The challenging interoperability between academia and industry

The Angelfish Project

A Sea Surface Clean-Up Initiative

DEMOKRITOS

DEMOKRITOS INNOVATION

insane
intelligent science and engineering

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Christoforos Rekatsinas

Story

Academia
Diploma in Mechanical & Aeronautics Engineering – 2010
Military obligations - 2011
PhD in Composite & Smart Materials – 2016
Post Doctoral researcher – 2019

Industry transition
Hystore Tech (Composite UAV Design Optimization) – 2021
Hellenic Aerospace Industry – RnD – 2021

Back Academia
National Center for Scientific Research - Demokritos || Project management/Associate researcher – 2022
BlueJay- Fabrications foundation - 2023
Research Scientist (C) – NCSR-D - 2023

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Team Composition

Name: Christoforos Rekatsinas
Role: Founder

Name: Georgios Giannakopoulos
Role: AI Specialist

Name: Nikolaos Charalampous
Role: Sensors and electronics

Name: Odysseas Simatos
Role: Robotics and automation

Name: Christos Kartanos
Role: Design and analysis

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Team's Contact Details
Email: rekatsinasx.cr@gmail.com

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The idea

Attika || Sounio

Lefkada Port

Ithaka || Vathi Port

Argalasti beach - Pilio

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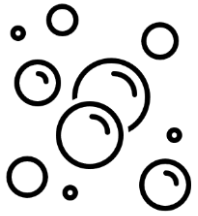
Problem Statement

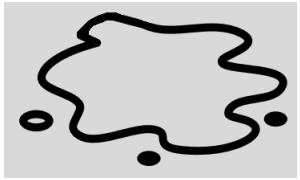
Aims to rid the sea surface of pollutants

The Problem

Scum

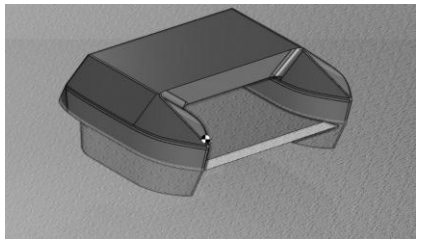


Oil



Trash

Our tools



Autonomous Surface Vehicle

Artificial Intelligence

Data collection

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Solution Overview

- **Development of ASVs suitable for harbors, marinas, open sea and lakes, capable to detect (using AI and UAVs) and clean pollutants.**
- **Wide range of pollutants clean-up through layerwise filtering technology (bio-waste, plastics and microplastics 100μm)**
- **Unified data acquisition to a continuously trained Neural Network (Heaven)**
- **Low production cost and maintenance**
- **Easily expandable and customizable to customer specific needs**

Fully electric vessels

Considering different customer needs, we have predicted 3 vessel sizes:

- Kid Angel: ~1m x 0.8m x 0.22m
- Blue Angel: ~1.6m x 1.2m x 0.45m
- Queen Angel: ~3m x 2m x 0.9m

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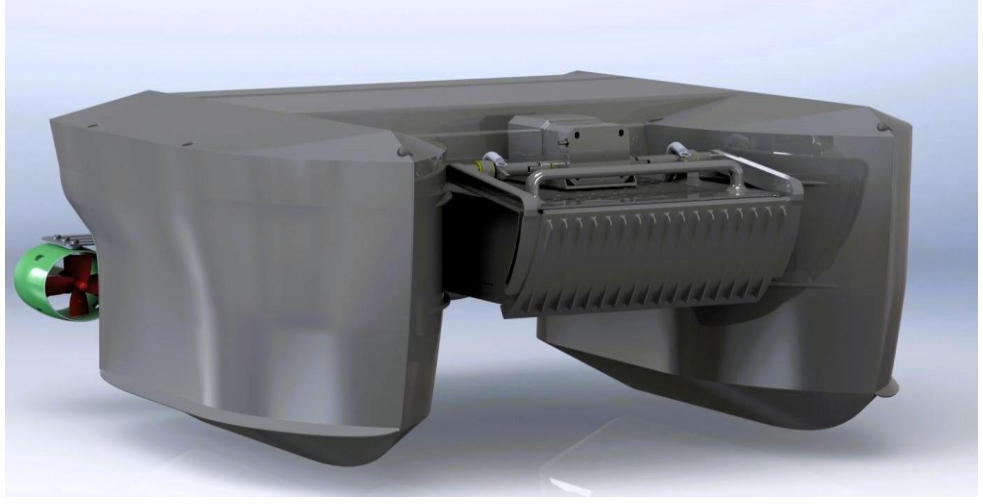
Our vessels – The angles

