Government of India
Ministry of Micro, Small & Medium Enterprises

MSME IDEA Hackathon 5.0

Mention the Project Title of the Proposed Idea or Innovation

Team members' details

Sl.No.	Name (Start with Applicant/Incubatee)	Student Reg. No.,Class, Dept..	Mobile No./Email	Industry details (If others / entrepreneurs / MSMEs)	Aadhar No(Mandatory) / Udhyog Aadhar No/ Udyam Registration (If any)
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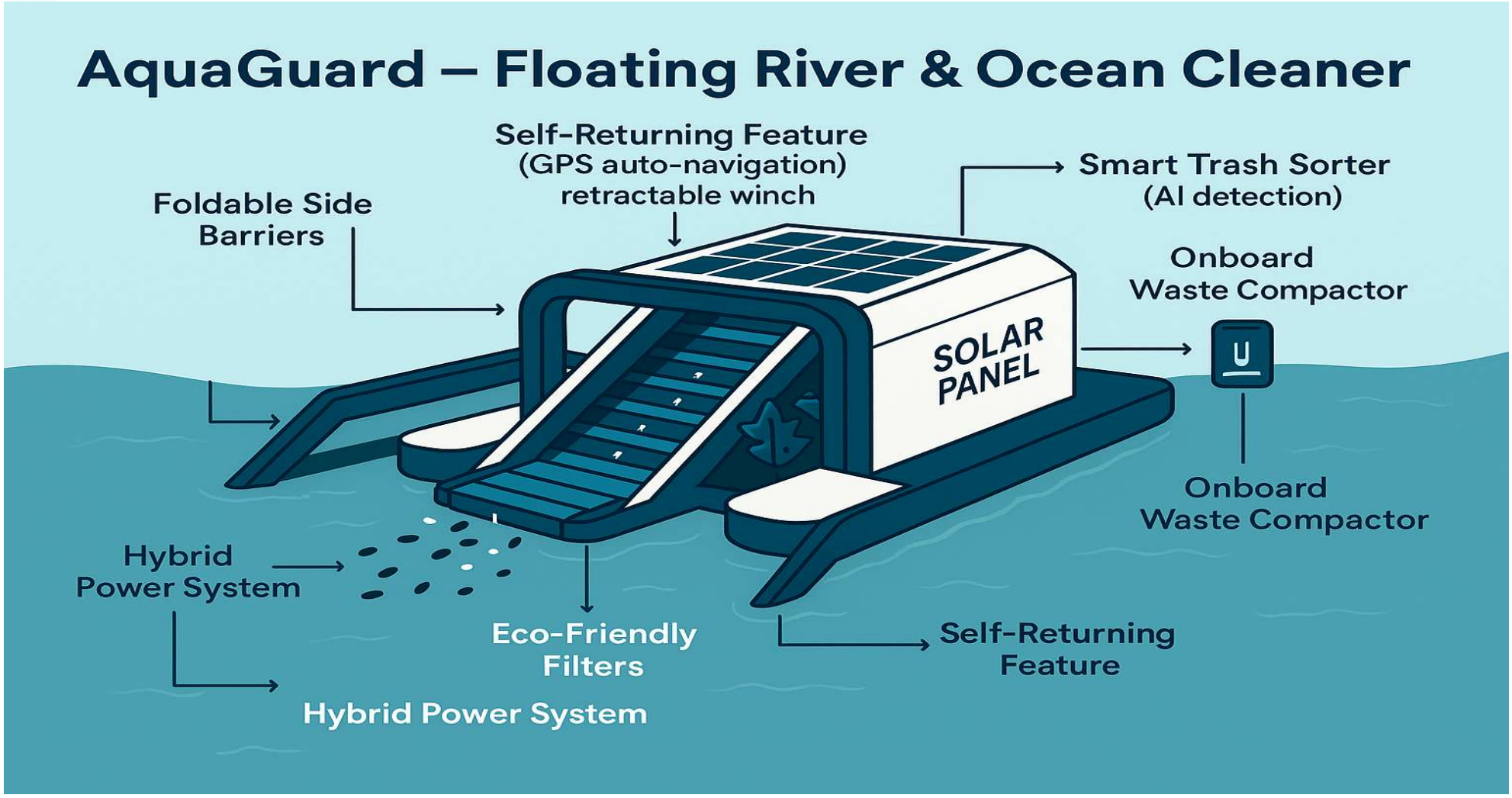
INNOVATION AND SUSTAINABILITY IN COASTAL AREAS



