BLUE MISSION MED

BlueMissionMed Support Programme

Aqua-Lit Toolbox for implementing policies in national laws and certification procedures

Baltic, Mediterranean, North Seas

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Problem to be solved

About 8 to 11 million metric tons of plastic waste enter the ocean annually.

The Institute for Environmental Research and Education, 2024

Plastic waste from the fisheries and aquaculture sector — including lost fishing gear and other debris — is contributing to the global crisis of plastic pollution.

IMPACTS

Environmental: damage to biodiversity and habitats

Economic: fish stocks reduction, damage to vessels and equipment, forcing the industry & authorities to spend heavily on clean-ups and gear replacement

Social: plastic leakage threatens food safety & human health

Why Aqua-Lit Toolbox?

There are no global estimates of the amount of plastic waste generated by the fisheries and aquaculture sector.

FAO, Technical Paper 615, 2017

Aquaculture is expected to be the sector that meets future demand for food, predicted to rise by 40% by 2030.

The State of World Fisheries and Aquaculture, 2018

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Our Innovative Solution

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Value Proposition: A Unique Solution for Managing Marine Litter in Aquaculture

Massive Repertoire:

- 400+ actionable solutions including best practices, technical measures, and policy guidance.

Comprehensive & End-to-End

- Covers all phases of marine-litter management — prevention, monitoring, removal, recycling.

Multi-Stakeholder Relevance:

- Designed for producers, ports, NGOs, policymakers, researchers, equipment suppliers, and more.

Co-Developed with Practitioners:

- Built through “Learning Labs” across Mediterranean, North, and Baltic Seas.

Bridges Knowledge, Policy & Practice:

- Includes policy recommendations, funding opportunities, and operational guidelines.

Flexible & Transferable:

- Adaptable to other seas/ regions, aquaculture practices, and regulatory contexts.

Live, Evolving Resource:

- Online repository open to stakeholder continuous contributions.

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Business model and Implementation

Customer segments:
Aquaculture producers, Ports, Equipment suppliers, Waste management/recycling companies, Policymakers & regulators, NGOs, Consultancies, Certification bodies, Researchers, Academics, Monitoring institutions, Funding agencies & investors.

Channels:

Online portal, Learning Labs/workshops, partnerships, conferences.

Revenue streams:

Origin: 2-year EMFF project (2019–2020). Potential for consulting, recycling contracts, certification, public funding, licensing.

Sustainability & Scaling:

Open-source / open-access knowledge base. Stakeholder contributions. Integration with larger marine-data ecosystems and policies.

Key partners:

Consortium: Geonardo, EurOcean, VLIZ, s.Pro, IEO, FRCT, Nausicaá. Expertise: marine science, aquaculture, policy, technology, stakeholder engagement.

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Aqua-Lit Toolbox for implementing policies in national laws and certification procedures

CONTACT US

www.aqua-lit.eu/toolbox

Geonardo: Ömer Ceylan, Managing Director omer.ceylan@geonardo.com

Nausicaa: Iwona Gin, Head of International Relations iwona.gin@nausicaa.fr

Thank you

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Innovative Development of Multitrophic Aquaculture (IDMA)

GREECE

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Problem to be solved

- Rapid expansion of aquaculture in Greece and the Mediterranean, large amounts of wastes produced (*ca* 60,000 tons N + 12,000 tons P /yr)
- Integrated Multitrophic Aquaculture (IMTA) can be a solution **but** there are questions (and reservations) on food safety issues.
- Concerns about environmental impacts and wasted material that could be exploited increasing profitability of the farming companies.

Our Innovative Solution

- Brief description of the solution
  - Test organisms suitable for IMTA
  - Deployment at various distances from farms
  - Following growth with time
  - Effects on natural habitats
  - Food safety issues
- Alignment with EU MISSIONS OBJECTIVE

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Our Innovative Solution

Name	Species name	Method	Feeding type	Possible uses
Mussels	*Mytilus galloprovincialis*	Pergolari	Filter feeder	Commercial
Oysters	*Pinctada radiata*	Oyster baskets	Filter feeder	Commercial / High value
Holothuria	*Holothuria poli*	Oyster baskets	Sediment feeder	Commercial / High value
Macroalgae	*Ulva* rigida	Baskets	Diluted nutrients	Fish feed
Micro-algae	Species from local community	Floating *in situ* bioreactors	Diluted nutrients	Fish feed, substances for nutrition & pharmaceutical industry

