



Official Portfolio
World Robot Olympiad 2019

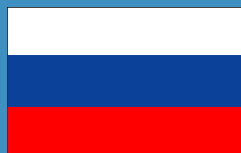
www.minders.gr



Jakarta - Indonesia 2013



Padova - Italy 2014



Sochi - Russia 2014



Doha - Qatar 2015



Costa Rica 2017

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Welcome

This is an elaborate presentation of our team who will proudly be participating in the World Robot Olympiad 2019.



THE TEAM 2019

HISTORY

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

Minders is one of the most widely known teams in the Hellenic Contest WRO Hellas, having participated very successfully for the past 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, ShineSpace Project, Poseidon 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.

2019 AWARDS Skeye Project:

WRO Hellas 2019 - 1st Place



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. ”

OLD AWARDS

Poseidon Project :

World Robot Olympiad @ Qatar 2015 - 25th Place

WRO HELLAS 2015 - 1st Place

ShineSpace Project :

World Robot Olympiad @ Sochi 2014 - 7th Place

WRO HELLAS 2014 - 1st Place

RoboHermes Project

World Robot Olympiad @ Jakarta 2013 - 12th Place

WRO HELLAS 2013 - 1st Place

Project Eurydice

WRO HELLAS 2012 - 4th Place

RoboMail Project

WRO HELLAS 2012 - 5th Place

RoboMind Project

WRO HELLAS 2010 - 2nd Place

Atlantis Project:

WRO Hellas 2017 - 2nd Place

AeroFarm Project:

WRO Hellas 2018 - 3rd Place

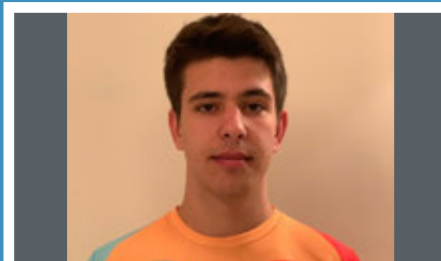


ROSTER & RESPONSIBILITIES

DETAILED PRESENTATION OF THE 7TH GENERATION

The 7th generation of Minders has presented the most developed project in the Hellenic Contest and aims higher by introducing breakthroughs in various fields.

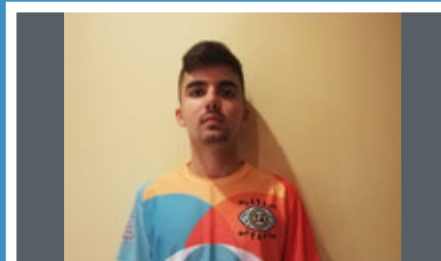
The team consists of four Senior students who have been co-operating on different projects for many years and their endeavor has produced impressive results.



Christos Antonopoulos

Team Leader

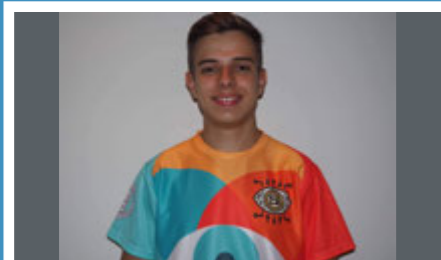
As a team leader Christos is responsible for the marketing of the team and supervises both the engineering and programming department of the team in tandem.



Kostis Spyridonos

Manufacturing Engineer

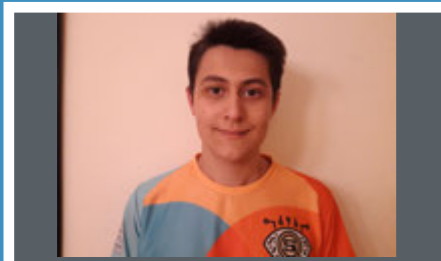
Kostis is the manufacturing engineer of the team ,his main responsibility was the construction of the robot.



Theodore Gkamaletsos

Programmer

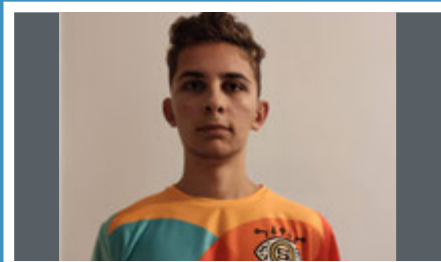
Theodore is the main programmer of the team, therefore he developed the program for all EV3 parts..



Dimitris Papageorgious

R&D Manager

Dimitris is the R&D manager of the team, he focused on programming the image recognition system.