Considering different customer needs, we have predicted 3 vessel sizes:

- Kid Angel: ~1m x 0.6m x 0.22m
- Blue Angel: ~1.6m x 1m x 0.45m
- Queen Angel: ~3m x 2m x 0.9m

Smart features	Potential extension
Fully electric - batteries	H_2 Powered and solar panels
Semi autonomous navigation	Fully autonomous
pH, turbidity, temperature measurements	Real time monitoring and reporting
AI based pollutant recognition	Path correction after collecting the pollutant
Micro to macro and bio-mass collection	Maybe extension to oil

Conceptual designs



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Traction

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Awards and expos

Awards

- Science agora
- Bluegrowth Piraeus
- Hackathon Attica

Expos

Thessaloniki International Forum

Business Model

Possible income sources	Drawbacks
Leasing	Support
Product as a service	Personnel at the spot
Product sell	maintenance

Clientele

- Municipalities
  - Open sea
  - Lakes
  - Marinas
  - Harbors/ports

Blue Angel or Queen angel

- Private marinas & harbors

Kid Angel or Blue Angel

- Hotels with access to beaches and coasts

Kid Angel or Blue Angel

- Individuals
  - Owning private beaches
  - Owning large bots

Kid Angel or Blue Angel

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Impact & Value

Environmental Impact

Potential Impact:

- **Pollution Reduction**
- **Biodiversity Preservation**
- **Ecosystem Restoration**

Value to Industry:

- Enhances the natural beauty of water bodies, supporting local ecosystems and biodiversity conservation.
- Aligns with global environmental sustainability initiatives and international agreements like the UN's Sustainable Development Goals (SDGs).

Target Audience:

- Environmental NGOs, government environmental agencies, and international organizations focusing on sustainability.

Operational Efficiency

Potential Impact:

- **Automation of Waste Collection**
- **24/7 Operation**

Value to Industry:

- Cost-effective solution for waste management compared to conventional methods involving boats and large crews.
- Enhances the capacity for frequent and consistent cleaning, reducing the accumulation of waste.

Target Audience:

- Municipalities, local water authorities, and private organizations managing recreational water bodies.

Public Health and Safety

Potential Impact:

- **Cleaner Water Bodies**
- **Improved Public Spaces**
- **Value to Industry:**
- Supports tourism and local economies dependent on clean and attractive water bodies.
- Reduces medical costs and health risks associated with polluted water exposure.

Target Audience:

- Tourism boards, recreational facility managers, and local communities.

Economic Benefits

Potential Impact:

- **Tourism Boost**
- **Waste Repurposing**
- **Value to Industry:**
- Demonstrates corporate social responsibility for businesses operating near water bodies.
- Encourages investments in eco-friendly technologies and services.

Target Audience:

- Resorts, marina operators, and recycling industries.

Scalability and Customization

Potential Impact:

- **Modular Payloads**
- **Flexible Deployment**

- **Value to Industry:**
- Tailored solutions for specific needs, from urban water bodies to industrial applications in harbors and ports.
- Increases efficiency by automating repetitive tasks, freeing human resources for other roles.

Target Audience:

- Urban planning authorities, private waste management companies, and coastal area developers.