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Our Innovative Solution

Mytilus galloprovincialis
Mediterranean mussel
Filter-feeding organism
Eats mainly phytoplankton
High commercial value

Pinctada imbricata radiata
Pearl oyster
Filter-feeding organism
Consumes mainly phytoplankton and small organic particles
Non Indigenus species (NIS)
Newly introduced to the market

Holothuria poli
Echinodermata,
sediment deposit feeder.
High commercial value

Journal of *Marine Science and Engineering*
MDPI

Article

An IMTA in Greece: Co-Culture of Fish, Bivalves, and Holothurians

Dimitra Chatzivasileiou [1,*], Panagiotis D. Dimitriou [1], John Theodorou [2], Ioanna Kalantzi [3], Iordanis Magiopoulos [3], Nafsika Papageorgiou [1], Paraskevi Pitta [3], Manolis Tsapakis [3] and Ioannis Karakassis [1]

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Value Proposition

- There is already space in the Market for IMTA products. Occasionally with much higher value than that of the farmed fish.
- There is a long tradition in China/Asia but rather poor in EU
- Food safety tests were absolutely satisfactory.
- IMTA reduces the environmental footprint of the fish farms.
- There are still some issues to address

Food Safety on Bivalves and Holothurians

Food safety analysis was performed based on EU standards and known safety limits of co-cultured species flesh

• Dioxins and POPs PCBs, PCDDs, PCDFs, PBDEs, DDT, DDE, HCB, PFAs	REGULATION (EC) No 836/2011	below the safety limits
• Metals Hg, Pb, Cd, Cu and others	REGULATION (EC) No 466/2011	below the safety limits
• Biotoxins Microcystin RR Microcystin LR Microcystin YR	REGULATION (EC) No 853/2004	below the detection limits
• Toxic micro-alge		No toxic species detected
• Antibiotics		below the detection limit
• Microplastics		Lower MPs compared to natural populations or commercially available individuals

Manolaki, et al., (2023). Microplastic contamination in cultured mussels and pearl oysters in Greece. Microplastics 2:168-181

Aquaculture 2026, vol 613, 743440
Aquaculture
journal homepage: www.elsevier.com/locate/aquaculture

Metals in organisms cultivated in IMTA systems at Mediterranean Fish Farms: risk and benefit assessment

Dimitra Chatzivasileiou [a], Anastasios Baltadakis [d], Panagiotis D. Dimitriou [a], Iordanis Magiopoulos [b], Stefania M. Manolaki [a], Spiros A. Pergantis [c], Manolis Tsapakis [b], Ioannis Karakassis [a], Ioanna Kalantzi [a,b,*]

Business Model and Implementation

- Brief timeline (i.e. Pre-seed Stage, Early-stage start-up, Growth stage...)
- Current organisational structure (research teams from UoC and HCMR, including Biologists, Chemists, Material Scientists/engineers, plus associates from fish and mussel farms)
- Targeted clients: Aquaculture farming companies; accessible through common projects and meetings
- Key elements of Business Model: currently working and publishing on the scientific basis of our approach.

Next Steps: What are you looking for?

- Are you looking for partners? - which ones?
  - Partners with expertise on IMTA organisms (collaboration in progress) and cultivation of early stages of holothurians
- Are you looking for financing? - what for - else?
  - Further refinement of methodology and optimization of culture techniques
- Further developing pilot sites or elevating Technology Readiness Level (TRL)?
  - It will be used in 2 years. Before that licensing issues by authorities will have to be resolved

Publications on this issue

- Metals in IMTA organisms: https://doi.org/10.1016/j.aquaculture.2025.743440
- Mitigating impacts of Aquaculture: https://doi.org/10.1016/j.marpolbul.2023.115856
- IMTA farming: https://doi.org/10.3390/jmse10060776
- IMTA and ecosystem value services: https://doi.org/10.3389/fmars.2022.1083099
- Micloplastics: https://doi.org/10.3390/microplastics2020013