Thanasis Pantazis

Design Engineer

Thanasis main responsibility as design engineer was to assist Kostis in buildingg the robot.

Mentor



Timos Trifonidis

Short bio :

Polytimos is a student at the Metropolitan College, that collaborates with the University of East London. He is engaged in Electronic Engineering. He is responsible for coordinating the group's effort and implementing programming and mechanical techniques.

Coach



Dimitris Moraitis

Short bio :

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

THE PROJECT

Our planet faces a major problem with pollution. Big cities are a source of pollution. The Skeye Project provides a solution to this important issue by introducing new technologies and focusing on sources that are environmentally friendly.

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

Our project "Skeye" is an intelligent e-governance system.

As a basis we use a CCTV (security), which draws data from the city. Robot workers, on a routine basis, undertake to collect garbage from the city, disposing them in a recycling system that separates them accordingly.

In the event of a traffic accident they regulate traffic and provide first aid.

Finally the robots are assigned to guide the crowd to a safe place, in the event of a natural disaster or emergency. Our project's sorting system separates trash to paper, plastic, aluminium and non-magnetic metal for the purpose of recycling.



SKEYE'S CONTRIBUTION



After careful study, we came to the conclusion that Skeye can harmonize perfectly with most of the big cities around the world where pollution is a big problem.

NEW YORK

ATHENS

DOHA

TOKYO

THE ROBOT



Hardware Analysis

The project is divided in two parts, the robotic workers, and the garbage sorting system:

- one Arduino Genuino
- one 9V battery
- A 4K camera
- two generators
- one laser
- two infrared sensors
- one electromagnet
- two LED screens
- photoresistor (LDR)
- Two Ev3
- Two Ev3 touch sensor
- four Ev3 large motor
- Four Ev3 medium motor

Robotic Workers

We use 2 large motors for driving the robot .

Three extensions that attach in the front of the robotic worker,each extension can be replaced within 8 seconds,which enables our robots to be adaptable in every enviroment

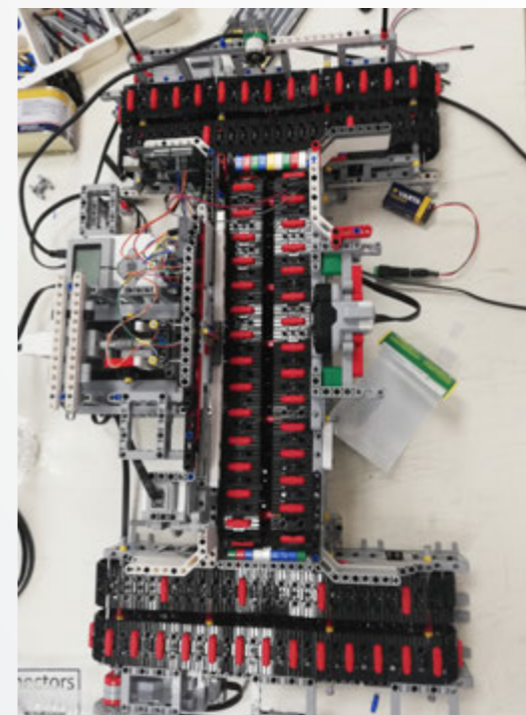
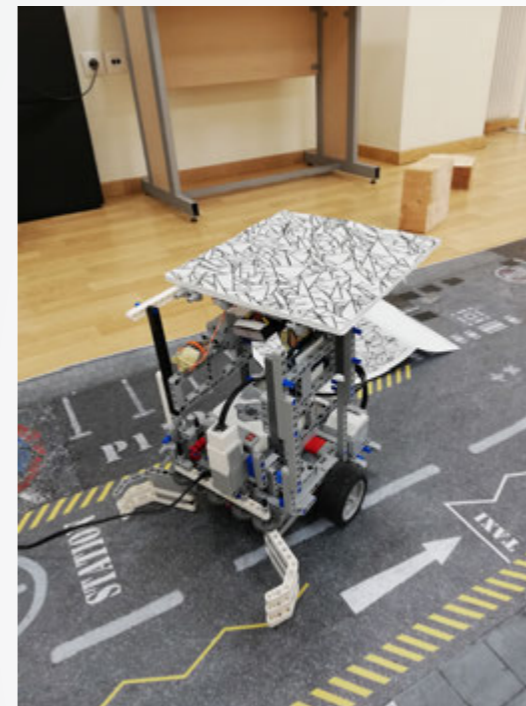
Our Robotic claw ,uses a blocking cogs mechanism to collect the garbage and raise them above the ground.We designed this complex system since due to limited Ev3 motor ports (4) one motor had to move in both X and Z axis.

