



# Official Portfolio World Robot Olympiad 2014



[www.minders.gr](http://www.minders.gr)



Sochi - Russia 2014

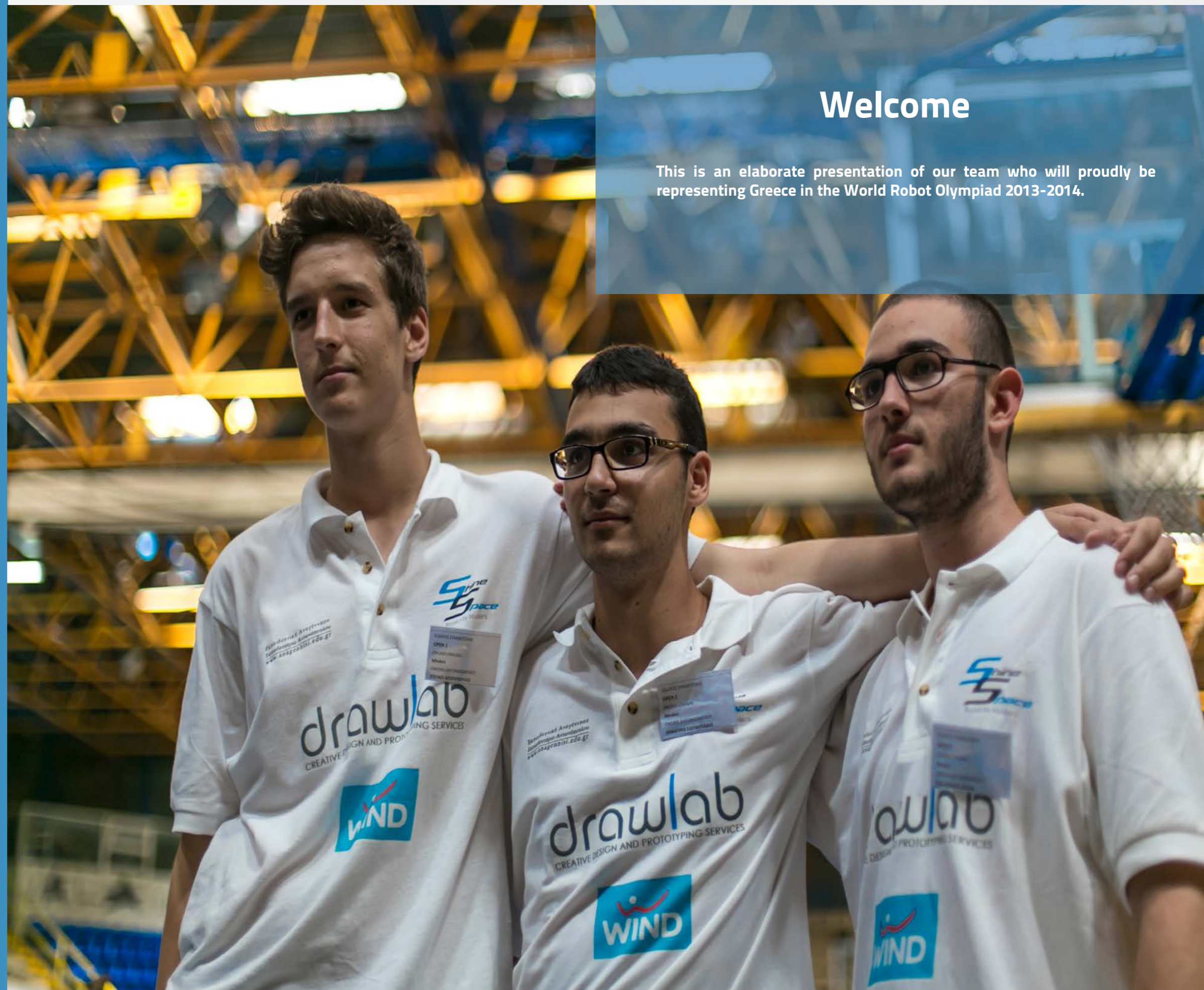


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## Welcome

This is an elaborate presentation of our team who will proudly be representing Greece in the World Robot Olympiad 2013-2014.