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IDMA

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Marine Ecology Lab: https://marineecologyuoc.weebly.com/

IDMA Project Web site: http://www.idma.uoc.gr/index.html

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BIOGEARS

Biobased ropes for mussel aquaculture

PhD Leire Arantzamendi
larantzamendi@azti.es

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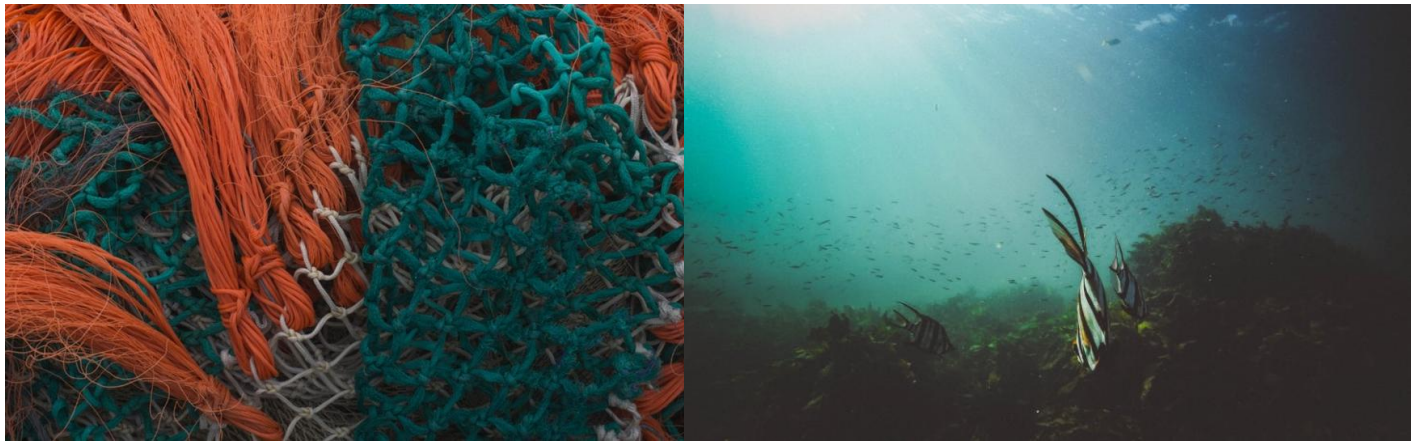
Problem to be solved

- Aquaculture can be a source of marine litter and plastic pollution
- **3 000 and 41 000 t of plastics are yearly discarded from aquaculture**
- Current strategies aim to **reduce 50% marine litter and 30% MPs by 2030**



