

(Colonization of the asteroids belt 2.0)

📅 Science Fair - Riwa and Yusra

This year Presentation

Nov/7/2023

In phase one of the project we said that gold mining is one of the most destructive industries in the world. It pollutes water and land with mercury and cyanide, endangering the health of people and ecosystems. This does not apply only on gold but on many other minerals and resources.

Some of the resources the earth is in need are nickel and copper. extracting nickel ores, which also contain copper, cobalt and platinum, produces acid byproducts. This sulfide mining has a toxic legacy across the world, including mines owned by Rio Tinto, the Anglo-Australian company and joint venture partner here with Talon Metals.

The distance between the earth and the asteroid belt is not short, it is approximately 179.5 million km (or 111.5 million mi) and mars is in between.

Now that we have a colony on mars and with the help of YZ-ranger everything is ready, now we need to start analyzing the asteroid belt. With that we need help to reach there. We can't try to shoot the asteroids without analyzing them.

Nov/14/2023

- **New robot name : YR-ranger 2.0**
- **Write the story in a professional way**
- **Practice the coding**
- **built the map.**
- **Understand what we are doing**
 - **Take pictures of the asteroids and mine tiny pieces to analyze them on the colony on mars**
 - **Plan how we going to analyze the materials from the asteroids**

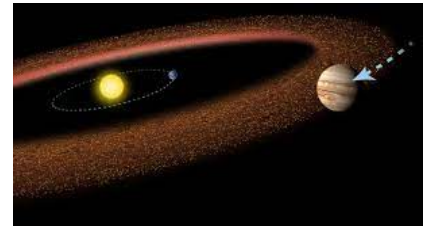
☐ Copy of Colonization of the asteroids belt

Link to last year presentation

Science fair deadline is Feb 26. The celebration is march 4-8 and the deadline for writing in the website is march 15

The website is [CYSE](#)

Example of how the project could look like



Now/17/2023

Dec/7/2023

{The asteroids will be represented by the balloons. The balloons will have helium inside which will let them fly. A small object will be tied into the balloon which will represent the resources.

There is QR code on the floor which the drone will scan then now that it needs to land on it. When the drone is close to the code we will cut the rope and the resource will be released. The balloon will go away which we will not need anymore. The drone will scan the resources while flying and wil know which area/box it will land on. After the resource is

released, the robot on mars will come and grab the box and puts it in a place which the boxes will be send to Earth

Dec/10/2023

Dec/14/2023

Asteroid belt

**Drone bringing
Asteroids from the belt**



Robot Analyzing asteroids



Mars



Earth

Dec/25/2024

Jan/5/2024

Coding



Understand the robot

Me Auriga Mainboard

Featuring 6 integrated sensors, 12 sets of RGB lights and 10 extension interfaces (with 100+ connectible electronic modules).

Strong and lightweight tracks

Give Ranger a superior ability to avoid obstacles.

Industrial grade aluminium alloy parts

Compatible with Makeblock Maker's Platform, 500+ parts, and other building bricks.

Powerful motor performance

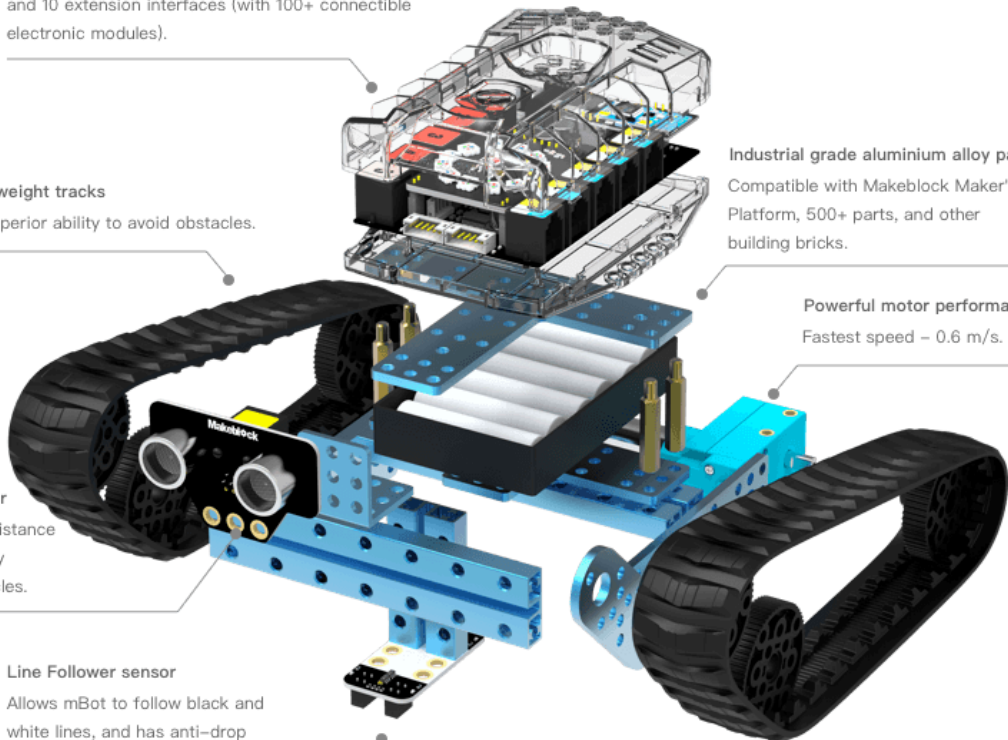
Fastest speed – 0.6 m/s.