# THE TEAM 2013-2014

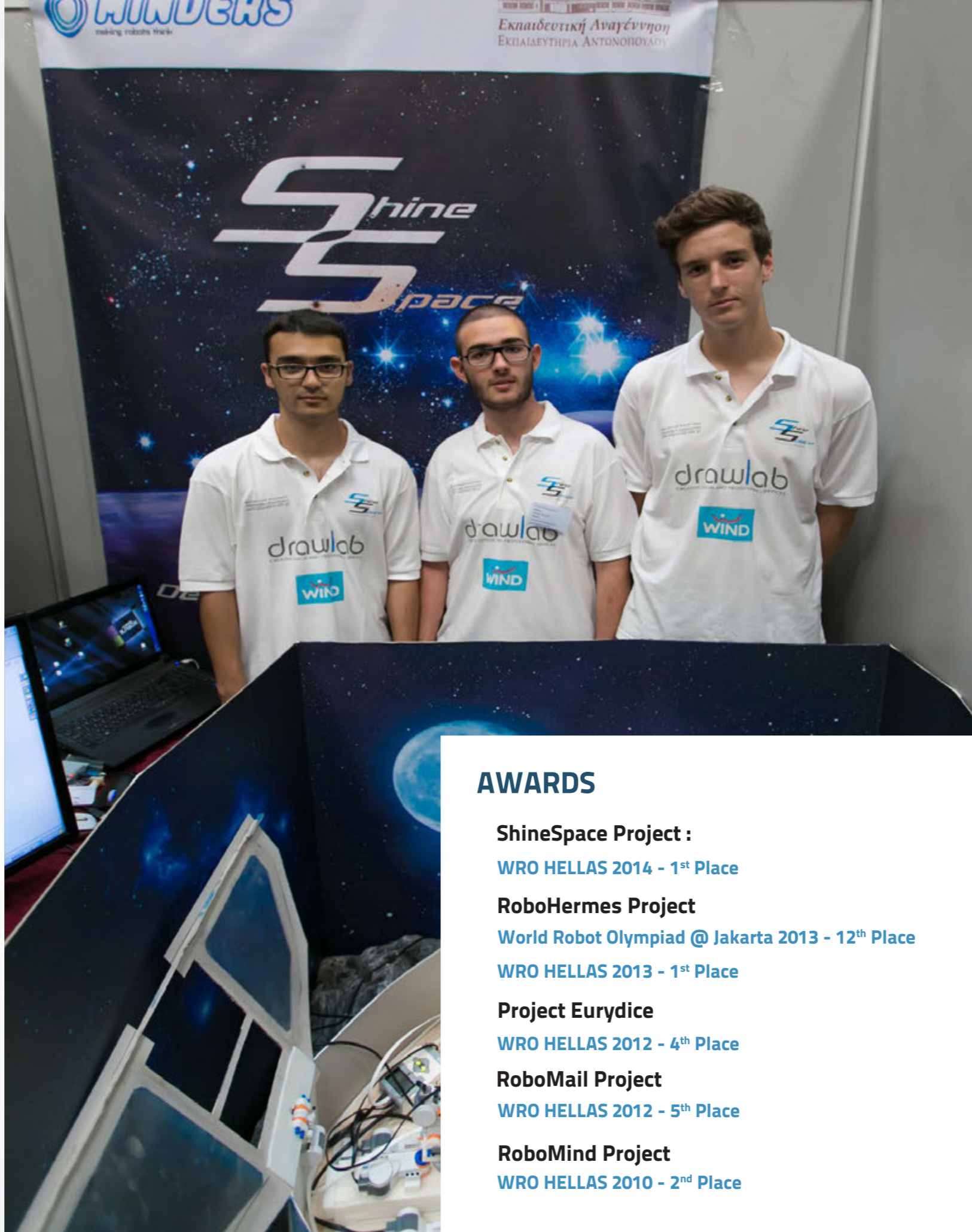
## HISTORY

"Minders" is team established in 2010 by a group of Ekpedeftiki Anagennisi students, a private school, aiming at including and promoting robotics in its curriculum.

They are one of the most widely known teams in the Hellenic Contest WRO Hellas, having participated very successfully for the past four years.

Since their inception, the team has aimed at applying techniques of human logic and thought to their creations in order for the "robots" to be able to identify with humans and, therefore, to enhance the standards of living in any field (eg. Project Eurydice, RoboMind Project, RoboHermes Project).

With this criteria in mind, the Minders team was established with the goal to further advance and evolve the technology in the field of Robotics, something that has been successfully achieved by each generation of Minders.



Reference from  
WRO HELLAS  
Secretary of the  
Scientific Committee

PROF. DIMITRIS ALIMISIS

“

Minders, being one of the most successful teams in the Hellenic WRO, have continuously achieved to introduce unique innovations, and with their strong presence, raise the bar every single year.

”