We designed a 3d printed robotic gritter for snowy days.Our system drops salt along the road evenly.The period of the cylinder can be adjusted in order to maintain the required speed depending the weather conditions.

We developed a robotic cleaner.Using a single motor and a complicated cog system we trasfered the motors motion to two rotating brooms.They can be used to reduce dust and make roads cleaner.

Sorting machine

We used 3 large motors to control the 3 different belts. Every time a garbage drops into oy system,the Ultra-sonic sensor activates the system,a laser beam hits the can in order to realise if it its transparent,then two electrodes are steadily pushed towards the trash to understand if it is conductive ,and finally the electromagnet is activated to check if the material is magnetic.Gathering all this information we could now understand the nature of the refused material (paper ,glass plastic,aluminium,metallic magnetic0,and drive it to recycling .



THE ROBOT



Software Analysis (EV3 & Arduino)

The programming side of our project is just as complex and advanced as the mechanical. It is something we have worked really hard on and are really proud of. Perhaps the most advanced part programming wise is the image processing algorithm. The image recognition of the worker robot on the map is done by a computer that analyses the camera image that is fed to it. The computer is programmed to recognize a special pattern that is located on top of the robot and use that as a reference to the position and heading of the robot. The special locations on the map are pre-stated in the program with reference to the image of the map. Using basic trigonometry we are able to guide the robot to wherever it is needed. The trash items get pinned by the computer using color recognition and also act as locations on the map for the robot to go to. Our algorithm is specially made to be dynamic, this means that the camera image is constantly updated in order for the system to respond to any changes happening on the map (items or robot changing location suddenly) and alter the course of the robot. The computer is paired via Bluetooth to the EV3 and therefore guides the robot through every scenario of operation.

We have 3 operation scenarios with this priority line:

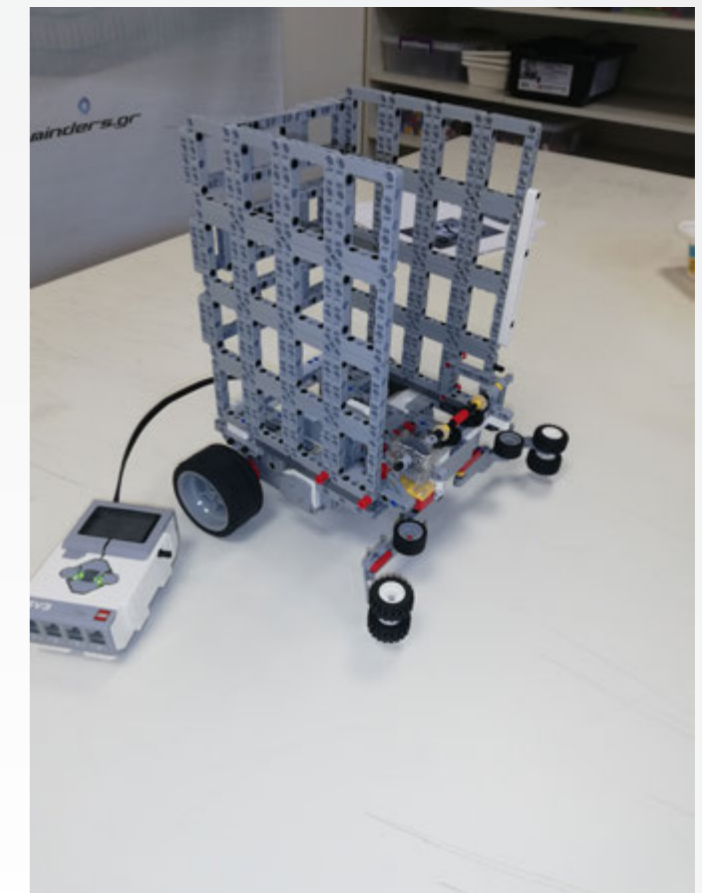
- 1.Citizen search and rescue
- 2.Road accident catering
- 3.Routine operations

The robot works as a translator. It turns the computer's messages into movement on the map. It simply follows the instructions given to it. This is not a problem though since the image analysis outputs excellent results for the robot's guidance.

