

# Hydrospatial Intelligence

**The Unseen Engine for  
Water Security, Decarbonized Mobility  
& Blue Tech Entrepreneurship**



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i4-Marine Technologies, Pune: India**

# The Critical Question

With India's vast water infrastructure, are our decisions **based on data or on decades-old assumptions?**

India has invested massively in its water assets—dams, rivers, and thousands of kilometers of coastline. These are the lifelines of our economy and communities.

Yet, the intelligence used to manage them, mitigate risk, and plan for the future remains dangerously outdated.



# India's Water Infrastructure Runs Blind

*Our sector is starved for real-time, machine-readable insights.*

## Commitment:



- **Massive Investment**



- **Critical National Assets**



- **Ambitious Policy Goals**

## Reality:



- **Data Silos**



- **Outdated, Static Reports**



- **No Real-Time Insights**

*This data gap means climate adaptation, risk financing, and asset resilience lag years behind our ambitions, creating unseen liabilities.*



# Market Reality:

Hundreds of Crores Spent & budgeted

## No focus on Indigenous Innovation

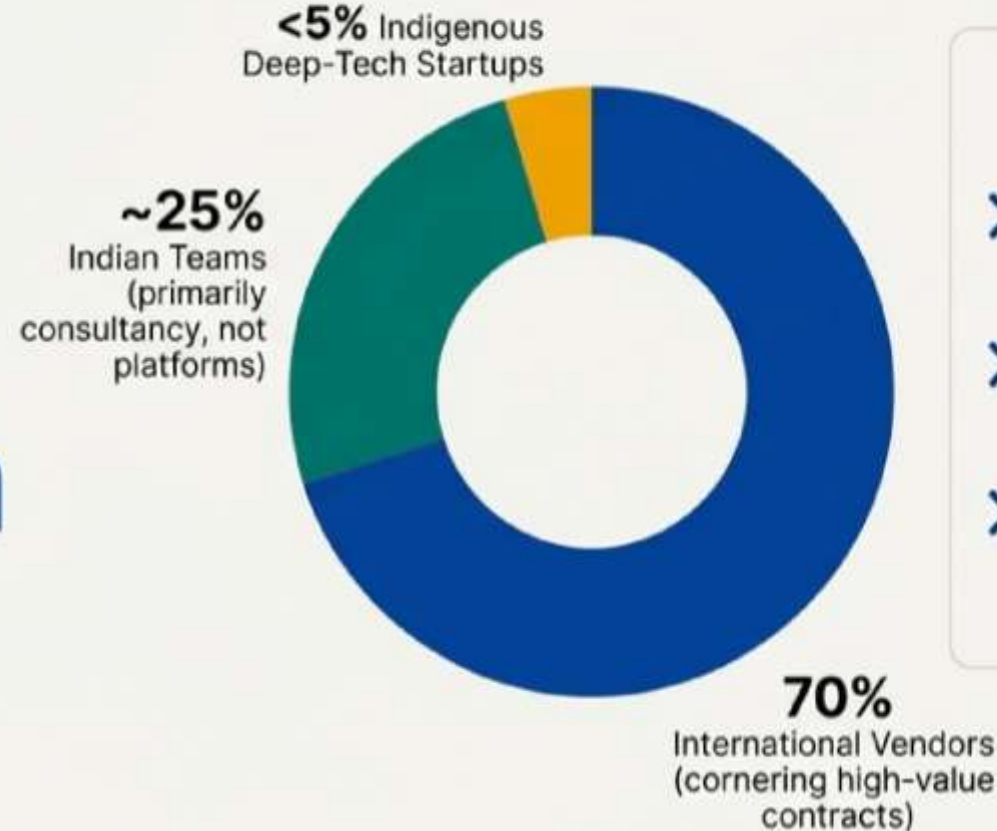
# ₹120 Cr+

Cumulative Spend on bathymetric & sedimentation surveys in the last 5 years.

# 500+ sq km

Area surveyed across reservoirs, rivers, and coastal zones.