## AWARDS

**ShineSpace Project :**

WRO HELLAS 2014 - 1<sup>st</sup> Place

**RoboHermes Project**

World Robot Olympiad @ Jakarta 2013 - 12<sup>th</sup> Place

WRO HELLAS 2013 - 1<sup>st</sup> Place

**Project Eurydice**

WRO HELLAS 2012 - 4<sup>th</sup> Place

**RoboMail Project**

WRO HELLAS 2012 - 5<sup>th</sup> Place

**RoboMind Project**

WRO HELLAS 2010 - 2<sup>nd</sup> Place



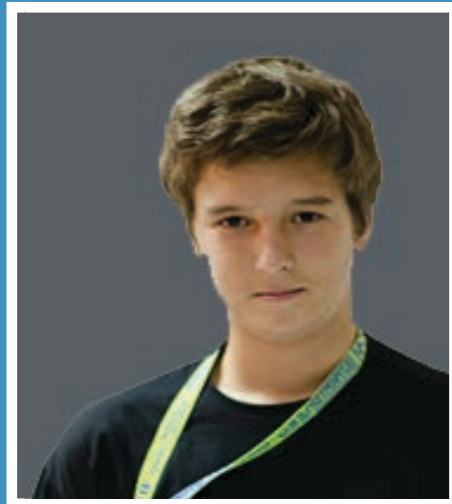
# ROSTER & RESPONSIBILITIES

## DETAILED PRESENTATION OF 4TH GENERATION

The 4th generation of Minders has presented the most developed project challenging the Hellenic Contest and aiming higher by introducing breakthroughs in various fields.

The team consists of three Senior students who have been co-operating on different projects for many years and their endeavor has produced impressive results.

The composition of the team:



**Stelios Agoropoulos**

Team Leader & Programmer

Short bio :

Stelios is a Senior student. He is actively involved in Programming as well as Graphic Design, hence he has undertaken the programming of the Robot and he is head of the team.



**Alex Lessis**

CAD Designer & Constructor

Short bio :

Alexander is a Senior student. He engaged in 3D Design and 3D Modelling construction and science. He is responsible for the design and building of the Robot.



**Dimitris Eleftheriadis**

Marketing & Media Manager

Short bio :

Dimitris is a Senior student. He is involved in Computer Science and he has a flair for Economics. He is in charge of the accumulation of subsidies as well as the promotion of the team to the public.



## Mentors



**Orfeas Zafeiris**

Short bio :

Orfeas is a student at the University of Ioannina and one of the founding members of the Minders group. He is mostly engaged in Computer Science, Software Engineering, and construction of large and complex systems. He is responsible of coordinating all programming efforts and introducing new and advanced development techniques.



**Iasonas Taoukis**

Short bio :

Iasonas is a student at the University of Piraeus, and along with Orfeas he is one of the founding members of the Minders group. He is mostly engaged in Computer Science and Robotics Teaching, and is responsible of coordinating the group's efforts and maintaining communication with external partners.

## Coach



**Dimitris Moraitis**

Short bio :

Mr. Moraitis is a Computer Science teacher. He is the team's director since 2010, and he counts all of the team's successes in his biography.