Problem Identification

- Every year, **over 11 million metric tons of plastic waste** enter the ocean, and **up to 80%** of it comes from rivers.
- **Floating waste** clogs waterways, harms marine animals, and breaks down into **microplastics** that contaminate the food chain.
- Current cleanup solutions are **slow**, **labor-intensive**, and **fuel-powered**, making them costly and environmentally unsustainable.
- Collected waste often fills boats quickly, forcing frequent trips to shore, which increases operational costs and reduces cleanup efficiency.

Background for getting the idea/innovation

a. Who it is for?

b. Coastal towns, riverfront cities, ports, and environmental NGOs.

c. What will it do?

d. Autonomous Cleanup – Patrols rivers, harbors, or coasts using GPS, guiding waste in with foldable barriers

e. Microplastic Filtration – Cleans return water by capturing harmful microplastics safely.

f. Onboard Compaction – Compresses collected waste to maximize storage and reduce offloading trips.

g. Renewable Operation – Runs entirely on solar power with tidal/battery backup, returning to dock automatically when full or low on power.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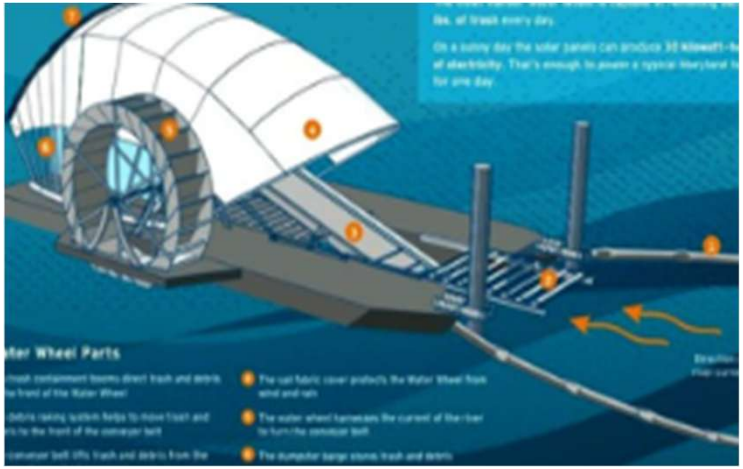
Credit: PhilAugustavo
175456543

Newness/uniqueness of the innovation



TRASH TRAPPING MODULE

- **Extended arms or net structure**
- **Guides floating trash toward the intake**

TRASH GATHERING MODULE

- **Conveyor belt or suction mechanism**
- **Transfers debris into the trash container**

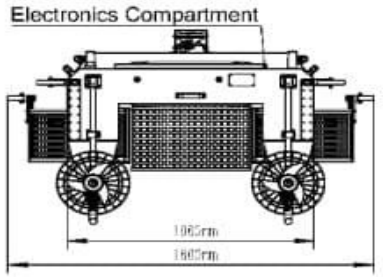
POTENTIAL ENHANCEMENTS

- **Solar-powered operation**
- **AI-based obstacle detection**
- **Modular storage bins**
- **GPS tracking and remote monitoring**
- **Real-time pollution data reporting**

DUAL-STAGE CLEANING

Removes both large waste and microplastics from water.

