

NEWSLETTER 2018

# OCEANOS 2018

THE JOURNEY TO HYDROCONTEST 2018



## WHO WE ARE

Oceanos is a team consisted of undergraduate students of the School of Naval Architecture & Marine Engineering, NTUA.

We participate in an annual competition named Hydrocontest, aiming to design and construct two innovative and efficient small boats with electric propulsion.

Hydrocontest is an enormous opportunity for us to apply our knowledge, learn from our peers and expand our horizons in a worldwide scale.

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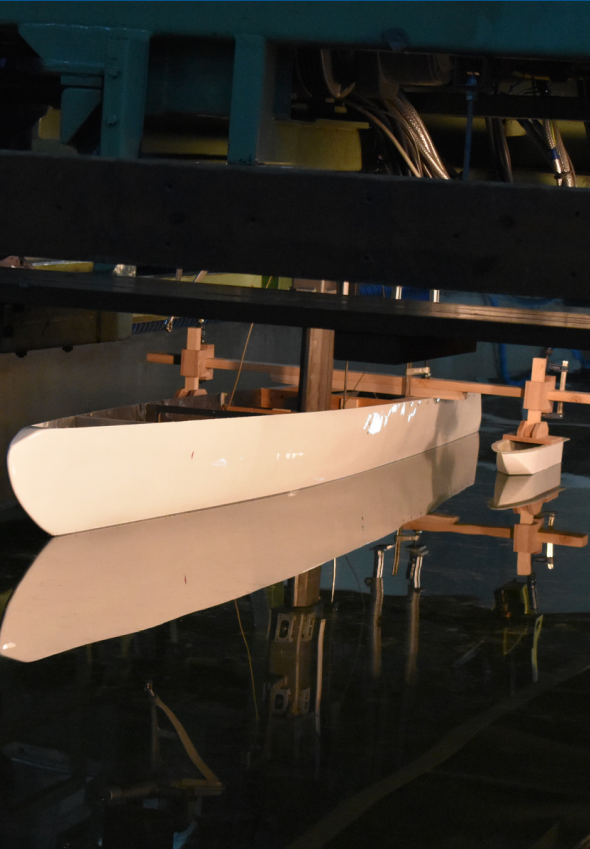
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“The people who are crazy enough to think they can change the world are the ones who do.”

STEVE JOBS

## THE 2018 TEAM

OCEANOS 2018 OPTIMIZED OUR HYDROCONTEST 2017 BOATS.

The member worked in the following teams:

1. TRIMARAN TEAM
2. ELECTRONICS TEAM
3. PROPELLER TEAM
4. HYDROFOILS TEAM
5. CONSTRUCTION TEAM
6. MARKETING - FUNDRAISING TEAM

## The objectives

Our participation to Hydrocontest gives students the opportunity to acquire hand-on knowledge and face real life engineering problems. Our main objectives this edition are to:

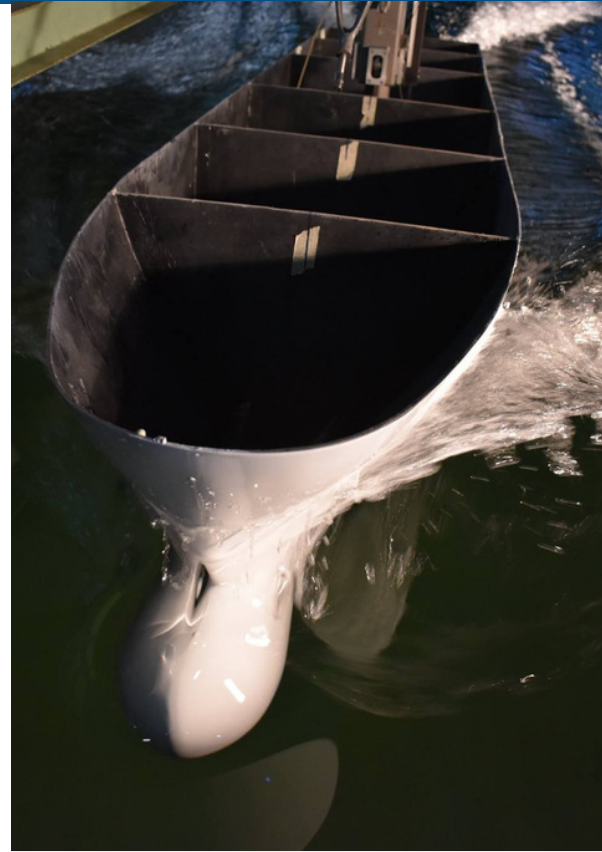
- demonstrate and enhance our knowledge and abilities
- test our optimized vessels and achieve better efficiency than last year
- have a successful participation and reach the finals