### Generic Service Provider Mix



### The Gap

- ✗ Zero real-time platforms
- ✗ Zero open-data workflows
- ✗ Zero predictive intelligence systems



# Why We Remain Tech Consumers

## Instead of Intelligence Producers

### Current Reality:



- Single-vendor data contracts create proprietary, unshareable formats



- CWC, IWAI, and State Governments operate in isolation with no national archive



- **Heavy dependence on imported equipment and legacy workflows**

### The New Way:



- An open hydrospatial data stack built for interoperability (GeoTIFF, LAS, HDF5)



- **Indigenous development & production of Equipment, Platform and protocols for Data Generation**



- Indigenized & Democratized marine spatial intelligence for all mission stakeholders



# The i4-Marine Response:

## Autonomous Survey & Inspection



# The i4-Marine Response: Autonomous Survey & Inspection

## Modular Constructions:

For Rapid deployment  
Offering range of options for  
hardware and communication

## PPK-GPS Integration:

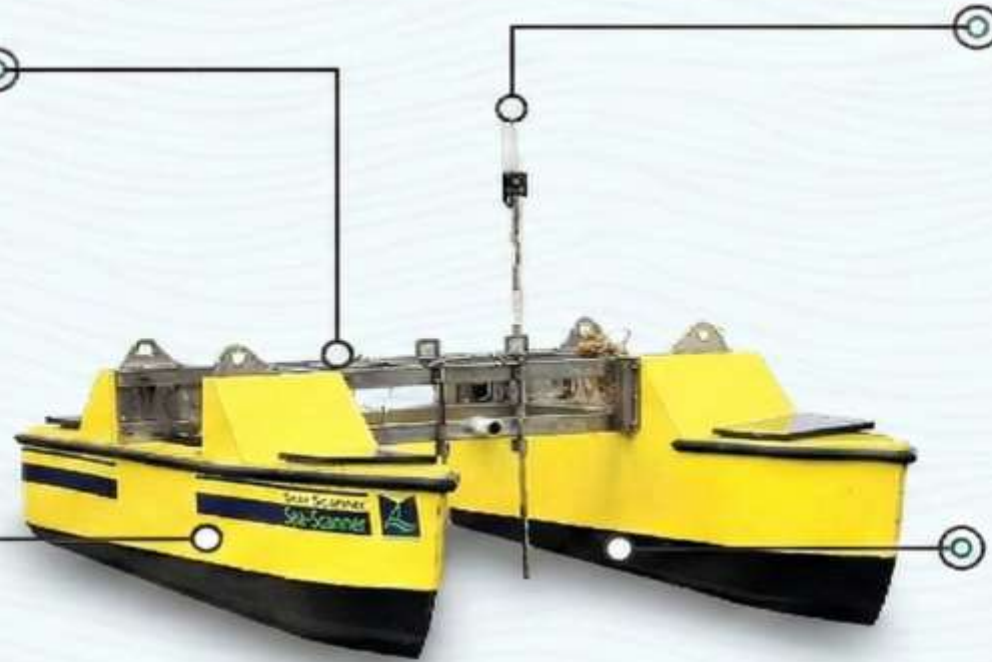
For accurate geospatial  
positioning

## Hydrodynamic Design:

Stable, Silent hull with  
Green Mobility

## Advanced Bathymetric Sensors:

For precise, real-time sedimentation  
volume analytics



## Coverage:

Rivers | Creeks | Coastal Zones |  
Reservoirs | Lakes



## Scale:

10-50 sq km per deployment, enabling  
continuous monitoring vs. annual snapshots