Objective(s) of the idea/innovation



Major Components

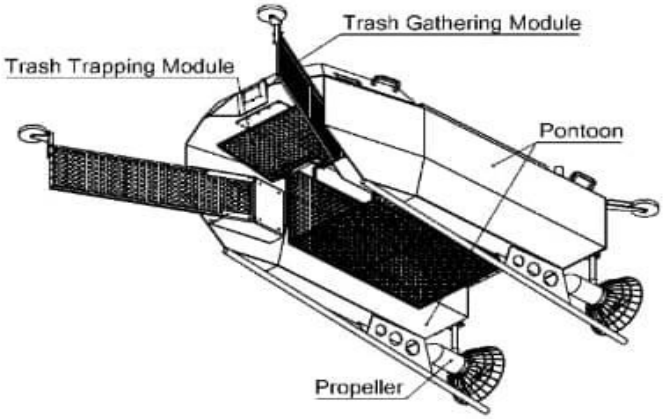
- **Trash Container**
  - *Stores collected debris*
  - *Large capacity for extended operation*
- **Electronics Compartment**
  - *Contains sensors, controllers, batteries*
  - *Enables autonomous navigation*
- **Propulsion System**
  - *Twin propellers for movement and steering*
- **System Dimensions**

  Overall Length: ~253 cm

  Overall Width: ~196 cm

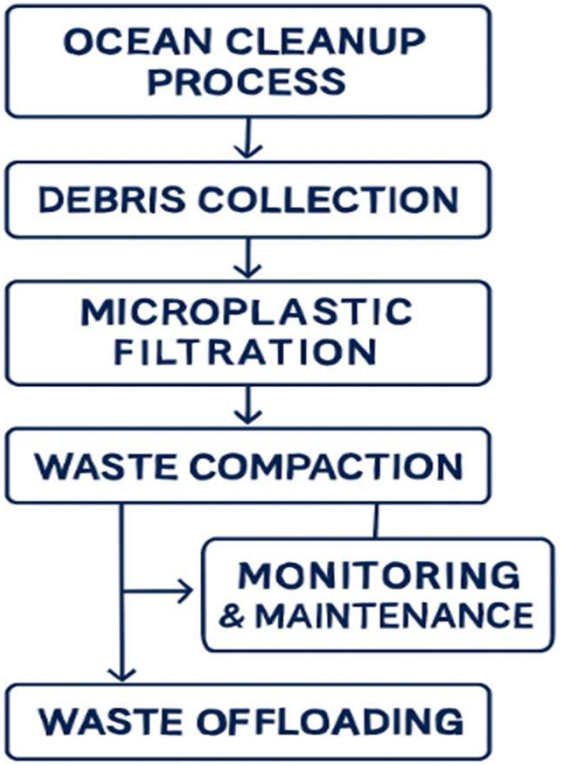
  Height: ~87 cm

  Compact Size: Allows operation in narrow water channels



Potential areas of application in industry/market in brief

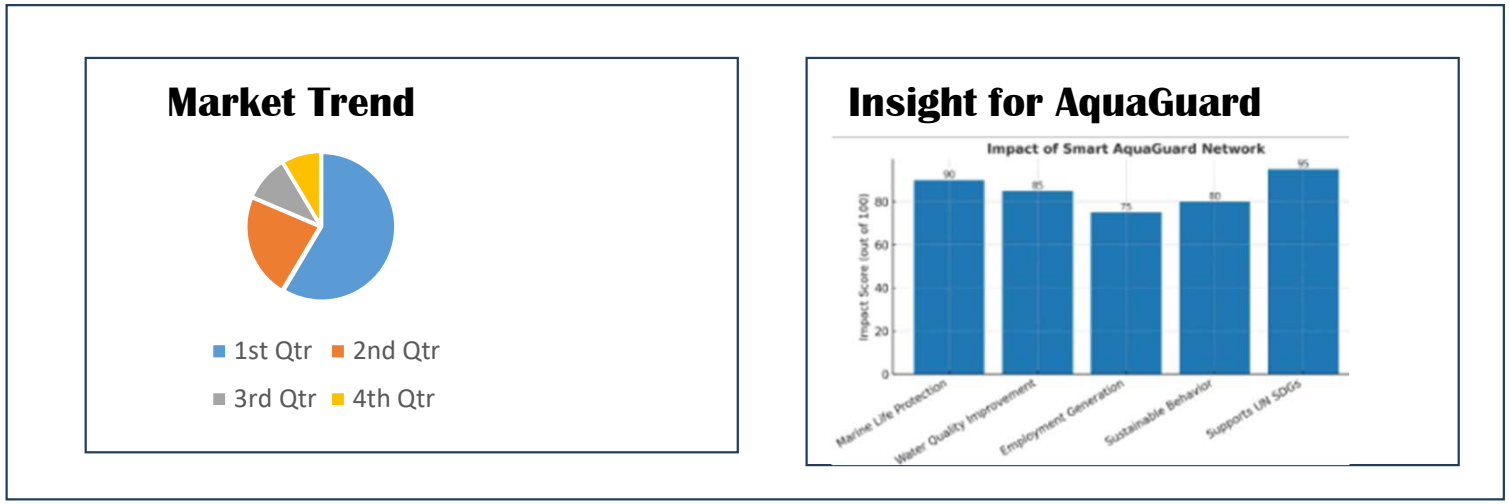
- **Port Authorities**
- *Keeping harbors and docking zones free from floating waste.*
- **Tourism & Coastal Resorts**
- *Maintaining clean beaches and clear waters for visitors*.
- **Municipal Waterways**
- *Cleaning rivers, lakes, and canals in urban areas.*
- **Marine Conservation Groups**
- *Supporting environmental cleanup missions.*
- **Fishing & Aquaculture Industry**
- **Protecting aquatic ecosystems from plastic pollution.**



Note: Use bullet points with maximum of 7 lines. Avoid Paragraph. Include Pictures wherever required

Market data for the potential idea/ innovation

- **Recycled Ocean Plastics Market**