The heavyweight vessel featured a bulbous bow. The bulb modifies the way the water flows around the hull, reducing drag and thus increasing speed, range, fuel efficiency, and stability.

## Hydrocontest results

- 5th place on Lightweight category
- 13th place on Heavyweight category
- 11th place on Long Distance race
- Our vessels racing performance was improved
- For the first time we participated in all three races of Hydrocontest



Team-Oceanos NTUA 2018.



The lightweight vessel mounted with the hydrofoils on night trials in the bay of Saint Tropez.

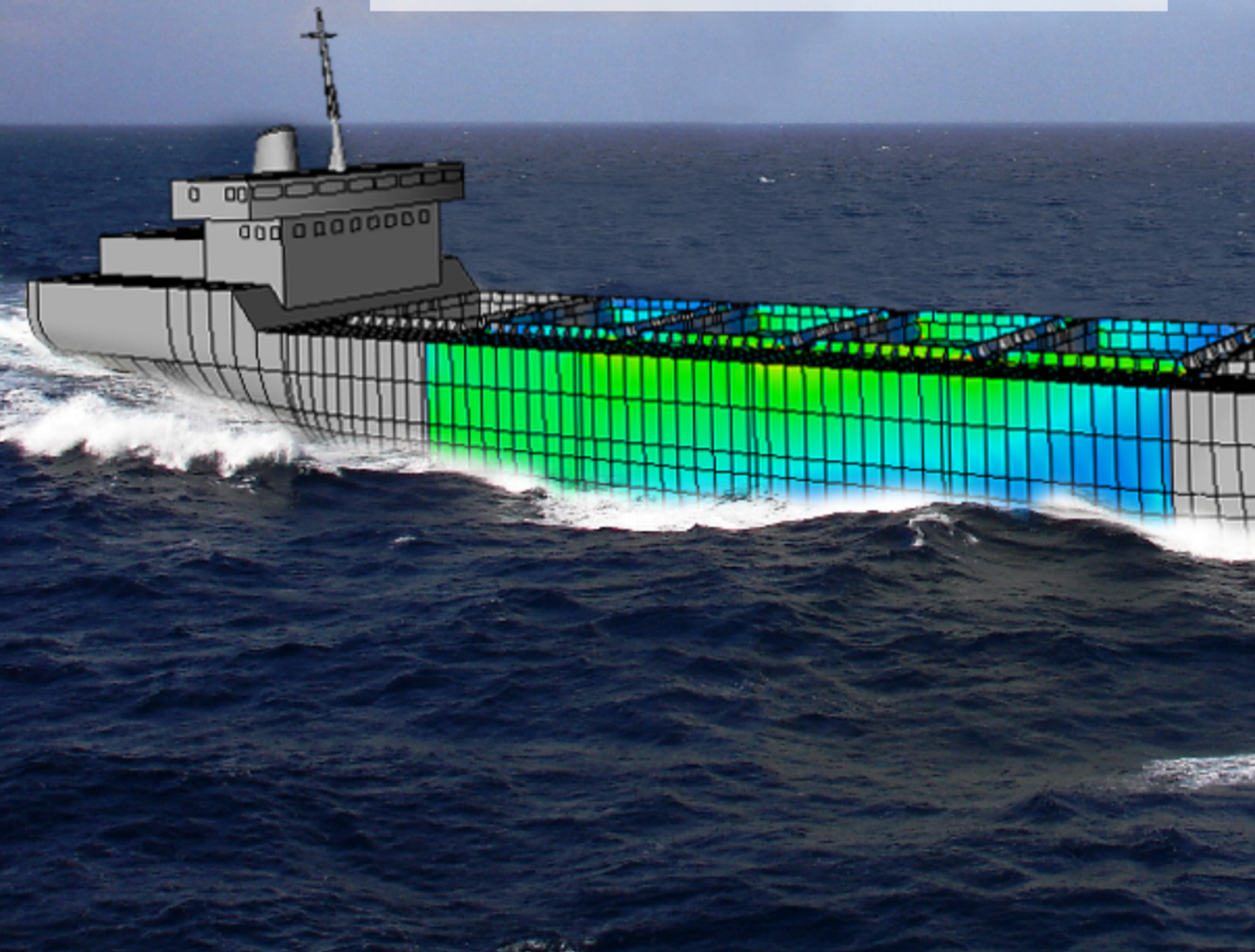
“We dream of a ship fast and capable enough to deal with the challenges of our time.”