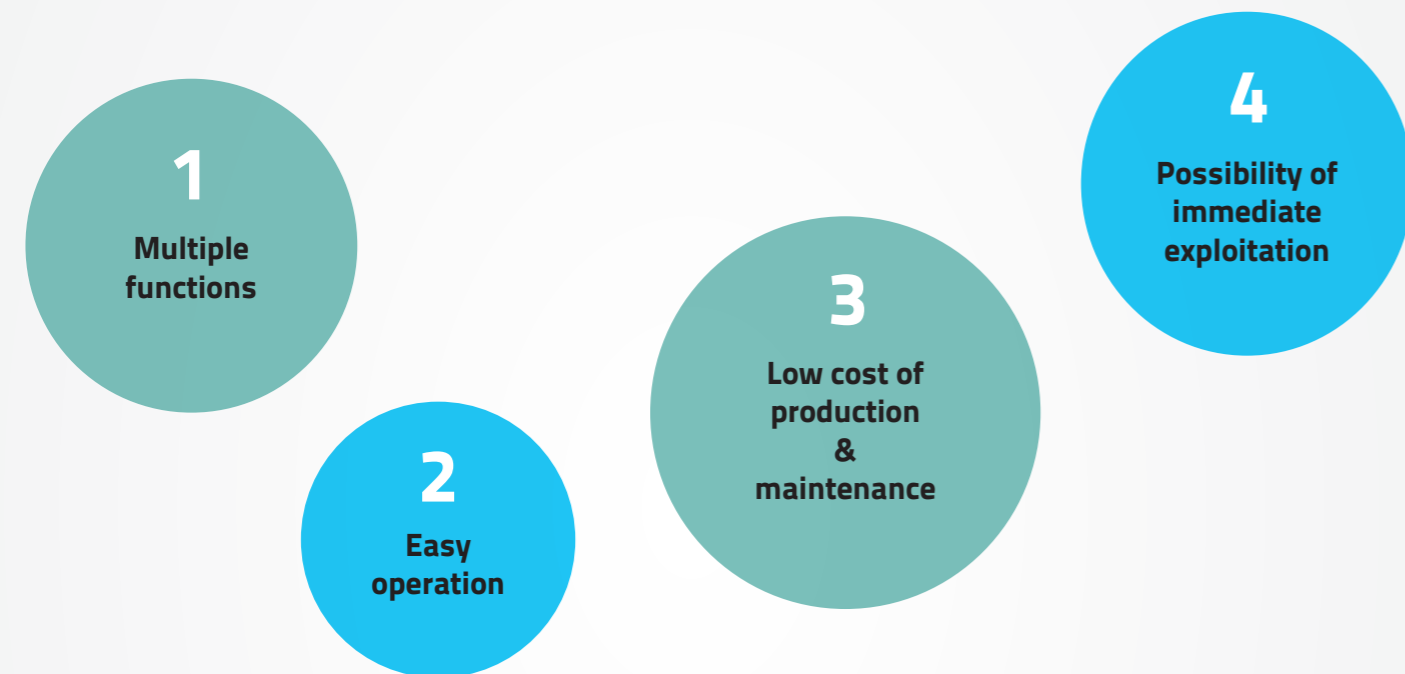


# THE PROJECT

The reduced industrial development in space not only makes research hard, but it also financially burdens many countries and organizations. The World Shinespace Project provides a solution to this important issue by introducing new technologies and focusing on space wealth that is left unexploited.

## The Basic Idea

Taking into account all the above, we decided to create a model robot that will meet certain criteria:



The results speak for themselves

Shine Space is an advanced Robotics system that aims to develop a mining industry in space. This is achieved through the extraction of precious minerals found in asteroids located in the zone between Mars and Earth.

What makes the difference in Shine Space is its practical use and multi-functional design. This is showcased through Shine Space's structure and functions. Moreover, its manufacturing cost is relatively low.

Lastly, the minerals collected by Shine Space can be used in space stations and thus the transportation of minerals from Earth to Space and its associated costs are avoided. Based on the evidence above, we can conclude that Shine Space is a useful device that can assist space colonisation programs.



# SHINESPACE'S CONTRIBUTION



After careful study, we came to the conclusion that Shinespace can harmonize perfectly with the most evolved and active space services in the world, which could use it to their benefit.

With regard to its characteristics, it could work with the following services:

**National Aeronautics and Space Administration (NASA)**

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**Russian Federal Space Agency (RFSA)**

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**European Space Agency (ESA)**

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**China National Space Administration (CSNA)**

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# THE ROBOT



## Innovations & Progress

The design of our robotic system is made in the most elaborate and innovative way. The use of Lego parts rendered our construction unstable. Therefore, we decided to design our own parts on which we attached the Legos. The design of these pieces was realized via SolidWorks and its mechanical functions were tried both electronically and in practice. For the transition of computer design to real parts we made use of 3D printing. The print involves resin set on the base of the printer which succeeds in gradually building each piece.

The aforementioned techniques enabled us to evolve our robotic system. The initial design consisted of solid constructions that restrained the movement of the robot. Through research and experimentation, we achieved enhancing our designs and creating arms that provide free movement and a smaller base than the original which results in energy efficiency.

Progress

Is

Success



## Working Procedure

**A detailed presentation of the function scenario.**

Shine Space automatically locates an asteroid in the Mars-Earth orbit. It immediately sets its course towards it with the aim of landing on its surface. Ground recognition and the collection of precious metals are to follow. After having collected and separated the metals, there are two options to be taken:

1. The system returns to its base in order to deposit everything it has collected.
2. The robot is approached by an auxiliary spacecraft, which detaches the storerooms and carries them to the base and back to the robot, so that the procedure can continue. This option is less time-consuming and minimizes the possibility of not collecting metals from the asteroid.



## Hardware Analysis

**The system consists of 3D printed parts, the assembly of which makes the robot complete.**

- It consists of individual parts, easily disassembled and re-assembled for every mission.
- On the base there is a claw, a drill and the storerooms a-Fuel or battery space
- Landing and attachment legs
- Zero fragility
- 3D printed parts make its production easy, even on space stations.