- Rapid growth driven by rising awareness and infrastructure investments.
- Asia-Pacific dominates, backed by stringent sustainability initiatives and industrial expansion.



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Current development status of idea/innovation by applicant/incubatee

- **Concept Stage with Initial Design Blueprint** — Core features, functional modules, and operating principles defined.
- **3D Model & Flowchart Completed** — System layout, waste collection mechanism, and energy source integration visualized.
- **Component Feasibility Check Done** — Identified readily available parts (solar panels, GPS, waste compactor, microplastic filter) for prototype build.
- **Basic Navigation Algorithm Prepared** — Preliminary path-planning logic for autonomous patrol routes in calm waters.
- **Market Research Conducted** — Verified demand in ports, coastal cities, and private marinas.
- **Ready for Prototype Build** — Next step is assembly and field testing in small-scale marine conditions.

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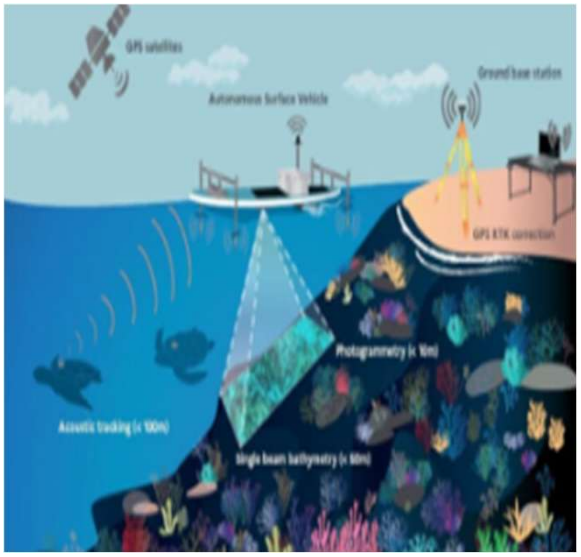
Literature Survey/Prior art on the concept, if any



MICROPLASTIC CAPTURE / FILTRATION —
Studies on membrane filters, coagulation/flocculation pre-treatment, and novel passive collectors for sub-millimeter particles.