OCEANOS NTUA



## Exceed the standards in engineering for the sea

BETA CAE Systems' software suite offers simulation solutions that cover the advanced needs of the maritime industry. From CAD data to ready-to-run models and full reports generation, simulation processes become fast and easy taking advantage of the complete multidisciplinary capabilities that make possible the setup of almost any type of analyses such as, ship collision, durability and fatigue, CFD, underwater shock wave effects, weight efficiency design, and vessels behavior under different types of waves.





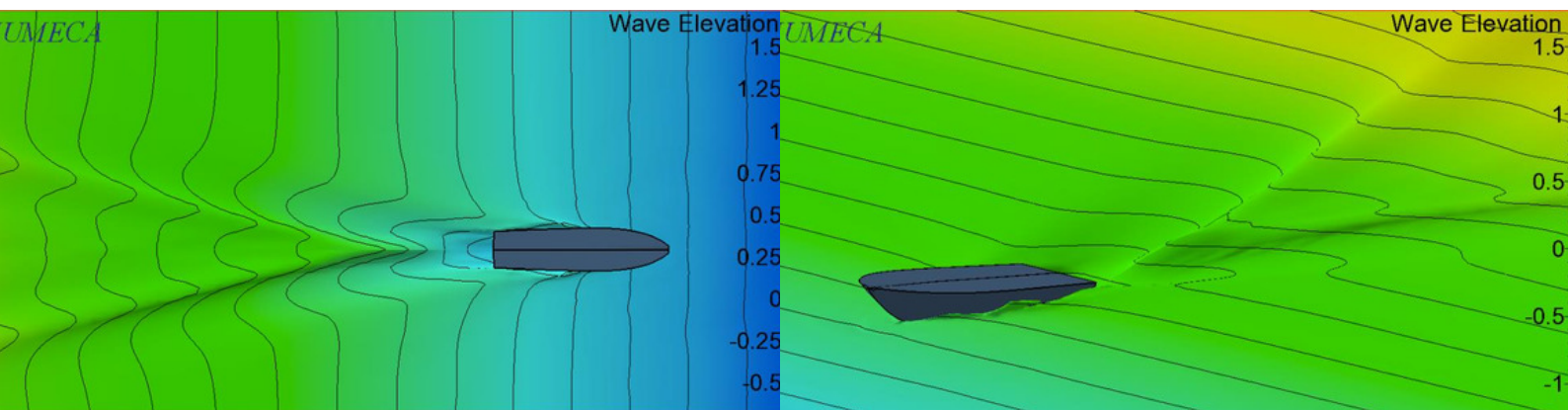
# The road to Hydrocontest 2018

## Design & Optimisation

Design Wageningen B-Series propellers for each race based on towing tank experiments and efficiency demands. We used NTUA in-house developed CFD codes for the hydrodynamics and modern CAD-CAE programs for the prototype models in 3D. The final product was constructed with 3D printing techniques.

The hull designs and hydrostatic calculations for the trimaran project were conducted with Rhinoceros Software V.5

The hydrofoil project was materialized via combined use of NTUA in-house developed codes for lifting flow problems and extensive sea trial testing for the final determination of shape and foil sizes. Achieving stability and efficient maneuvering with passive hydrofoils proved to be very challenging to design.