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Timeline - Future Development

Current status

- Fabricated prototype - Demo Angel |0.6m x 0.4m x 0.25m|
- Real conditions Demonstration
- Application for intellectual property at the European Patent Office
- Manual operation
- Capacity to collect garbage

Future development

- Kid Angel – v1 |1m x 1m x 0.3m |
  - Incorporation of AI garbage tracking algorithm
  - Semi automatic operation with predefined mission
  - Sensors incorporation and monitoring
  - Controlled by ground station
- Establish a valid use case with | |
  - Municipality of Piraeus (Awarded third place in Blue growth competition)
  - Cyprus Hotel Association
  - Grecotel (Through Demokritos Innovation Office)
  - Ports: Patras, Thessaloniki, Peiraia

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Current status

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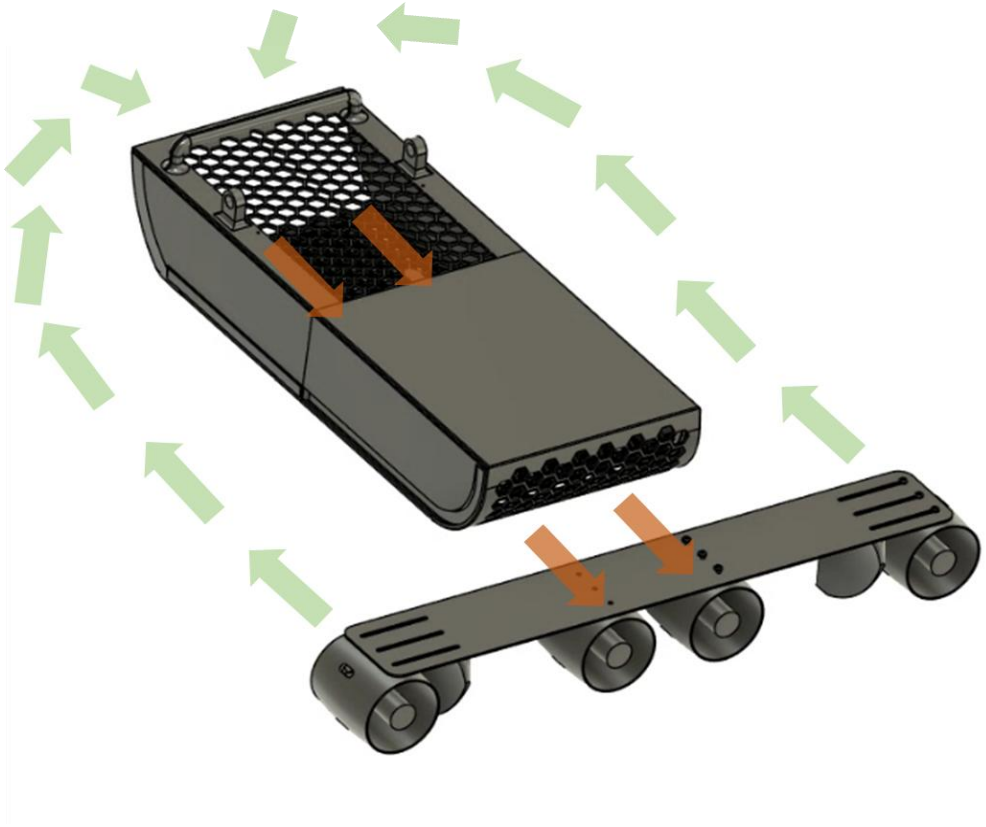
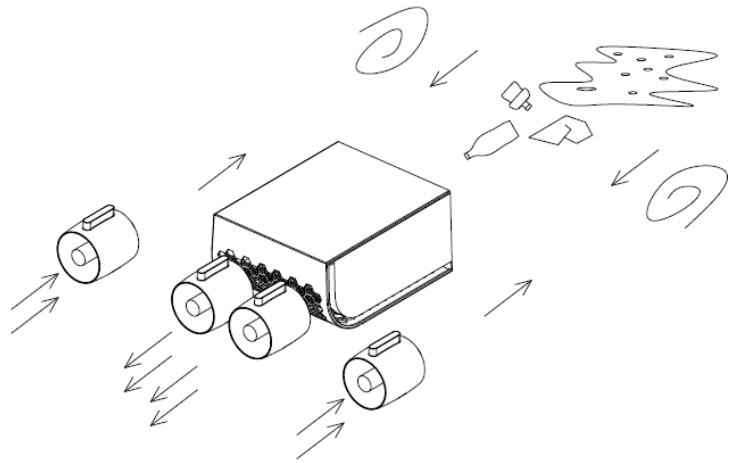
Patent