AUTONOMOUS SURFACE VEHICLES (ASVS) —
Papers on navigation, path planning, collision avoidance directly relevant for self-patrol + return features.

Solution Proposed (with Block diagram/ 3D Model/ flow chart/ Circuit Diagram / Pictures)

Note: Use bullet points with maximum of 7 lines. Avoid Paragraph. Include Pictures wherever required

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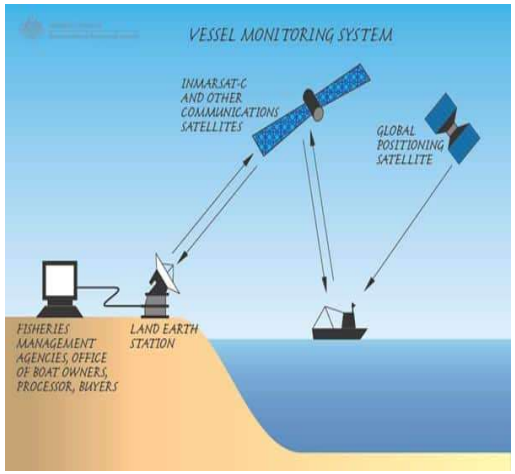

REMOTE TRACKING & GPS INTEGRATION

- **Equipped with a GPS module for real-time location tracking**
- **Tracks the robot's position on a live map interface via mobile or web app**
- **Remote access through Wi-Fi, 4G/5G, or LoRa communication modules**
- **Precise geolocation helps monitor cleaning routes and progress**
- **Enables route planning and geofencing to clean specific zones**
- **Receives automated navigation commands from a central control system**
- **Triggers alerts if the robot deviates from assigned cleaning area**
- **Stores historical path data for performance analytics and optimization**
- **Emergency override feature to stop or redirect the robot remotely**

Note: Use bullet points with maximum of 7 lines. Avoid Paragraph. Include Pictures wherever required

How you actually make, assemble, synthesize, or build the solution?

- **Mechanical Assembly**
- **Hull**: Lightweight corrosion-resistant materials (HDPE or marine-grade aluminum).
- **Barriers**: Retractable arms with netting or conveyor-belt system to collect debris.
- **Waste Compactor**: Onboard compression unit to reduce storage volume.
- **. Power & Energy Integration**
- **Solar Panels**: Mounted on top deck, connected to $LiFePO_4$ battery bank.
- **Backup**: Tidal generator or shore-based charging dock for low-light days

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How simple or complex will the idea's execution or implementation be? What are the risk factors involved in executing the idea?

Marine Environment Challenges

•Saltwater corrosion on metal parts.

•High wave conditions affecting stability.

•Navigation & Obstacle Avoidance

•Collisions with boats, buoys, or marine animals if sensors fail.

•Power Reliability

•Solar efficiency drops in cloudy or stormy conditions, risking mission failure without backup.

•Maintenance & Biofouling

•Barnacle growth and debris clogging can reduce efficiency and require frequent servicing.

•Waste Disposal Logistics

•Need reliable shore infrastructure to handle collected waste and recycling.