## Testing and Results

Condition of testing and measurements:

- Towing Tank at Laboratory of Ship and Marine Hydrodynamics - NTUA
- Sea trials at Agios Kosmas Marina

### Result description:

- Data collection for the propeller design
- Towing tank experiments showed the Trimaran Project to be insufficient
  - The hydrofoil position and shape was altered during sea trials



BEAUTY AND...



Photos by Marina Vennicos

***THE BEAST!***



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## Days of the competition

### Day 1

The official opening and some first trials. We had some problems with our foils but our team managed to repair them.

### Day 2

The day starting with us trying to repair some issues of the lightweight ship. The heavyweight qualified to the next round with the 3rd best time of the day. Our lightweight reached the speed of 6m/s. Finally, we did our tech talk.



### Day 3

We managed to improve our times and we got ready to secure a spot in the best 16 teams of Hydrocontest.

### Day 4

We managed to reach the last 16 in both categories. After the lightweight category we detected smoke coming from our ship. It was a problem with the motor the competition provided us, our electronics team resolved it as soon as possible.



## Days of the competition

### Day 5

In the first race for the lightweight category we managed to qualify to the round of 12 but on the race for the heavyweight category our rudder failed and we were disqualified.

Heavyweight Category: 13th place

### Day 6

We managed to qualify to the round of 8!



### Day 7

We were disqualified from the semifinals.

Lightweight Category: 5th place

### Day 8

We managed to race for 52 minutes in the long distance race and do 17 laps. Constant collisions to our ship broke two of our propellers forcing us to do two necessary pit stops losing valuable battery energy and laps, but in the end we finished in the 11th position among 28 teams.





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## The hydrocontest experience

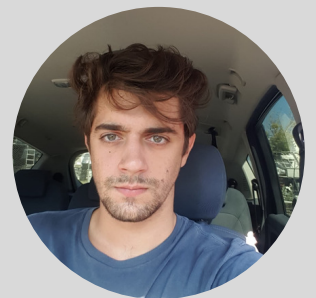


"Hydrocontest itself was a unique experience which urged me to renew my interest in Naval Architecture and above all in research and innovation. Through the group collaboration that we had, the amount of passion and effort we put in the project, along with the fresh ideas we came up with, put us in a position to both use and implement all of this technical mastery provided by our Faculty, as we engaged in the world of Shipping. While being a member of the Propulsion System Team, not only did I delved into the study of the Propellers in a theoretically, but also contribute to the manufacturing process of them, using the 3D-printing method. Thus, this past year left me with a very fulfilling, optimistic and enthusiastic taste, increasing my aspirations for the team's trajectory in the future."

Anevlavi Dimitra

"Despite the neverending issues which appeared throughout the whole process, along with the frequent designing and constructional infelicities, the acquaintances we made with people from all around the world was surreal. The joy of participation and excellence in this very contest showed me the reason why did I dedicate so much time and effort for this competition."

Anagnostakis George







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## The hydrocontest experience



**"Hydrocontest is a journey of knowledge, teamwork and sportmanship. Being part of a 300-minds group that are trying to make sea transportations more and more energy efficient is a noble achievement and leaves some pride in you, for all the time and efforts spent on the way. But since we are all young engineers competing and cooperating for this common goal, Hydrocontest 2018 had been an incredible starting boost for our mission as engineers!"**

**Karagiannidis Pavlos**

**"2018 marks my second participation in Hydrocontest. Frankly, words fail miserably to describe the amount of knowledge and experience I've gained throughout these past two years of participating to the contest. In my perspective, Hydrocontest's cornerstone is found somewhere between the friendly spirit and the exchange of both knowledge and opinions of its contenders. Out of all the piece of experience and knowledge I've gained by being part of such an enormous project, I consider the theoretical and practical knowledge to be the most important above all. Since we had to think and come up with a significant number of solutions to an already considerable number of problems related to our ships."**

**Manikas Nick**





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## The hydrocontest experience