The sorting of the recyclable items is done independently from the gathering system. Our sorting machine uses innovative testing methods to recognize the different types of materials. The sorting is done by using a case elimination algorithm. The first test results to plastic or something else, the second test results to paper or something else and finally with the third test we get a definitive result of magnetic metal or not magnetic metal. The sensors are all operated by an arduino module that is connected to the EV3 that operates the motors of the sorting machine. These two different brains communicate and share information through the I2C protocol and this allows them to work as one homogenous entity.

The fire alarm of the city is activated by a special arduino sensor which is called MQ-6 and detects a type of gas called LPG and also by a fire sensor that is activated by flame. This arduino also communicates with its own EV3 responsible for the safety bar operation. The fire alarm is deactivated by an RFID pass key. This whole fire alarm system operates on a routine check algorithm.

Finally the party trick of our project, the AR feature is done using a special platform called "Reyelise" and is specially set up to fit the demonstration needs of this specific project.



PROJECT MANAGEMENT

Project management and the organization of the team were two of the most important and decisive parts of the competition. Without them, we would not have been able to evolve and be competitive in the competition.

For this reason, our team put a lot of emphasis on this part, which we decided should be divided into three equally important parts:



Cost Calculation & Classification

One of our first steps is calculating our budget and classifying our needs. We divided our needs into financial ones and material needs. This meant that sponsors could either offer our team a financial amount with which our team would cover some of the expenses of the project or offer us a material sponsorship



Sponsors Targeting

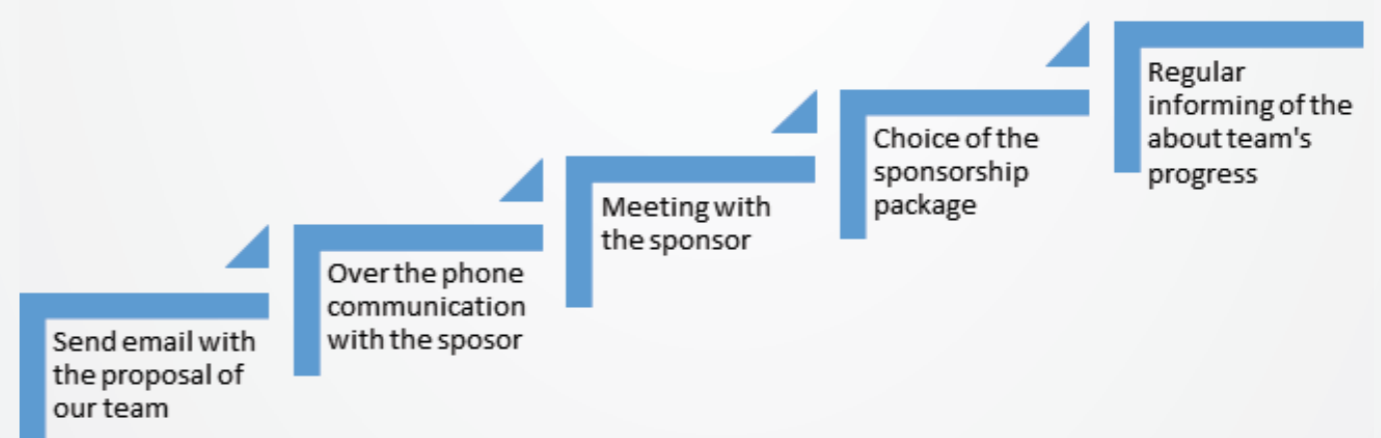
This list includes companies with which we could work together, in order to achieve the best on our sponsorships.

These companies usually meet one or more of the following conditions:

- Companies in which friends and relatives work there
- Companies that we have worked together in the past
- Companies that are in touch with the competition
- Companies that are interested in further education
- Companies that could offer us some type of material sponsorship

Sponsorship Approach

Our first action to approach potential sponsors is sending them an email with a comprehensive sponsorship proposal. The core elements presented in our proposal is our team's history and achievements as well as the certificate of 1st place in the competition in June. Our next step is communicating via telephone with the potential sponsors in order to schedule a meeting with so as to present them the different packages that they can choose and the according returns on investment that they will have. After the deal was closed we sent our sponsor's a monthly newsletter with the progress of our team.



TEAM BRANDING

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 Hungary.