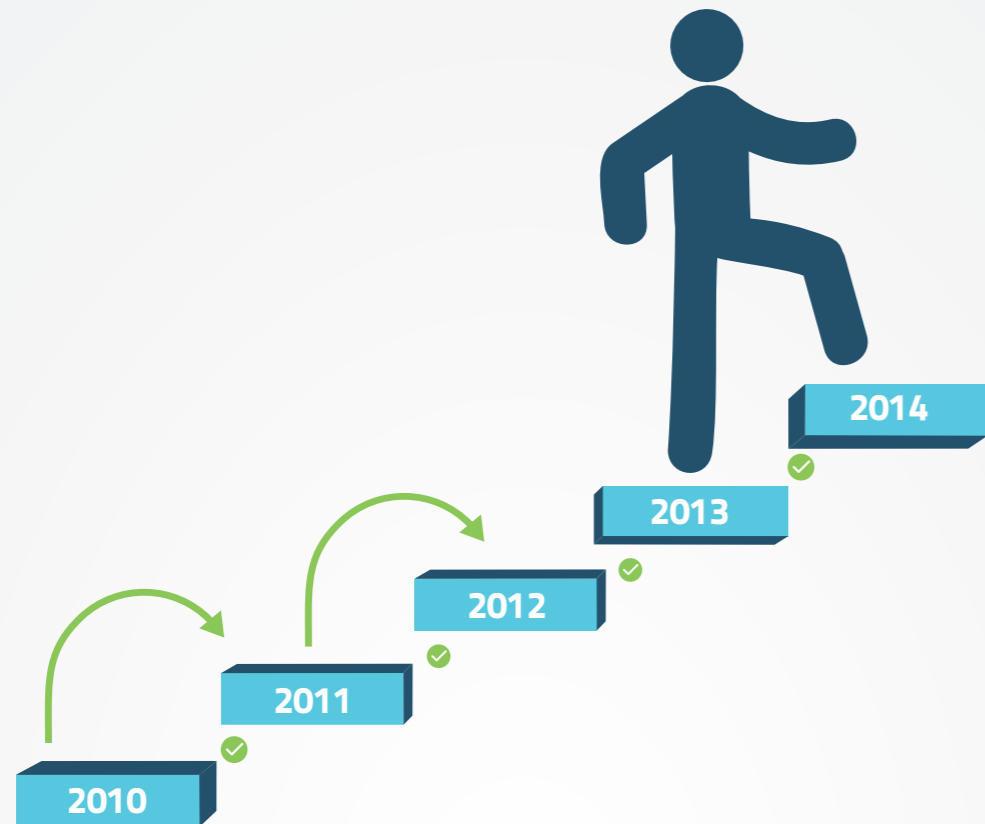
## Software Analysis

**ShineSpace software is up-to-date and meets the requirements for the robot's orderly function.**

Fully controlled function-wise.

- Automated program (primary use)
- Manual function possibility (secondary use)
- Sensors transmitting signals to the application
- Digital calendar with an immediate recording of the missions on a special database for each Shinespace.
- Start and shutdown text messages
- Error text messages

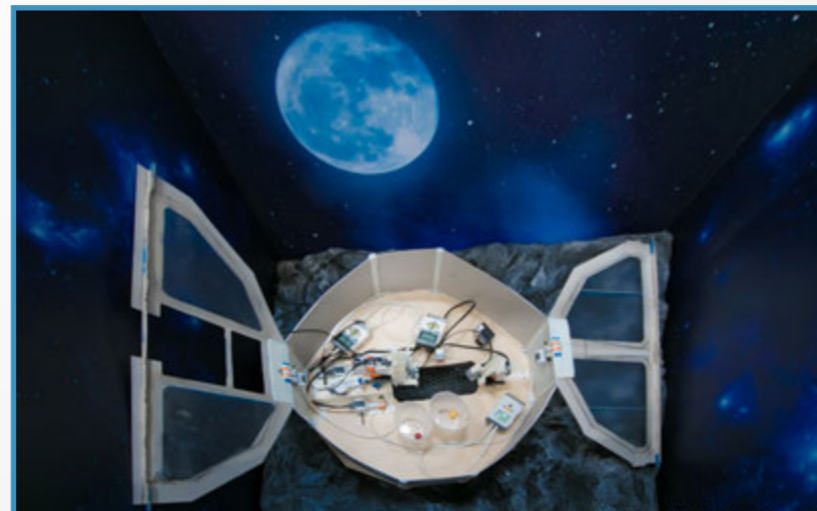
# DEVELOPMENT



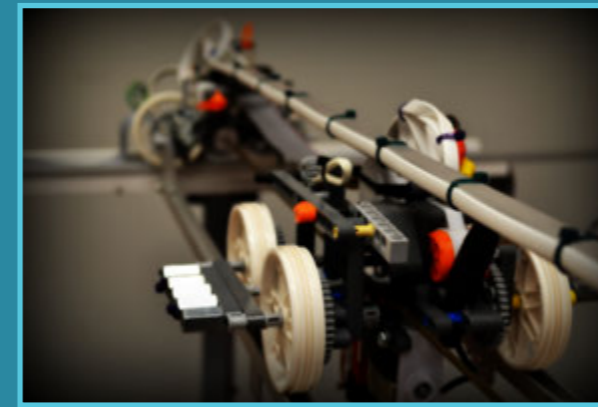
Through incessant will and continuous work, we have managed to improve and evolve not only throughout the years as a team, but also between the two competitions. Our well-organized team and way of cooperating have been fruitful in every aspect.