**"Hydrocontest was a unique experience. Preparing for and participating in the competition gives students the ability to test their knowledge, broaden their horizons and get hands-on experience on the area of their studies. Teamwork plays the most essential role during the course of the competition and instills in students the value of sharing a common vision and goal. However, the most amazing part of the competition, are the 10 days when students actually get to work as engineers. Solving unexpected problems, thinking through innovative and cutting edge solutions in a limited time and under the pressure of the competition, tests their limits and sharpens their thinking. Overall, Hydrocontest and, particularly, the Oceanos team have been a unique motivation for me to become a better naval architect, team player and engineer!"**

**Matthaiou Achilleas**

**"The road to the competition it is not an easy process. You must devote too much of your personal time trying to improve your project. But this is not much of a problem as long as you love what you are doing and we all do! And when finally the project is complete the emotions of what you have achieve are priceless. The competition is fantastic! You get to know people from all around the world with different cultures and different ways of thinking. At the end you understand that every single moment you spent for this experience was worthwhile. "**

**Pagonas Thanasis**





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## The hydrocontest experience



**"Unique is the only word I can find to adequately describe my experience in Hydrocontest. In my opinion, the biggest pleasure one can have when working as an engineer is to witness the projects he's been tirelessly working on to finally start functioning. Given that, and the fact that I get to collaborate with people I highly respect and appreciate, these were the two most important benefits I gained by being part of the Oceanos team."**

**Sabethai Orestis**

**"Complete, fulfilling, excellent. Certainly Hydrocontest and the preperation till the first days of September were a full experience of how you should work and think so as to be innovative and competitive. It was truly a pleasure being part of the Hydrocontest Community."**

**Tsioumas Panos**





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## The hydrocontest experience



**"Hydrocontest is a crazy experience. The road to HC enhance your engineering skills, helps you cooperate with other people and makes you find quick solutions on problems that you may face. During the contest, you get in touch with universities and cultures from all over the world. If you ask me, as one of the founder members, three years at Oceanos, there are a lot, but i would do it again."**

**Tzanetos Socratis**

**"With my second participation in hydrocontest I learned a lot of new things. Teamwork and creativity, along with problem solving and practical thinking are some skills developed in high pressure situations. Moreover, meeting people from all over the world and sharing knowledge is something priceless."**