•Regulatory Compliance

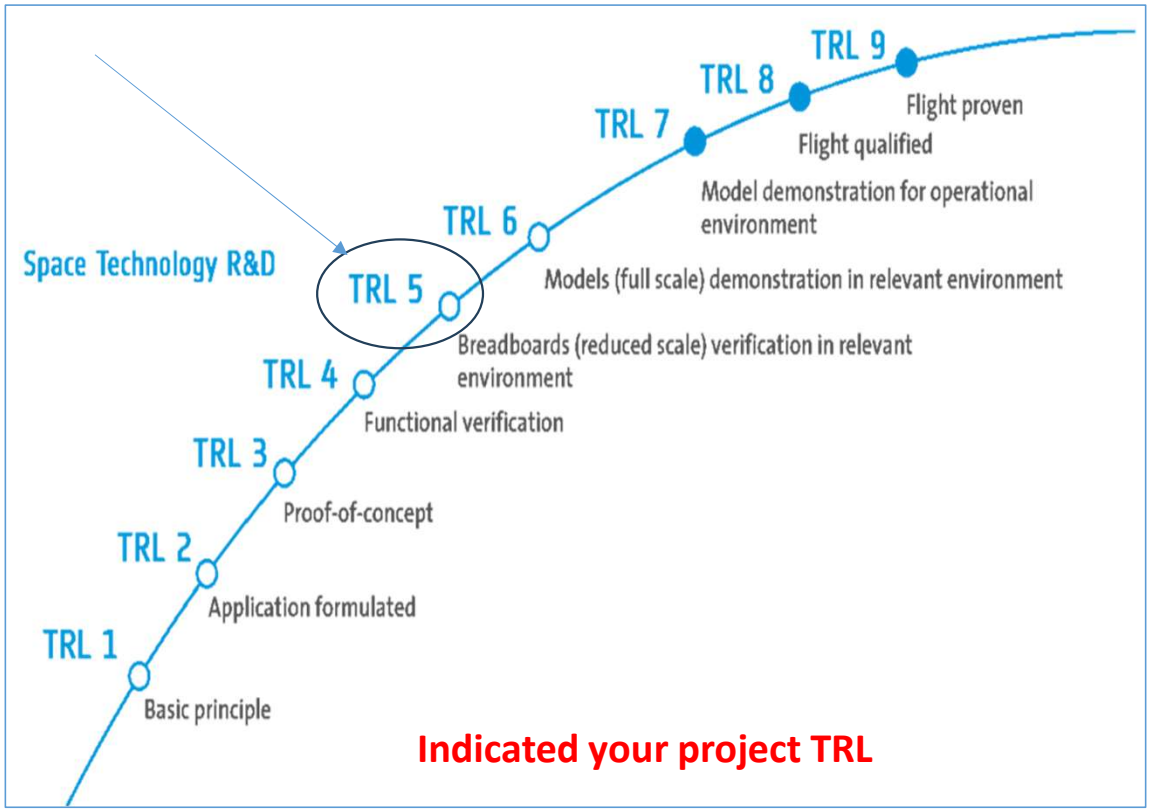
•Must meet maritime regulations, environmental permits, and coastal authority approvals.

Note: Use bullet points with maximum of 7 lines. Avoid Paragraph. Include Pictures wherever required

How soon could the idea be put into operation? (TRL of prototype)

- **CURRENT STAGE – TRL 4 OR TRL 5**
- **WHY:**

  - **You have a clear proof-of-concept: an autonomous vessel with GPS navigation, waste funneling, microplastic filtering, and renewable energy power.**
  - **The concept can be functionally verified in lab/small-scale testing (e.g., in a pond, swimming pool, or small harbor simulation).**
  - **If you already have a working prototype tested in controlled water, you're entering TRL 5 (breadboard/prototype in a relevant environment).**



