knowledge.

- Acoustic Survey & Robotics
- Social Engineering & Livelihood
- Geopolitics & International Relations

Field Deployment Specialists.

- Local Coastal & Riverine Communities
- Traditional Knowledge & Practices

Coming Together is a Beginning; Keeping Together is Progress; Working Together is Success.

~Henry Ford



THANK YOU!

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