**Nick vlachakis**

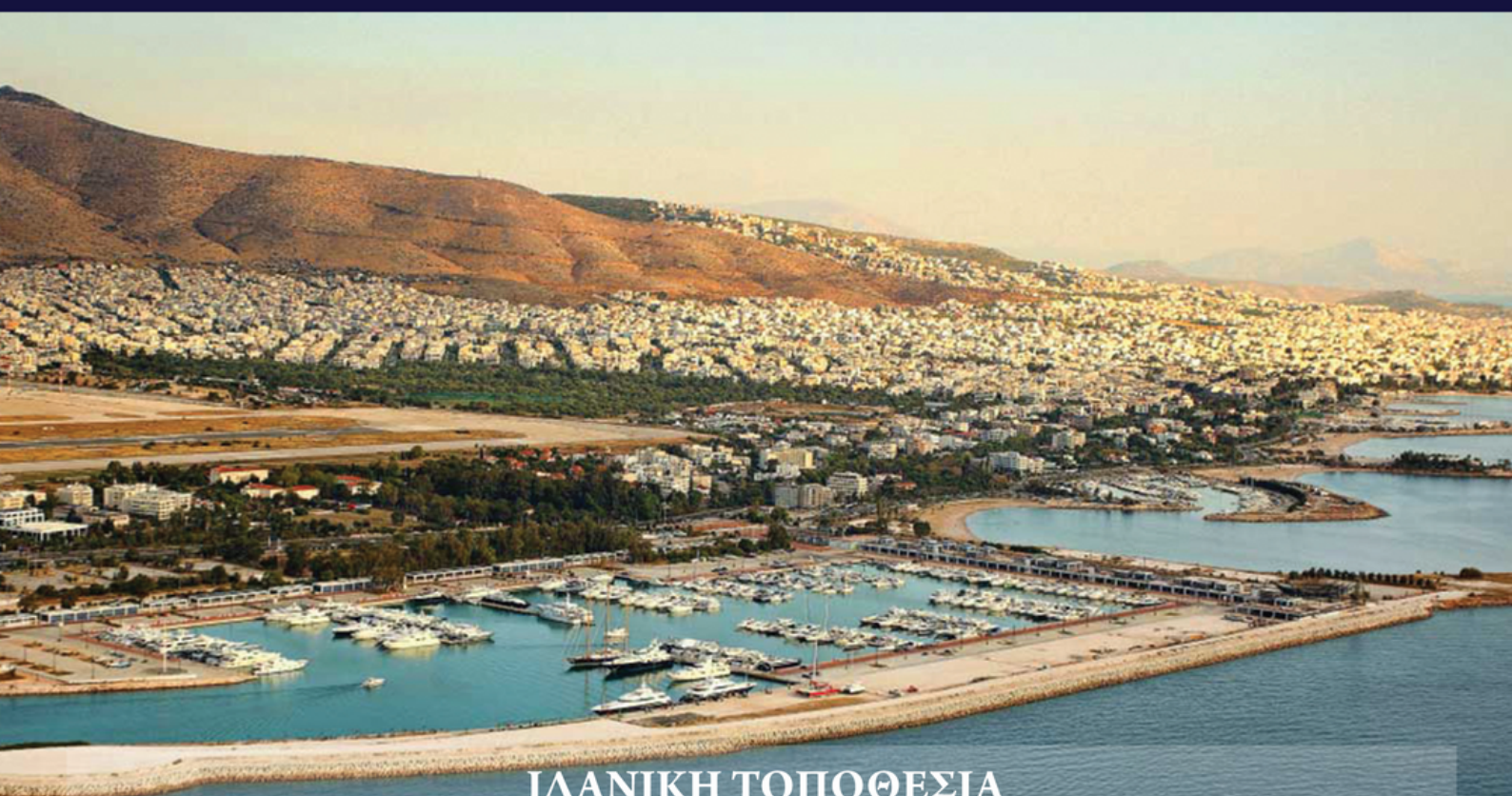






# ΕΛΛΗΝΙΚΟ ΑΕ

## ΜΑΡΙΝΑ ΑΓΙΟΥ ΚΟΣΜΑ



### ΙΔΑΝΙΚΗ ΤΟΠΟΘΕΣΙΑ

Η Μαρίνα Αγίου Κοσμά (έκτασης 450,000 τ.μ.) δημιουργήθηκε για να φιλοξενήσει τους αγώνες ιστιοπλοΐας των Ολυμπιακών Αγώνων "Αθήνα 2004".

Μετά-ολυμπιακά, αναπτύχθηκε ως ιδιωτική Μαρίνα, προσφέροντας στα σκάφη την καλύτερη προστασία από δυσμενείς καιρικές συνθήκες, σε ολόκληρη την ακτογραμμή περιοχή της Αττικής λόγω της εξαιρετικής της μορφολογίας.

Βρίσκεται στην παραθαλάσσια περιοχή στο νότιο τμήμα της Αττικής, δίπλα στην Γλυφάδα, 15 χιλιόμετρα από το κέντρο της Αθήνας και 25 χιλιόμετρα από το "Ελευθέριος Βενιζέλος" Διεθνές Αεροδρόμιο προσβάσιμη από τις γραμμές τραμ και λεωφορείων.

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Ο χώρος καλωσορίζει σκάφη μεγεθών από 6μ έως 70μ είτε για βραχυχρόνιο ελλιμενισμό, είτε σε βάση ετήσιων ελλιμενισμών καθώς και διαθέτει και χώρους για δεξαμενισμό και διαχείριση σκαφών.

Το προσωπικό της Μαρίνας έχει επιλεχθεί και εκπαιδευτεί προσεκτικά, ώστε να παρέχει στους πελάτες της, τις υπηρεσίες που υψηλού επιπέδου, με φροντίδα, εχεμύθεια και επαγγελματισμό.

# Industrialization

## Production

The production started in January and continued until August, with a budget of 10000€ covering R&D, materials, tools, consumables and essential model prototyping parts.