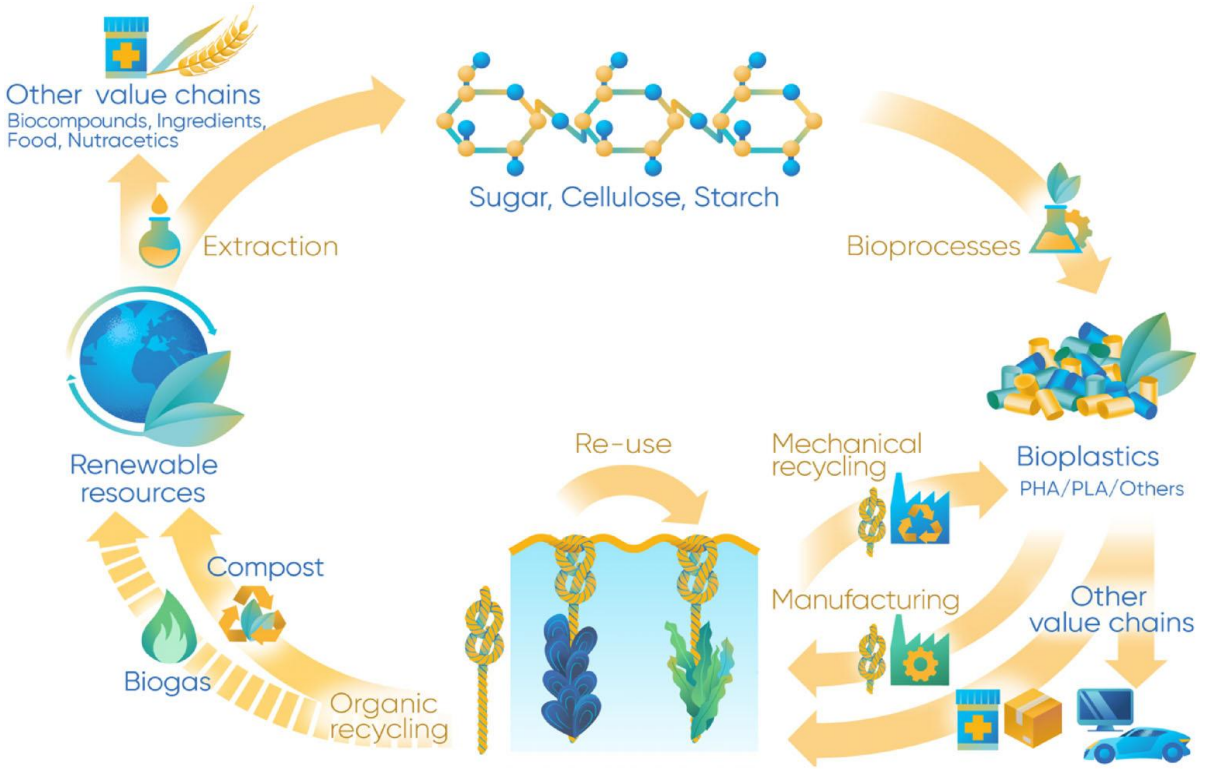
Our Innovative Solution

- **BIOGEARS can be more sustainable alternatives**
- **ECO-efficient**
  - 85% INCREASE in MUSSEL YIELD/ rope m
  - 20% REDUCTION ENVIRONMENTAL FOOTPRINT /Kg mussel

Higher biomaterial price is compensated by higher mussel production!!

Value Proposition

- Biogears offers a **high-performance, cost-effective biobased, biodegradable and compostable ropes.**
- Competitive advantages:
  - **Higer price compensated**
  - **Sustainability as value**
  - **Regulatory compliance**
  - **Durability**
  - **Circular Economy fit**



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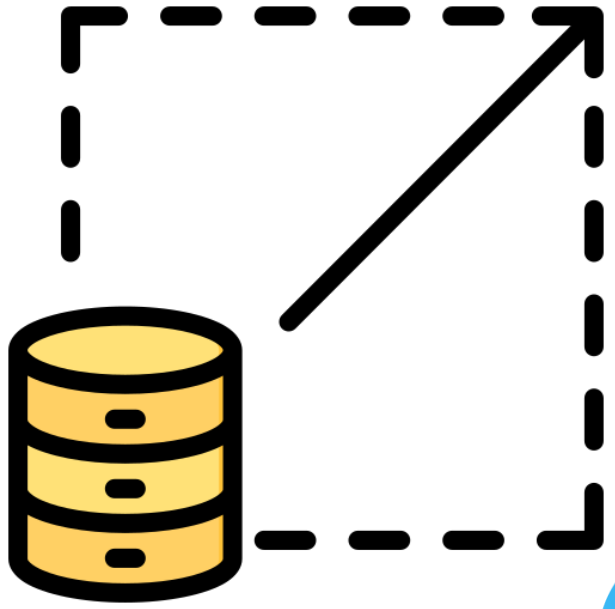
Business Model and Implementation

- **Exploitation agreement**: **AZTI , GAIKER , CENTEXBEL**
- **Patent and Trademark registration applications submitted**
- Targeted clients **in and outside Europe**
- **Revenue:** IP transference by patent licensing to yarn producers, rope producers, and aquaculture gear suppliers.
- **Market potential**: +3, 000, 000 m/y (mussel) growing offshore + algae sector

Next Steps

- We are looking for **patent licensing: yarn and rope producers, and aquaculture gear suppliers**
- We are looking for **Industrial partners for scalability and validation at sea**
- We are developing pilot sites to increase Technology Readiness Level (TRL)
  - Ongoing in TRANSEATION project (www.transeation.eu)
  - Proposals for validation of **algae ropes submitted**



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BIOGEARS

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BIOGEARS

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MyGearTag

United Kingdom

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Problem: Ghost Gear

- Every year between **500,000 & 1 Million** tonnes of fishing gear is lost at sea.
- "Ghost gear" continues to endanger wildlife for months/years after it is lost.
- Longer term it breaks down and contributes to **microplastic pollution i**n our oceans.
- Attempts to recover lost gear are time consuming, expensive and have low success rates.