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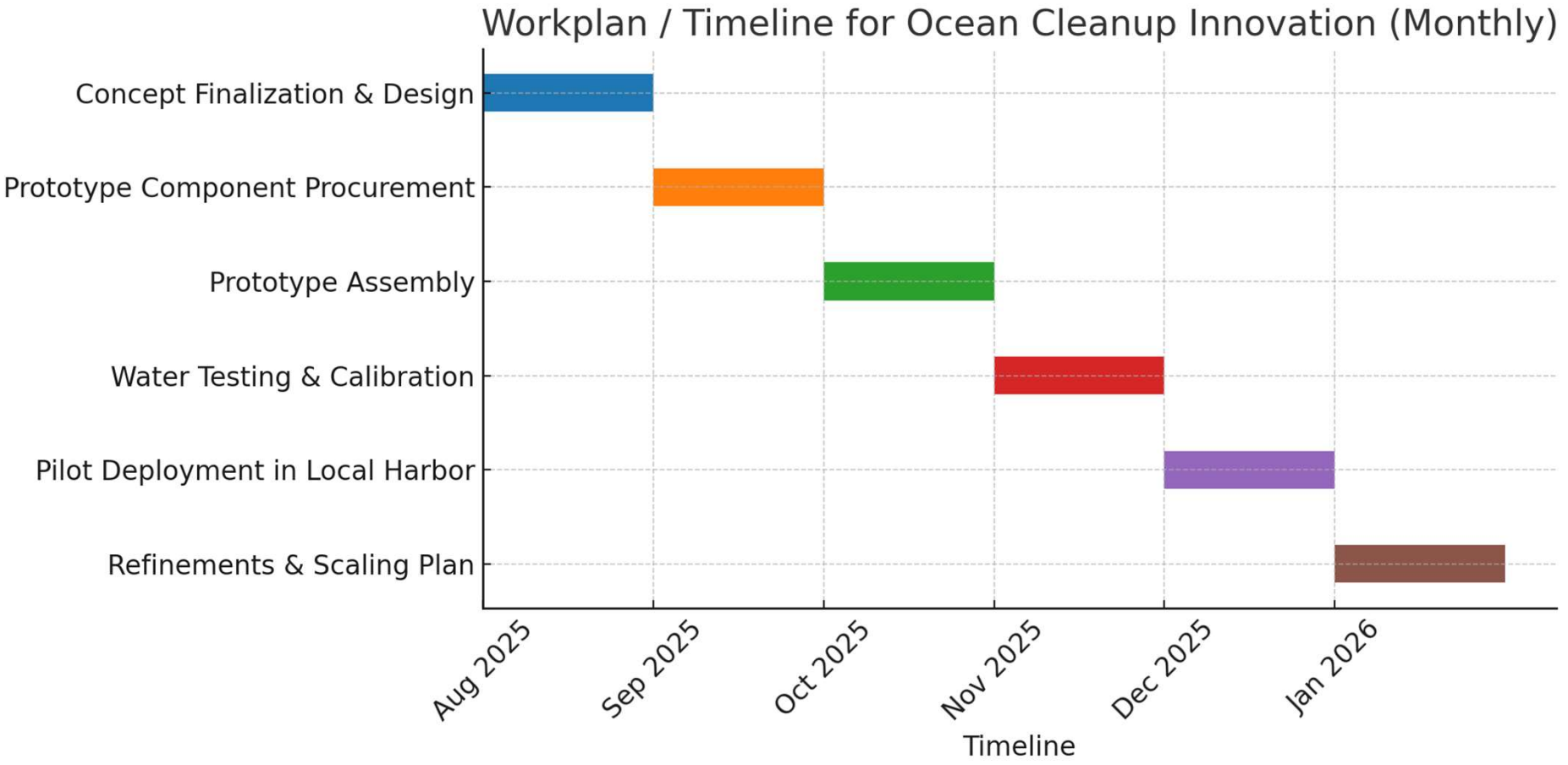
Workplan/Timeline (Monthlywise – Chart)



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Technology related Expenditure towards machine usage charges etc., Electricity charges, Procurement of raw material , testing/Calibration charges, other charges essential for development of idea. **Max (10.00) lakh.**

Sl.No.	Particular/Item/Specification	Quantity (No.s)	Rate (Rs./No.)	Amount (Rs.)
1	Procurement of Raw Materials & Components (Solar panels, wind turbine kits, sensors, batteries)	5	70,000	***3,50,000***
2	Machinery Usage Charges (CNC cutting, fabrication, assembly tools)	2	50,000	***1,00,000***
3	Testing & Calibration Charges (Lab and field equipment testing, environmental simulations)	3	50,000	***1,50,000***
4	Software Development (Control system, monitoring dashboard,optimization,algorithms)	2	60,000	***1,20,000***

Technology related Expenditure towards machine usage charges etc., Electricity charges, Procurement of raw material , testing/Calibration charges, other charges essential for development of idea. **Max (10.00) lakh.**