AquaScanner in action at a dam near Pune



# Blue Mobility: More Than a Boat, A Moving Data Platform

**Continuous  
Bathymetry Logging**



**Water Quality Analysis  
(pH, turbidity, DO)**



**Micro-Drone  
Launch & Recovery**



**Rural Logistics &  
Payload Delivery**



**Fisheries Stock  
Assessment**



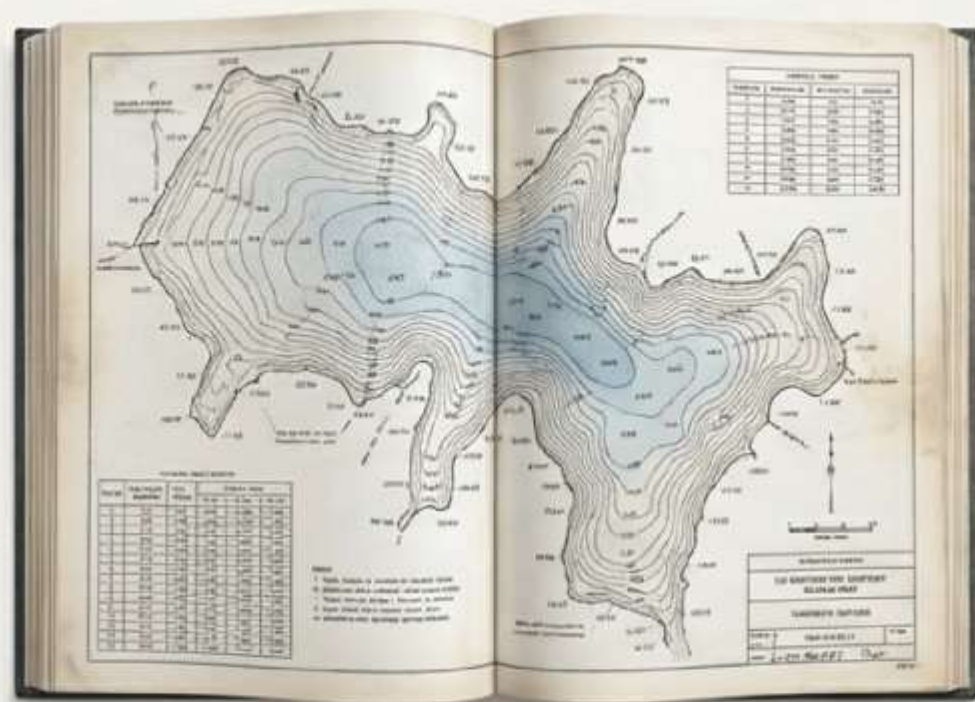
Every boat run becomes a  
data acquisition event for  
the national hydrosatial  
archive

**Inland Waterway  
Navigation Mapping**



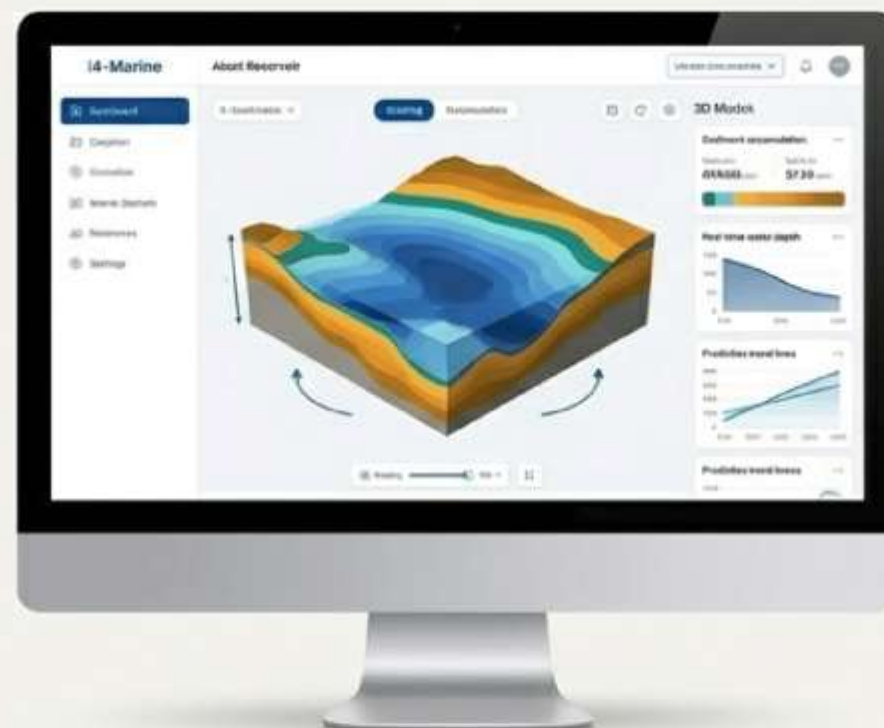
# From Static Reports to Living Intelligence

## Before



Annual, labour-intensive, and outdated upon delivery.