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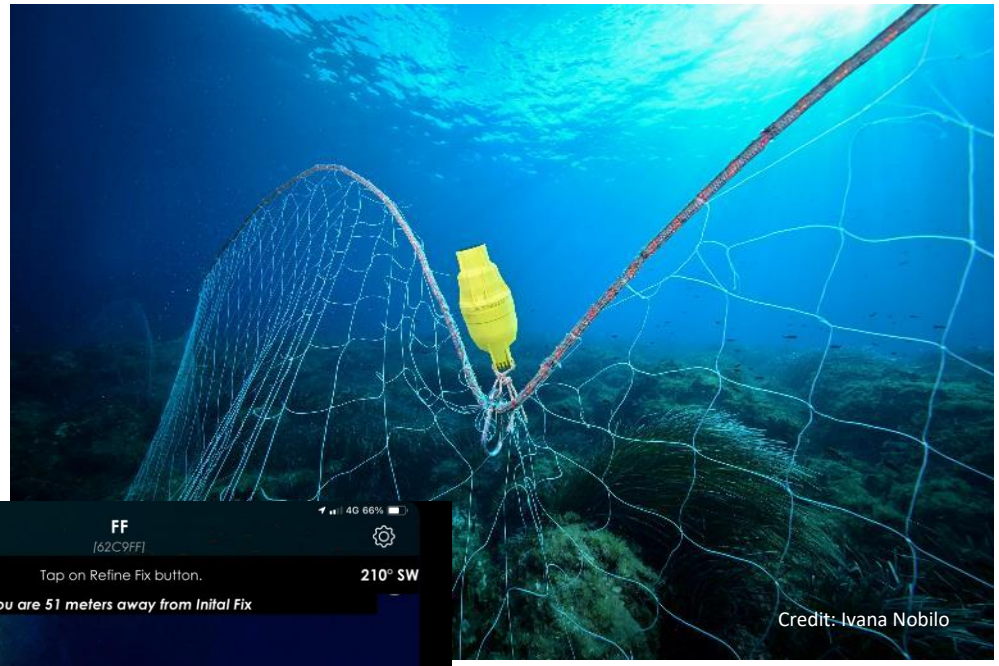
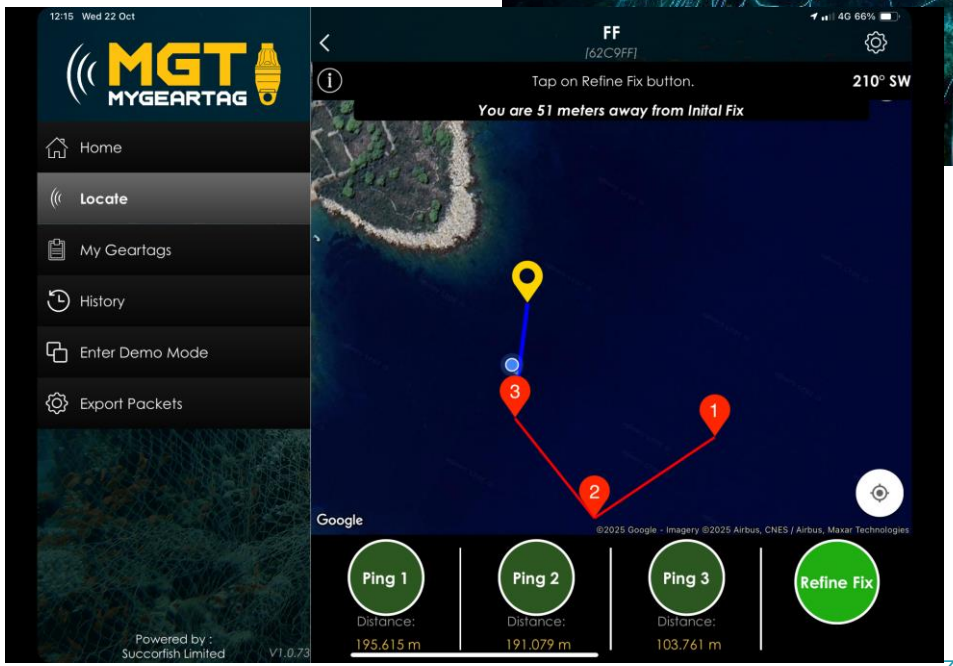
MyGearTag Acoustic Transponder