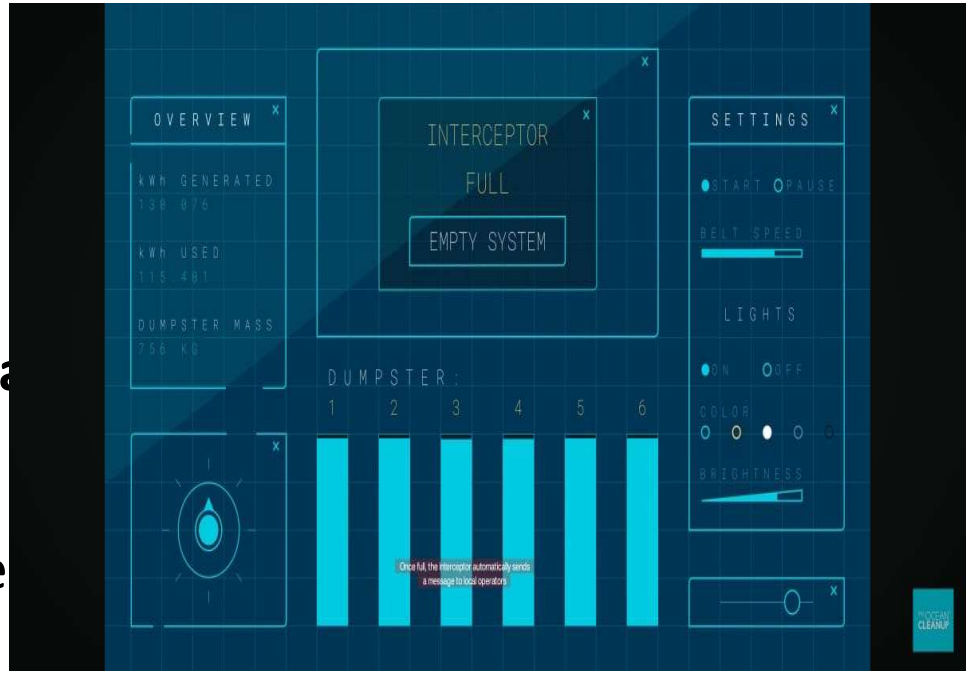
Sl.No.	Particular/Item/Specification	Quantity (No.s)	Rate (Rs./No.)	Amount (Rs.)
5	Electricity & Utility Charges (during prototype building and testing phases)	1	50,000	***50,000***
6	Field Deployment & Transportation (to coastal sites)	2	20,000	***40,000***
7	Documentation, Reporting, and Contingency	2	40,000	***80,000***
8	GPS Receiver/Device, Satellite Network, Communication Network, Server/Cloud Platform	4	10,000	**40,000**
				930,000
Total. **Max (10.00) lakh.**				***930,000***

Financial requirements (activity-wise break-up)

Particular/Item	Total idea project cost (Rs.)	Amount GOI assistance (Rs.)	Incubatee share (Rs.) (Nil for Students/ 15% for others/ entrepreneurs / MSMEs)
Technology related Expenditure towards machine usage charges etc., Electricity charges, Procurement of raw material , testing/Calibration charges, other charges essential for development of idea. **Max (10.00) lakh.**	10,00,000	10,00,000	1,50,000
Charges for mentor/handholding supporting team. **Max (3.00) lakh.**	3,00,000	3,00,000	45,000
Travelling Expenses or any other item not covered as above may be allowed as per need for development of the idea. **Max (2.00) lakh.**	2,00,000	2,00,000	30,000
Total. **Max (15.00) lakh.**			

Whether the idea involves use of existing intellectual property or not, give brief detail there of / Patenting Possibility

- **Risk & Opportunities in IP**
- Risk: Potential overlap with mechanical collection methods already patented.
- Opportunity: Patent around **integration, automation logic, energy system design, a compact mechanical arrangements**.
- Bonus: Open-source certain non-core components to attract collaborators while keeping critical IP proprietary.



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Paste Student ID Card / Entrepreneurs/MSMEs Proofs

	
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JANE HANNAH S	KARISHMA T

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THANK YOU