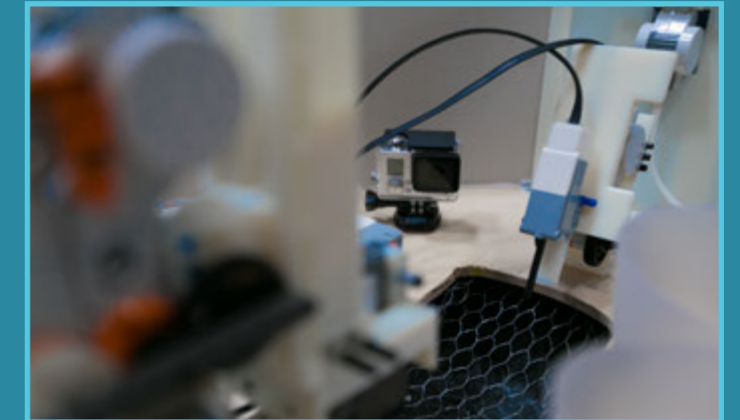
2011



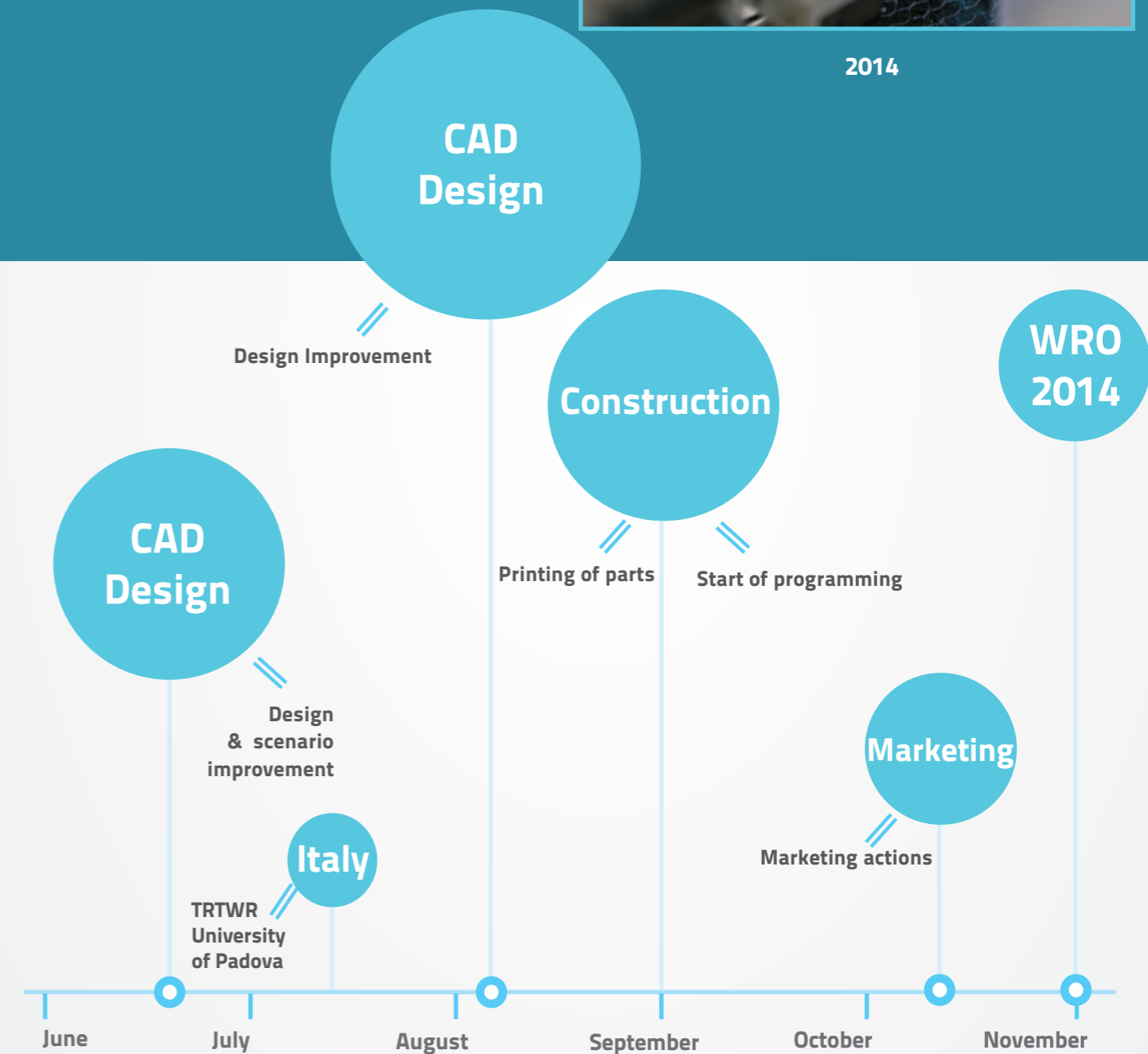
2014



2013



2014





# MIND THE MINDERS!

Our passion for robotics fills our desire for another visual issue

## Teaching Robotics & Teaching With Robotics 2014

In the aftermath of our success in the 2014 Teaching Robotics Panhellenic Competition, our team was invited to participate in the International Conference on Intelligent Autonomous Systems and in the "Robotics in Education 2014" exhibition, which took place in Padova University in Italy, in July 2014.