- **Affordable** subsea acoustic transponder (tag).
- Locator and using **simple to use** mobile app.
- Pinpoint lost gear from up to 2km away within 10 minutes.
- Globally unique ID.
- Battery life of months.





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Value Proposition

- Most acoustic transponder technology is outside the reach of fishers (cost many kEuro, complex operation and installation).
- Proven by **ordinary fishers** with minimal training.
- Tags can be attached to most fishing gear types or other assets.
- Surface locator can be shared among fishers.


Credit: Darko Mihailic

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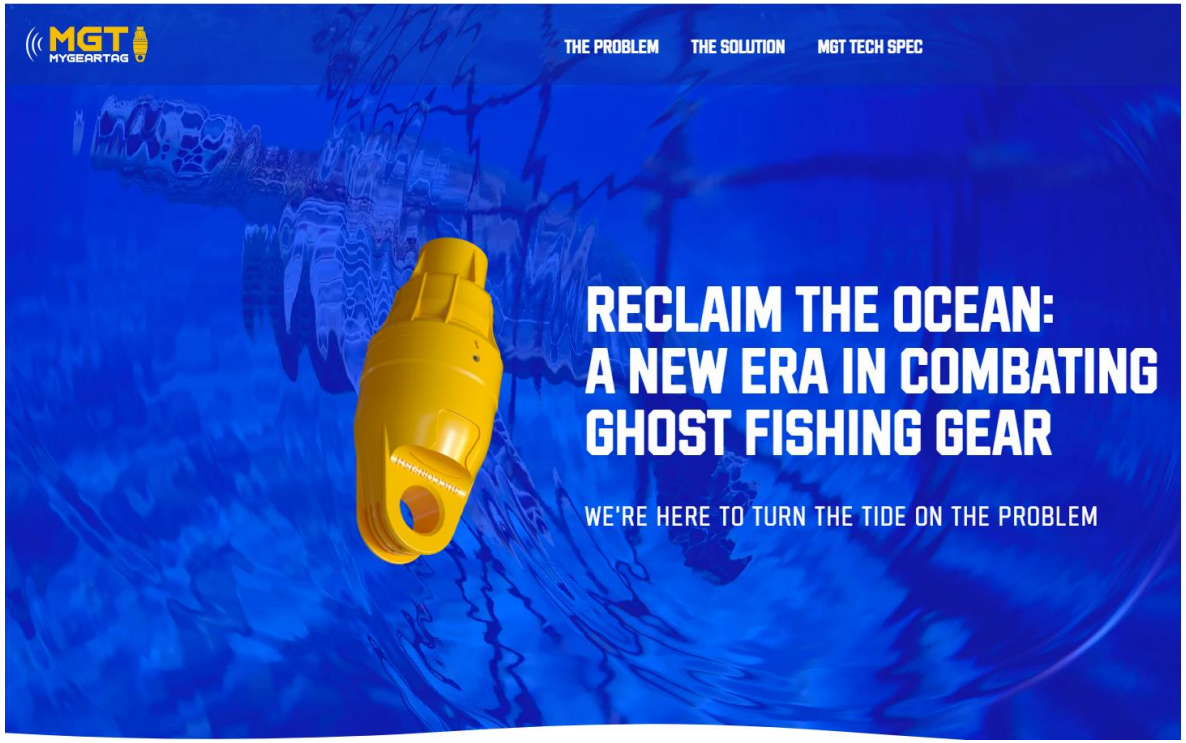
Business model and Implementation

- University developed technology with commercial partner **Succorfish** and licensed technology.
- Initial sales to first adopters..
- Looking for **partners**, **use cases** and **trial opportunities** for scale up.



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MyGearTag

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