## After



Living, actionable, and predictive intelligence, updated continuously.



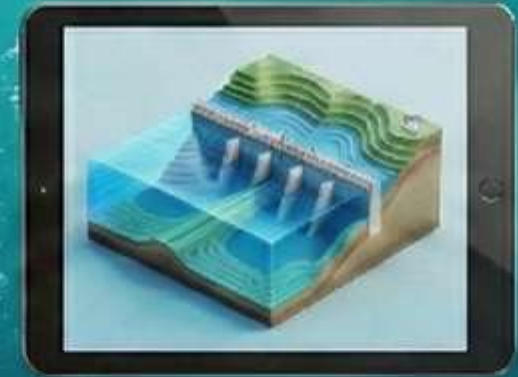
# Vision- Raw Data to a Living Digital Twin



**Autonomous Data  
Acquisition**



**Cloud-Native  
Processing & Analytics**



**Site-Specific  
Digital Twin**

**Output:  
Actionable  
Intelligence**

- Proactive dam health risk mapping
- Predictive asset and siltation management
- Sedimentation volume analytics for reservoir longevity and flood control
- Real-time mapping of waterbody morphologies for infrastructure planning



# India's Innovation Leap Must Be Exponential, Not Incremental

To shift from a tech consumer to an intelligence producer, we need visionary policy. We must mandate the future, not just procure the present.