- For the propellers among the FDM and SLA 3D printed prototypes the latter were selected due to superior properties and surface quality.
- The hydrofoils were constructed as sandwich-composite materials using foam or wood as core and carbon fiber as outer skin. Among various production methods vacuum bagging gave the best results.

## Industrialization of the Project

### 1. The future of propellers:

The know-how of wake adapted propeller designs is essential for this project to materialize, but when it comes to production new methods and techniques in 3d printing may be the future of custom-made propellers for recreational vessels. It is important to note that:

- World's first class approved 3D printed propeller is already a reality!
- Wide range of materials and production techniques
- Fast production with relative low cost

2. Affordable, recreational vessels with passive hydrofoil designs: Active hydrofoil positioning control mechanisms provide excellent maneuverability to hydrofoil vessels, but require increased CAPEX indexes. Our design is suitable for small recreational hydrofoil vessels that are energy efficient, affordable and relatively easy to produce. Simplicity sometimes is key!







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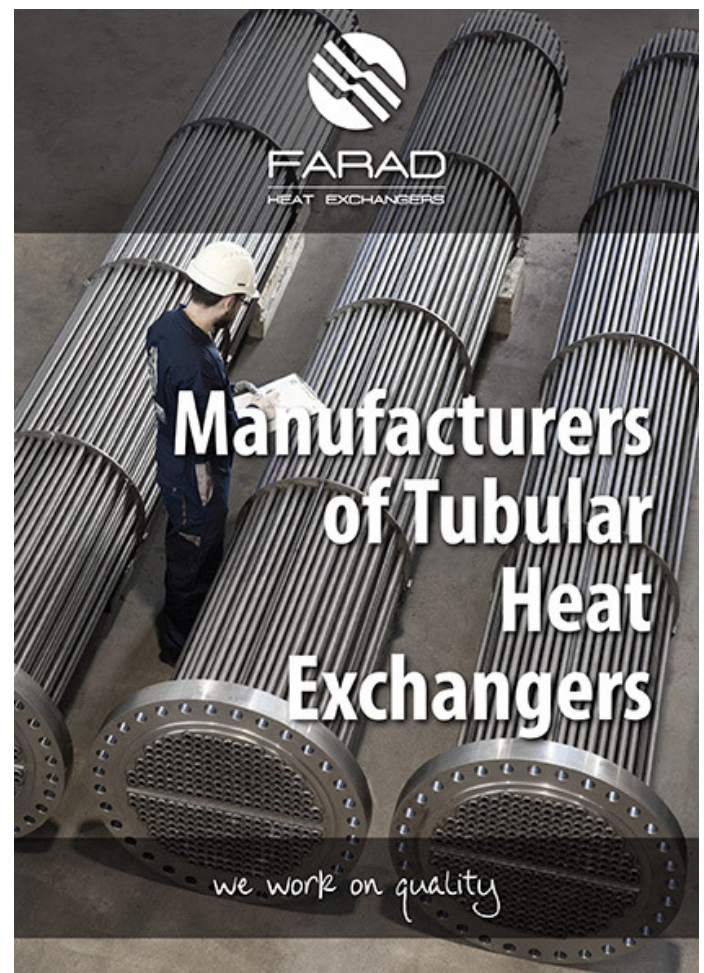
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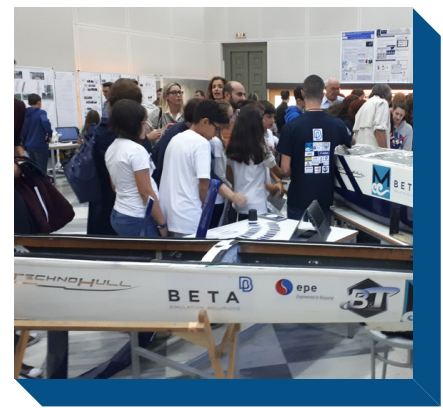
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## Promoting green shipping and energy efficiency