Our participation, gave us the chance to present our robotic system before an audience of experts at robotics and autonomous systems. It was definitely a memorable experience, through which we gained knowledge, which helped us achieve our goal in 2014 Robotics Olympics.

## TEDx Academy 2014

We were given another chance to present our project by Drawlab, where we print out the 3D printed parts of our construction. Consequently, one of the parts of our construction was exhibited in the TEDx Academy 2014 stall, in the Opera House of Athens.

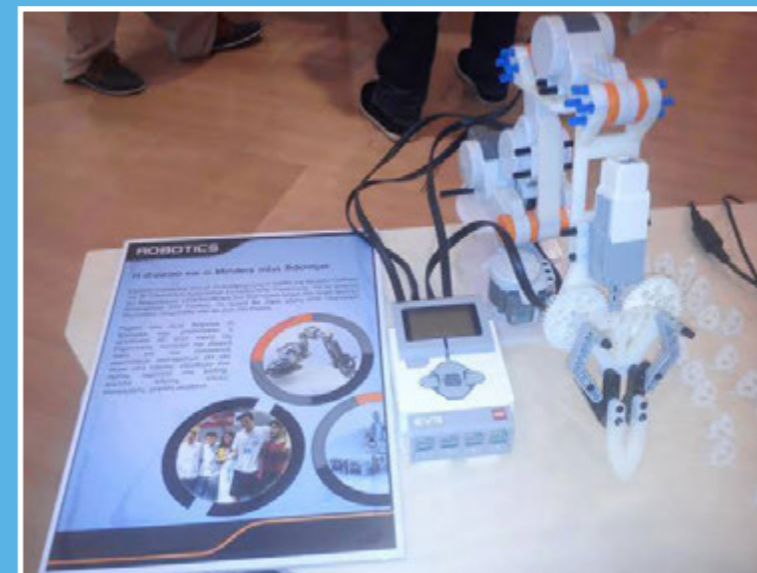
**TED<sup>x</sup> Academy**  
x = independently organized TED event



Minders at Centro Congressi - Padova "A. Luciani"



Minders after Teaching Robotics & Teaching With Robotics 2014



Minders' Part of Project at TEDx Academy 2014



# MARKETING

Marketing is essential to the team's orderly function, since it ensures all the necessary funds, not only for our projects and travels, but also for the promotion of our team.

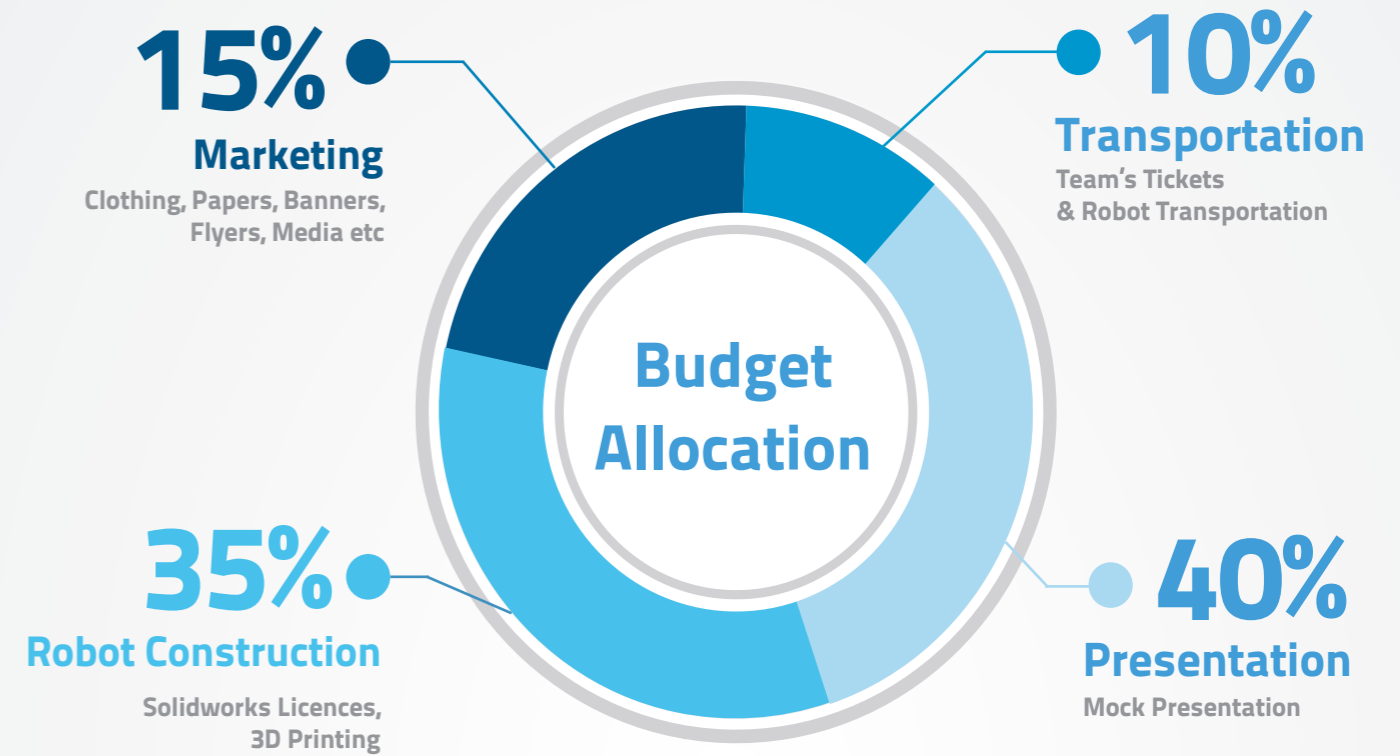
The sponsors on the next page funded our project and helped us realize our travel to Russia.