## 1. Build Open Hydrospatial Data Ecosystems:



## 2. Implement Digital Twin Mandates:

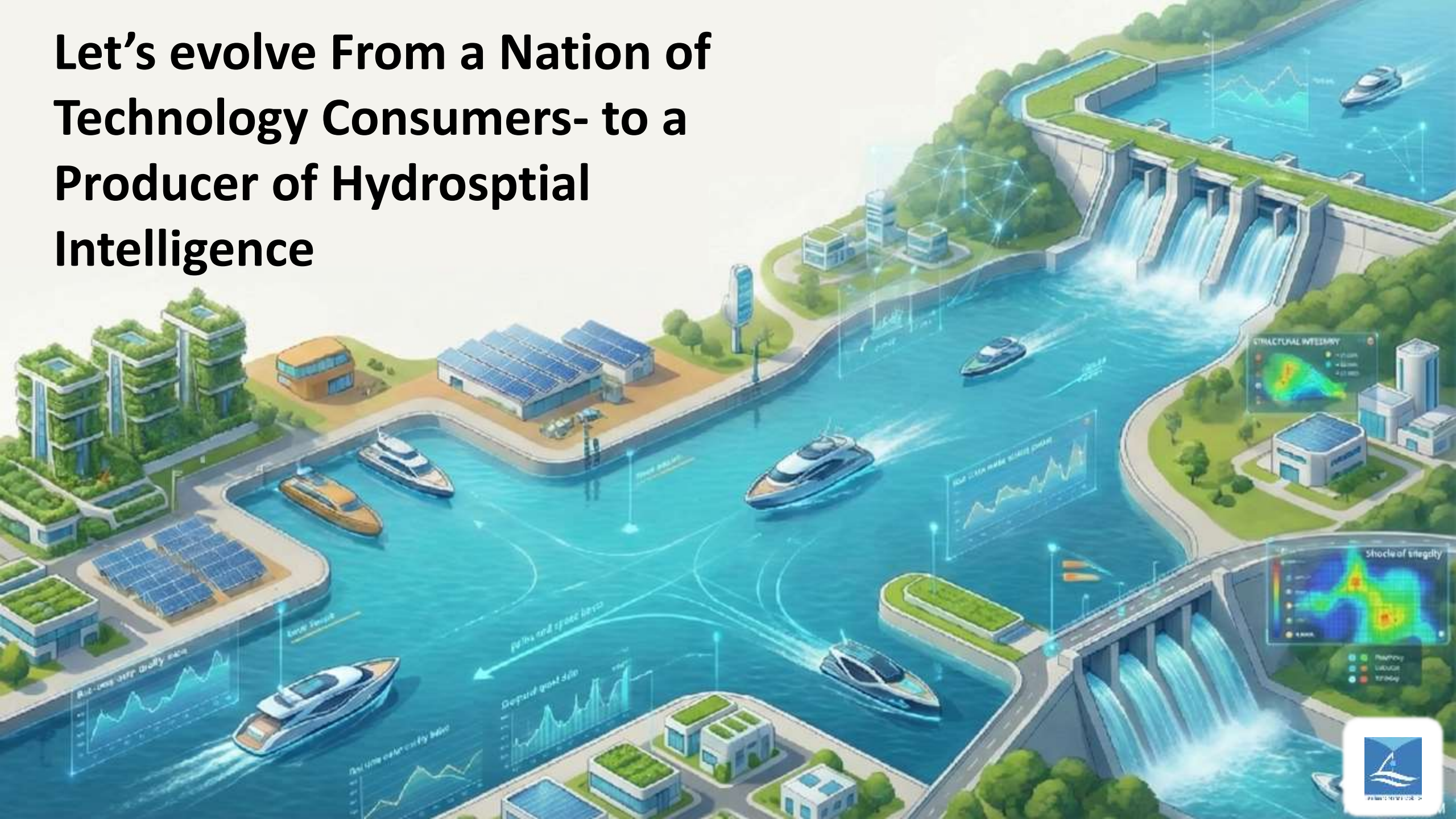


## 3. Enforce Real-Time Interoperability

PPP models to build  
a National Marine Spatial Data Infrastructure (NMSDI)



# Let's evolve From a Nation of Technology Consumers- to a Producer of Hydrosptial Intelligence





- **Globally Competitive Marine Tech**
  - **Data-Driven Decision Making**
    - **Climate-Resilient Infrastructure**



# The Startup



The team i4marine Technologies is a Start Up company, founded by experience product designers

With a Vision to Design, Develop and Manufacture  
**Innovative Autonomous Surface and Underwater Vehicles and Systems for Marine Applications**



**Alok Mukherjee,**  
Group Director –  
Robotics, DRDO, Pune



**Sanjeev Afzulpurkar,**  
Head Marine Instrumentation,  
NIO, Goa



**Raja Mahbubani,**  
IITB Alumni Electronics  
System Design



**Sunny Sebastian,**  
Experienced Boat builder



**Prakash Khanzode,**  
NID + VJTI , Mech. Engineer  
& Product designer

1. Innovation of State-of-the-art Autonomous Systems
2. Pioneering Intelligent Aquatic Platforms
3. Integration of Multiple Green technologies on-board
4. Smart Technology Application
5. Realization of Make in India products