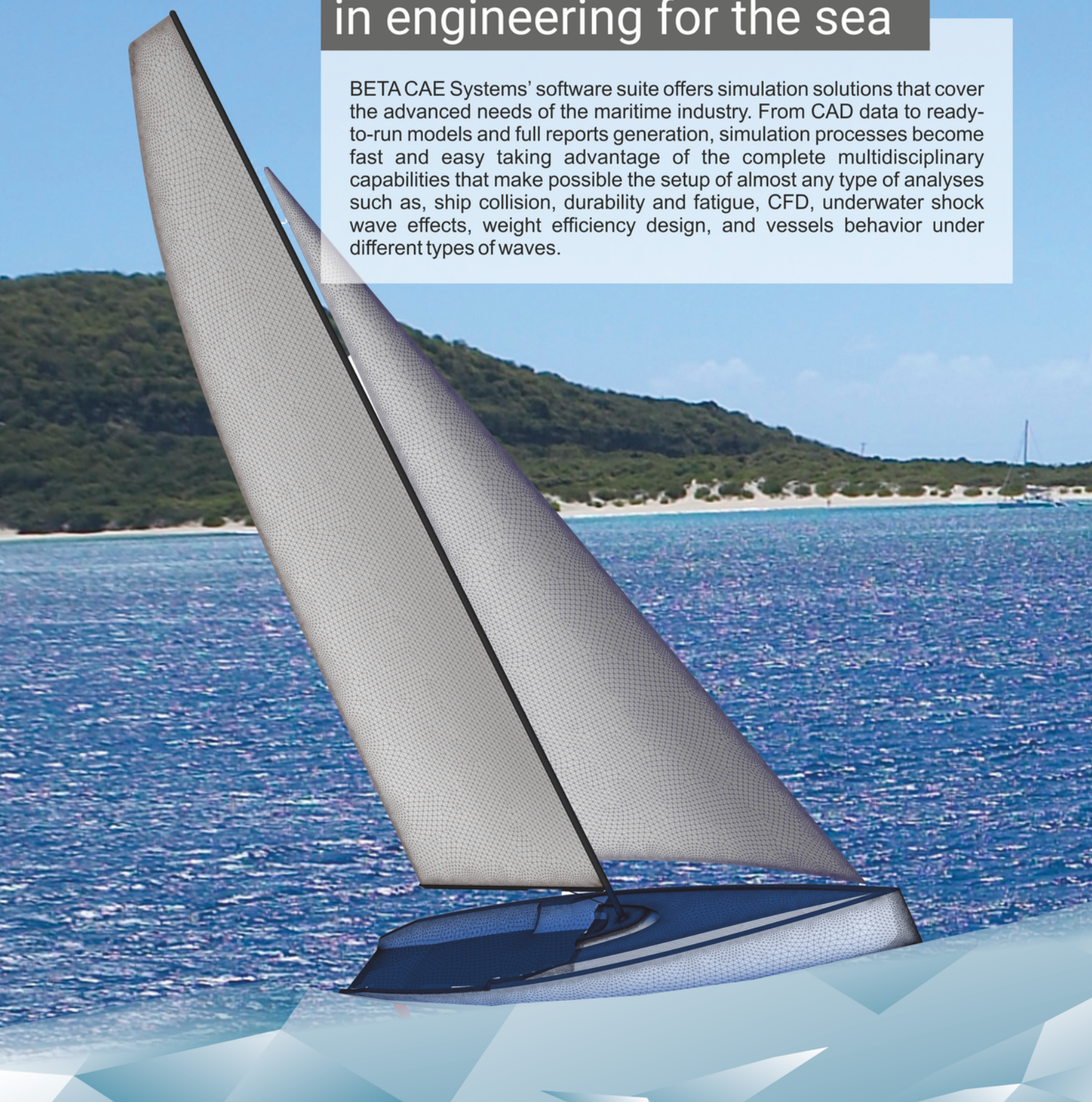
Apart from the researching and the competing character of Oceanos, our team aims at raising awareness of the greek general public in the sectors surrounding the green shipping and the energy efficiency. All of the above were achieved by taking part in numerous students events and in the following events of a general interest : **Posidonia 2018, researcher's night, NTUA's 180 years celebration, TedxNTUA, Unique Days and the 1st official meeting of the entrants in Florina, Greece**





## Exceed the standards in engineering for the sea

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