Ultrasonic sensor

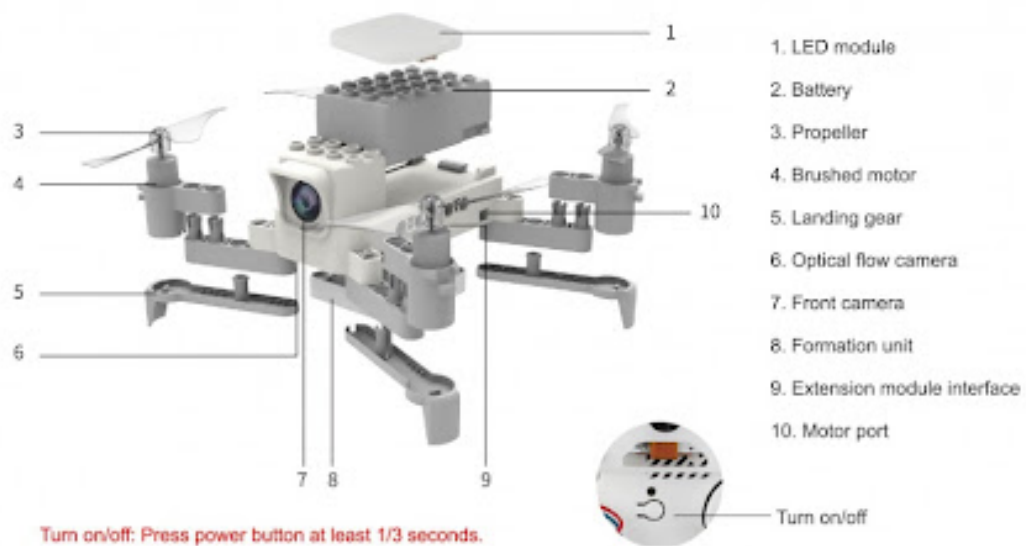
Used to detect distance and automatically overcome obstacles.

Line Follower sensor

Allows mBot to follow black and white lines, and has anti-drop functionality.



• Diagram



Jan/15/2024

Jan/20/2024

https://youtu.be/rbRJ7AfMj_I?si=zDec_FrxkYSW3BPM

<https://youtu.be/hwWCRIIO6n4?si=o4LmGR9v1cgKCNI>

Link to drone coding

Jan/30/2024

Feb/3/2024

Introduce /background research

Resources limitation

Planet Earth contains a huge amount of resources. However, they are limited. With the increased crazy demand on more resources, it is in a state of constant shortage, increasing at the same time the mining work all over the globe.

Some resources mining causes severe environmental pollution and ecological system destruction, for example, gold mining is one of the most destructive industries in the world. It pollutes water and land with mercury and cyanide, endangering the health of people and ecosystems. This does not apply only on gold but on many other minerals and resources.

Problem

Bringing resources from space!

Humans are approaching Mars to be an external space colony, and maybe we can use this to try obtaining minerals from the asteroid belt. Many studies showed that millions of years ago Mars was a live planet!

Last year's Phase of this project, the colony on Mars was built and ready on Mars. Now the next step is to start mining the asteroids on the asteroid belt.

Feb/8/2024

Feb/13/2024

Method/Materias

YR-Ranger 2.0 is a super smart robot designed for exploring asteroids in space. It has fancy tools and sensors to check out the asteroids and grab samples. The robot follows a specific path through the asteroid belt, using advanced technology to figure out what the asteroids are made of, especially looking for valuable materials like Gold, Nickel and Copper.