Propulsion system

- Two external motos suction
- Two internal trust
- Spiral currents creation

Garbage collection even while not moving



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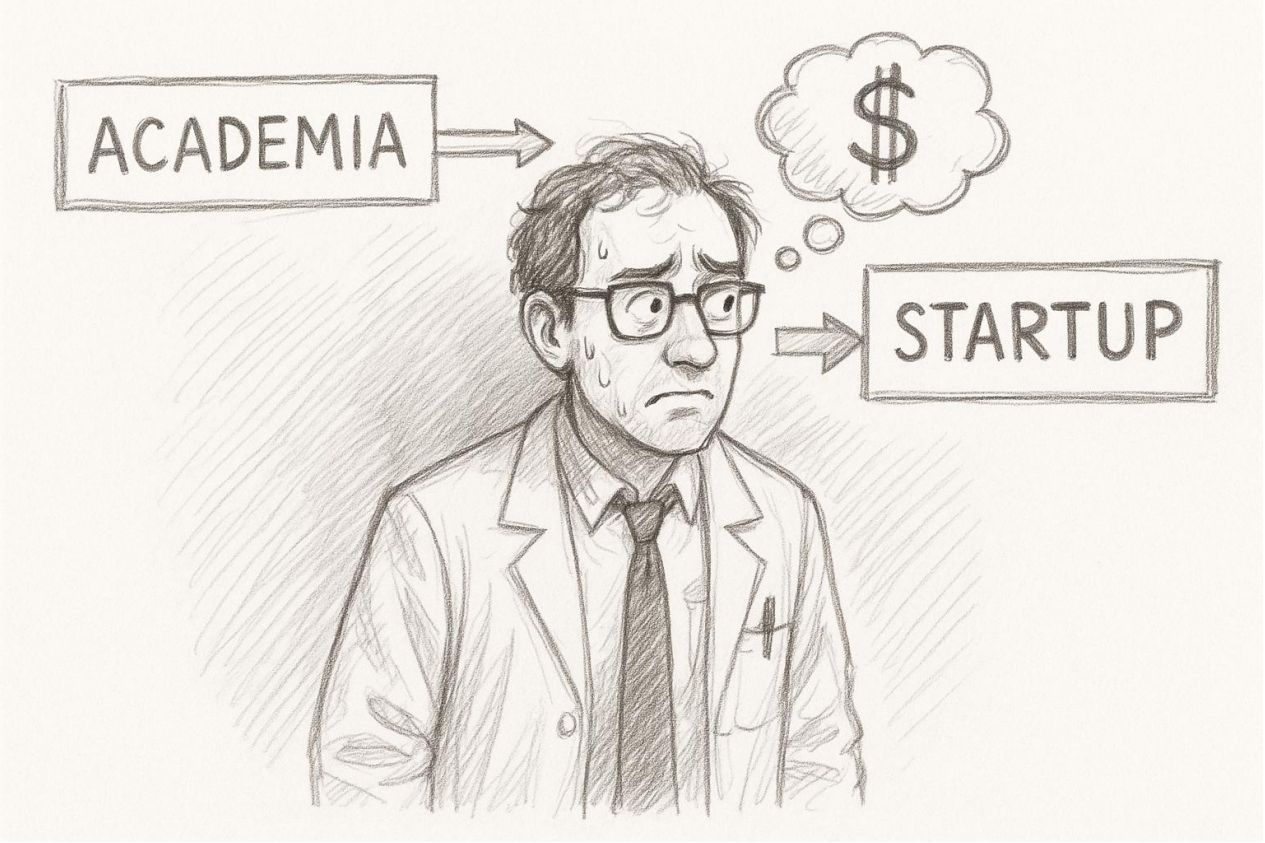
Trouble in industry transition

- Initial company expenses w/o income
- Difficulties in business model selection
- Science is underestimated
- 100% focus on the company
- Difficulties on how to present/sell your product
- Difficulties on persuading someone on your product
- Get familiar gith BC language
- Low company evaluation from VCs



Think

Intelligent Green Drones

We already are…

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