## The Team Brand

### Clothing for the Competition



## Marketing Strategy



In order to ensure the aforementioned funding, we approached some companies, with the well-known "Return on Investment" system, which depends on reciprocation, meaning that the company's offers in terms of money, services, e.t.c., are returned in the form of the promotion.

The sponsors over the page have funded our project and helped our participation in Sochi become a reality.

# OUR SPONSORS

**drawlab**  
CREATIVE DESIGN AND PROTOTYPING SERVICES



NBG PANGAEA



**innora**  
robotics and automation

**Vertitech**



Rhodes Marinas S.A.



**Clever point**

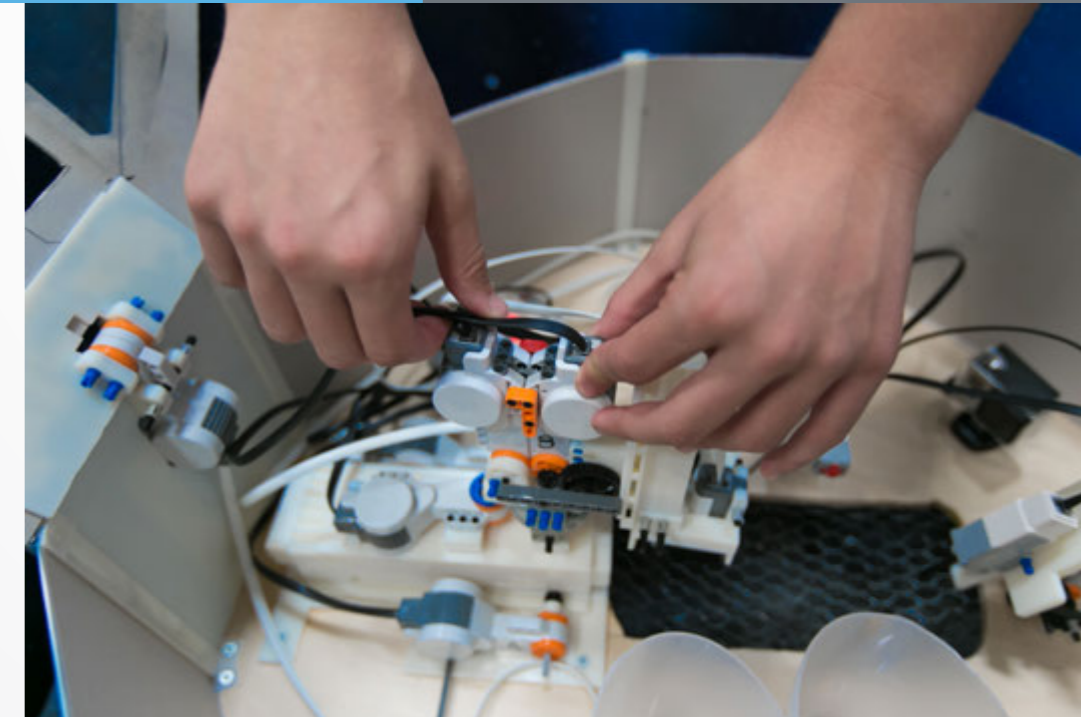
**SPORTS DUMBAI**  
Gamers Uniform **GREECE**

## Team Perspective

One of the assets of our team in the process of finding the right sponsors is the perspectives reflected by our project and the sense of confidence we inspire.

Therefore, we constantly try to invest on relations based on trust and interaction with our sponsors with the aim all parties benefiting from it.

Bearing the above in mind, our cooperation constantly improves and there is mutual respect, which eventually leads to success.







## OUR PASSION IS OUR OUR PATH TO SUCCESS

Throughout the years, the magical world of robotics has been an indispensable part of our everyday life, as well as a long journey with lots of experiences, the climax of which is the International Robotics Olympiad.

Our aim is the best possible representation of our country and the best possible rank.

We would like to thank all those who have supported our project and all those who dedicated their time to observe it.

The generations to come have even greater expectations and ambitions to walk in our path to success.

Minders 2014 - One Team - One Passion



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