YR-Ranger 2.0 communicates to the Mars colony led by YZ-Ranger, so the scientists on earth can guide it and decide which samples to grab based on what they've

learned before. YR-Ranger 2.0 has special storage spots for the asteroid samples and can sort them based on what's inside.

After finishing its mission, the robot goes back to Mars, where it packs up the sorted samples for a safe trip to Earth. On Mars YZ-Ranger gets to help decide which samples are the most valuable before sending them to Earth.

The YZ-Ranger is super smart and keeps getting better at its job over time, learning from both Mars and Earth scientists. It also takes care to not harm the environment in the asteroid belt.

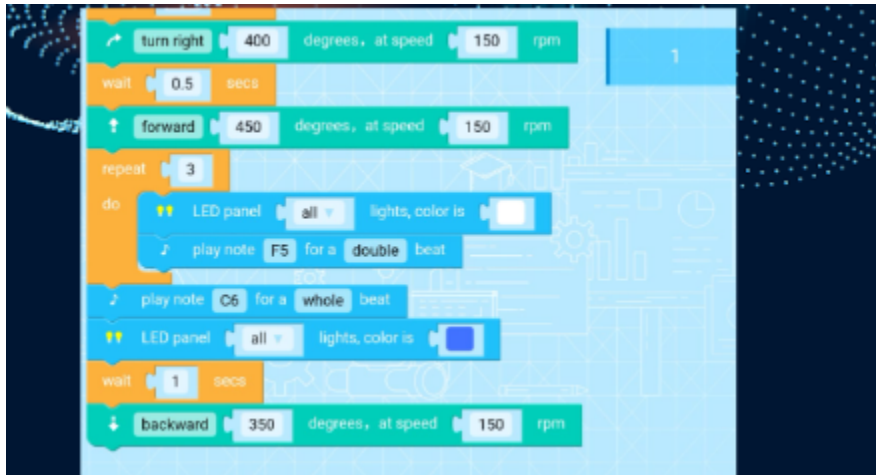
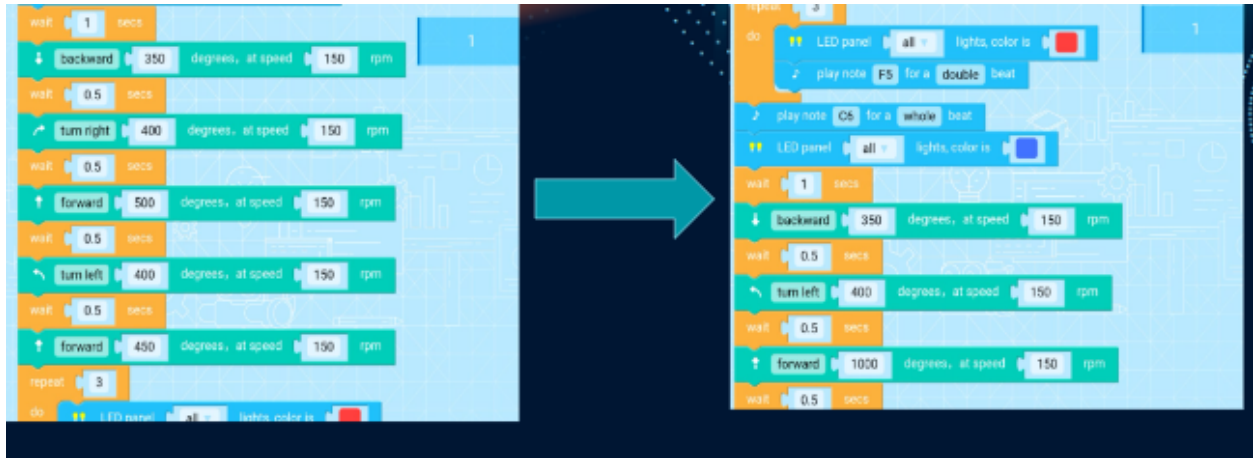
And here's the cool part - the mission isn't just about science; it's also a way to teach people, especially students, about space exploration, showing how robots, Coding, and smart technology work together to explore beyond our planet.

Feb/18/2024

Feb/20/2024

Data/Analysis





Feb/21/2024

Feb/27/2024

Result

The idea may look like science-fiction, but when reviewing the studies and the technology we have reached as humans, we think this project is applicable and could save this planet! We hope that in the near future we can share our project globally, showing the whole world the importance of saving this planet.