**Building Novel Technologies that are Endorsed, Supported and Funded by**



IIT Mumbai



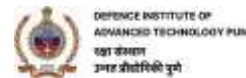
IIT Hyderabad



IIT Delhi



IIT Guwahati



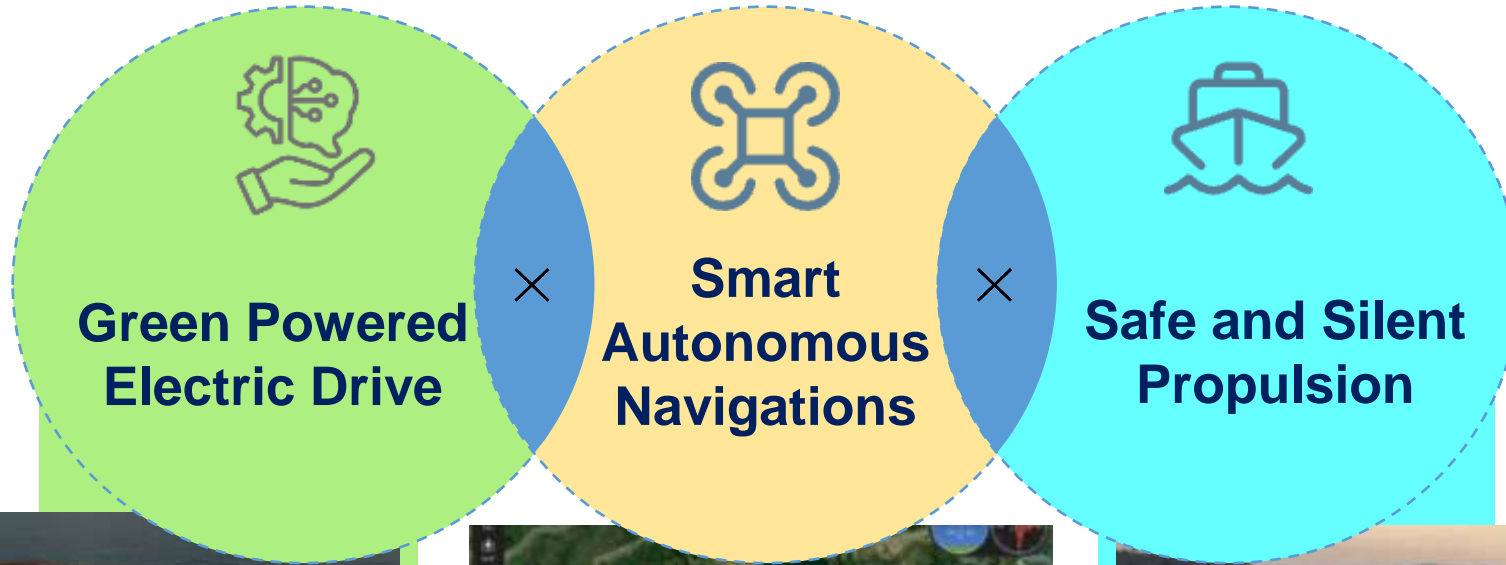
**Academic & Technology Collaborations**



**Industry Partners**

# Our Focus

All technologies and the products are designed and developed manufactured in-house. These are not sourced or traded products



**Battery & Solar Powered**



**Innovative Navigation Tech**



**Marine Propulsion Tech**

# The Winner at

# MAHARASHTRA STARTUP WEEK 2025



For the Vision to Design, Develop and Manufacture  
Innovative Boats and Underwater Vehicles for Marine Applications

The collage features three main elements. On the left is a digital award announcement with a light blue background and green confetti. It displays the i4 Marine Technologies logo (a blue book with a green wave and a white star in a circle) and the text: "i4 Marine Technologies is declared a Winner MAHARASHTRA STARTUP WEEK 2025". Below this, it states "Out of 1400+ innovative startups across Maharashtra". In the center is a photograph of three people (two men and one woman) standing in front of a backdrop that reads "MAHARASHTRA STARTUP WEEK 2025". One man is presenting a framed certificate to another man. On the right is a close-up of the framed certificate. The certificate is from the Maharashtra State Innovation Society, Department of Skills, Employment, Entrepreneurship & Innovation, Government of Maharashtra. It reads: "MAHARASHTRA STARTUP WEEK 2025 Certificate of Recognition This is to certify that, i4 Marine Technologies P. Ltd., Pune has been recognized as one of the Top 100 Startups in Maharashtra Startup Week 2025, organized by the Maharashtra State Innovation Society, Government of Maharashtra. This recognition is awarded in appreciation of your innovation towards solving key challenges through your groundbreaking solutions." The certificate is signed by Manisha Verma, IAS, Additional Chief Secretary, and Nitin Patil, IAS, Chief Executive Officer.

# The Blue Economy Revolution Starts Beneath the Waterline

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#BlueEconomy #HydrospatialIntelligence #GeoSmartIndia