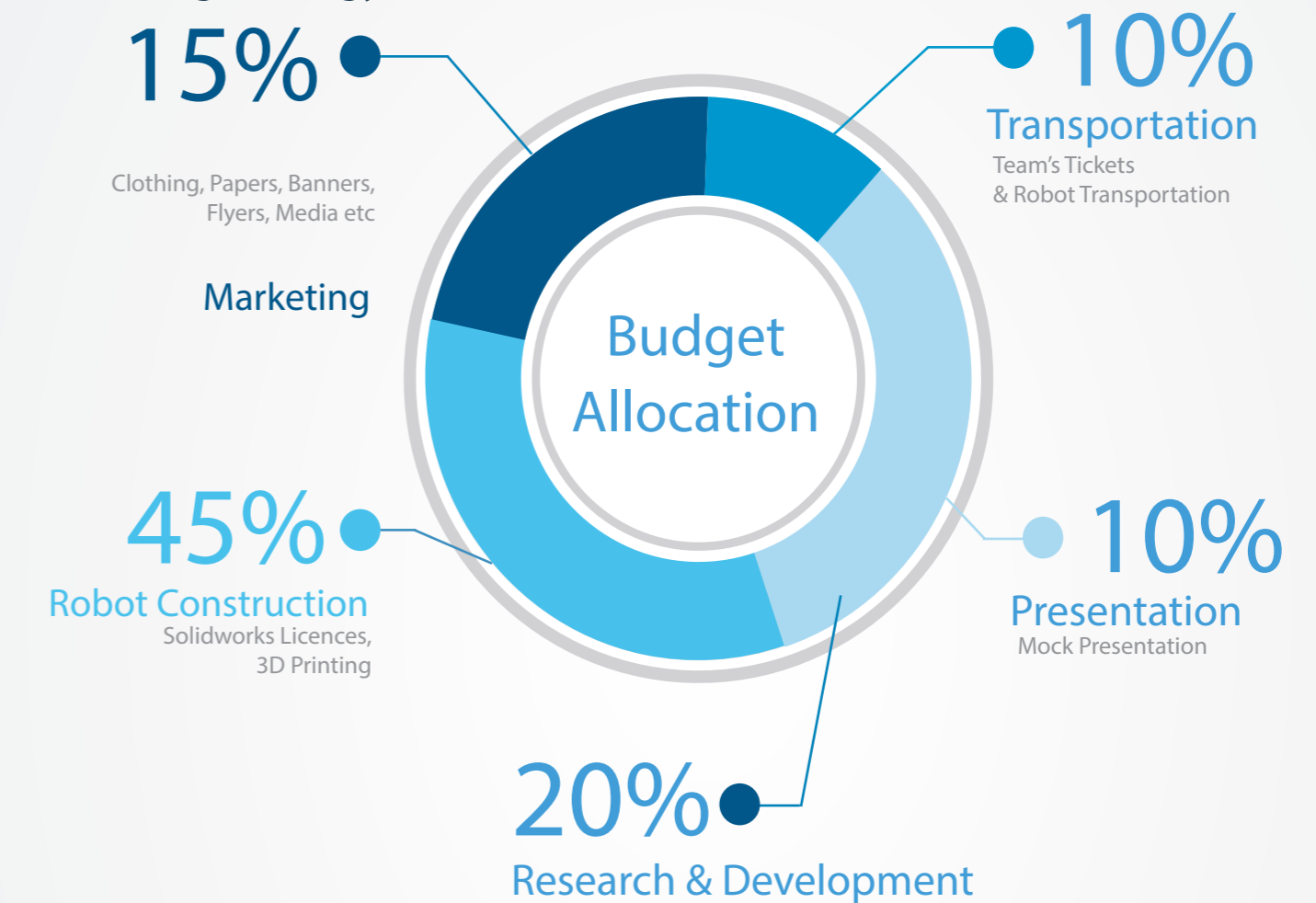
The Team Brand Clothing for the Competition



Team Promotion Interview about our project



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.

OUR SPONSORS



A STAR ALLIANCE MEMBER 



Team Perspective

In the process of choosing the right sponsor, we aim to find stakeholders that share a common vision and reflect the value that we place importance on. The underlying principle of our team is effective cooperation to bring about scientific breakthroughs, which are applicable and useful.

We constantly try to invest in relations based on trust and interaction with our sponsors with the aim that all parties benefit from it.

Bearing the above in mind, our cooperation with all stakeholders is based on mutual respect and the desire for ongoing evolution is the inherent key to success.





OUR PASSION IS 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 observing it.

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

Minders 2019 - One Team - One Passion



HUNGARY 2019

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