Sojourner Rover:

- **Launch Date: December 4, 1996**
- **Description: First Mars rover, part of NASA's Mars Pathfinder mission, analyzed Martian rocks and soil.**

Spirit Rover:

- **Launch Date: June 10, 2003**
- **Description: Part of NASA's Mars Exploration Rover mission, Spirit operated from 2004 to 2010, studying Martian geology.**

Opportunity Rover:

- **Launch Date: July 7, 2003**
- **Description: Twin of Spirit, operated from 2004 to 2019, making significant discoveries about Martian rocks and soil.**

Curiosity Rover:

- **Launch Date: November 26, 2011**
- **Description: Part of NASA's Mars Science Laboratory mission, Curiosity landed in 2012, designed to search for signs of past microbial life.**

Perseverance Rover:

- **Launch Date: July 30, 2020**
- **Description: Part of NASA's Mars 2020 mission, Perseverance landed in 2021, tasked with searching for signs of ancient life and collecting Martian samples.**

Zhurong Rover:

- **Launch Date: July 23, 2020**
- **Description: China's first Mars rover, part of the Tianwen-1 mission, Zhurong landed in 2021, designed to study the Martian surface and environment.**

March/1/2024

March/6/2024

March/10/2024

City science fair

Problem

Phase one of the project underscored the dire consequences of gold mining, which annually contaminates an estimated 1,000 tons of water with mercury and cyanide, posing significant risks to aquatic life and human health. Additionally, nickel and copper extraction contribute to air and water pollution, with nickel mining alone releasing approximately 2.8 million tons of sulfur dioxide into the atmosphere each year. These activities not only harm ecosystems but also displace communities, with over 1,000 cases reported globally of people forcibly removed from their lands due to mining operations. As Earth's resources diminish, the imperative for sustainable alternatives intensifies to avert further ecological degradation. Failure to address these issues could accelerate Earth's transformation into a barren landscape akin to Mars, highlighting the urgent need for responsible resource extraction practices.

Method

Situated between Mars and Jupiter, approximately 179.5 million kilometers from Earth, the asteroid belt emerges as a promising frontier for resource extraction, boasting an estimated value exceeding \$700 quintillion. Bolstered by the successes of previous Mars rover missions such as Sojourner, Spirit, Opportunity, Curiosity, and Zhurong, human endeavors toward Martian colonization offer a strategic vantage point for asteroid mining. Following the establishment of a Mars colony last year, meticulously prepared with the assistance of YZ-Ranger, attention now pivots toward the next phase: asteroid exploration and mining. Guided by the advanced capabilities of the YR-Droner, equipped with sophisticated tools and sensors, this robotic explorer navigates the asteroid belt, conducting compositional analyses and collecting samples, with a keen focus on valuable materials such as gold, nickel, and copper. Facilitating seamless communication between the YR-Droner and Earth-based scientists, informed decisions regarding sample collection are made, ensuring the optimization of resource acquisition. Upon the completion of its mission, the YR-Droner returns to Mars, where the YZ-Ranger aids in evaluating sample worth before their safe transport to Earth. Beyond the realm of scientific advancement, this initiative serves as a beacon for educational endeavors, illuminating the synergistic potential of robotics, coding, and technology in the realm of space exploration, propelling humanity toward a future characterized by sustainable resource acquisition beyond the confines of Earth.

Acknowledgment

We extend our heartfelt appreciation to all individuals and organizations who have contributed to the realization of this project. Special thanks to the dear judges who took the time to evaluate and provide feedback on our project during the science fair. We are grateful for the guidance and support provided by our mentors, educators, and advisors, whose insights and encouragement have been invaluable throughout the journey. We look forward to continued exploration and innovation as we strive to address the challenges of resource scarcity and environmental sustainability for the benefit of future generations.

Description of experiment or research study

The project centers on the exploration and utilization of the asteroid belt as a solution to Earth's resource limitations and environmental concerns posed by traditional mining practices. By highlighting the detrimental effects of conventional mining, particularly in the case of gold extraction, the project underscores the urgency to adopt alternative approaches. Introducing YR-Ranger 2.0, an advanced robotic system tailored for asteroid exploration, the project outlines a comprehensive strategy for analyzing and harvesting resources from asteroids. Through seamless collaboration with the Mars colony led by YZ-Ranger, efficient decision-making and sample collection are ensured. Beyond resource acquisition, the project serves as an educational platform, illustrating the integration of robotics, coding, and technology in space exploration. Ultimately, the project envisions a future where space exploration not only addresses resource scarcity but also promotes environmental stewardship, paving the way for sustainable resource management on Earth and beyond.