

Confined Cruiser



Can mobile robots be effectively used to remotely inspect or perform tasks that are dangerous for humans?

Suggested Equipment Skill Level

Intermediate User

Equipment Skills

Block Coding
3D Design

Project Engineer

Career & Skillset Connections

- Problem Solving
- Communication
- Detail-oriented

Project Guiding Themes

- Engineering design process
- Coding the RVR+ to meet constraints
- Integration of manufacturing technologies

Suggested Software & Materials

- Sphero App
- 3D modeling software
- 3D printer/CNC Machine

Aligned VDOE CTE Course(s) and Competencies

Electronics/Industrial Robotics Technology

36-Weeks

Technology Foundations

36-Weeks

Confined Cruiser

Mobile Robot Intermediate Skill Level



Can mobile robots be effectively used to remotely inspect or perform tasks that are dangerous for humans?

Project Problem & Career Prompt

Project Background & Resources

As the Project Manager for an industrial mobile robot company, you have been contacted by the Chief Engineer on the Moor Vessel Emma Maersk, one of the world's largest container ships. The Chief Engineer has determined that diesel fuel is leaking from fuel tank #1. They are in the process of transferring the fuel from tank #1 to tank #2. Onboard the ship, they have some of your companies industrial mobile robots. They need you to find the leak with the mobile robot in fuel tank #1 as entering the tank is dangerous and requires venting the fumes and special personal protective equipment. The Chief Engineer needs photographic or video proof of where the leak is. Also onboard is a 3D printer and a CNC machine, so if parts needs to be made, the ship has the capability.

Fuel Tank design and size
Capabilities of mobile robots in dark environments
Integration of additive/subtractive manufacturing with mobile robots

Investigative Questions

How do mobile robot precisely identify issues, like the hole in a fuel tank?
What risks are involved with sending a mobile robot into places that are potentially dangerous?

Project Criteria

- Mobile Robot must have photographic or video capability
- Mobile Robot must have capability to see and navigate in fuel tank
- Final physical prototypes must be completed prior to project deadline

Project Constraints

- 3D Printer or CNC Machine must be used for part of the solution to the problem
- Cannot use prefabricated 3D models
- Program used to code the RVR+ must be coded by you

Suggested Pacing

1-2 Days of research and sketching ideas

3-4 Days of design

2-3 Days of constructing and finishing prototypes

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Mobile Robots



Career & Skill Set Connections

Project Engineer

A Project Engineer is responsible for the development, design, installation, and improvement of mobile robot use on projects. They focus on the technical and engineering aspects.

Essential Skills

- *Problem Solving
- *Mathematics
- *Troubleshooting
- *Attention to detail
- *Communication



Academic Pathway

High School Diploma
and
Community College/Certification
or
Bachelor's degree



Aligned VDOE CTE Course(s) and Competencies

Workplace Readiness Skills & Work-Based Learning Opportunities & Examine All Aspects of an Industry

Technology Foundations

Controlling an Electric System

Use engineering design to solve an identified problem using an electronically controlled device

Designing a Product

Collect information about a technological problem to be solved

Generate potential solutions to the problem, challenge, need, or opportunity

Construct a prototype of the best solution

Electronics/Industrial Robotics Technology

Exploring Electronics/Robotics Technology Careers

Investigate community industrial and technical resources

Explore occupations related to electronics and robotics technology

Explaining Robotics Applications

Explain the use of robotics for industrial applications

Explain the use of robotics in the inspection and quality-assurance process

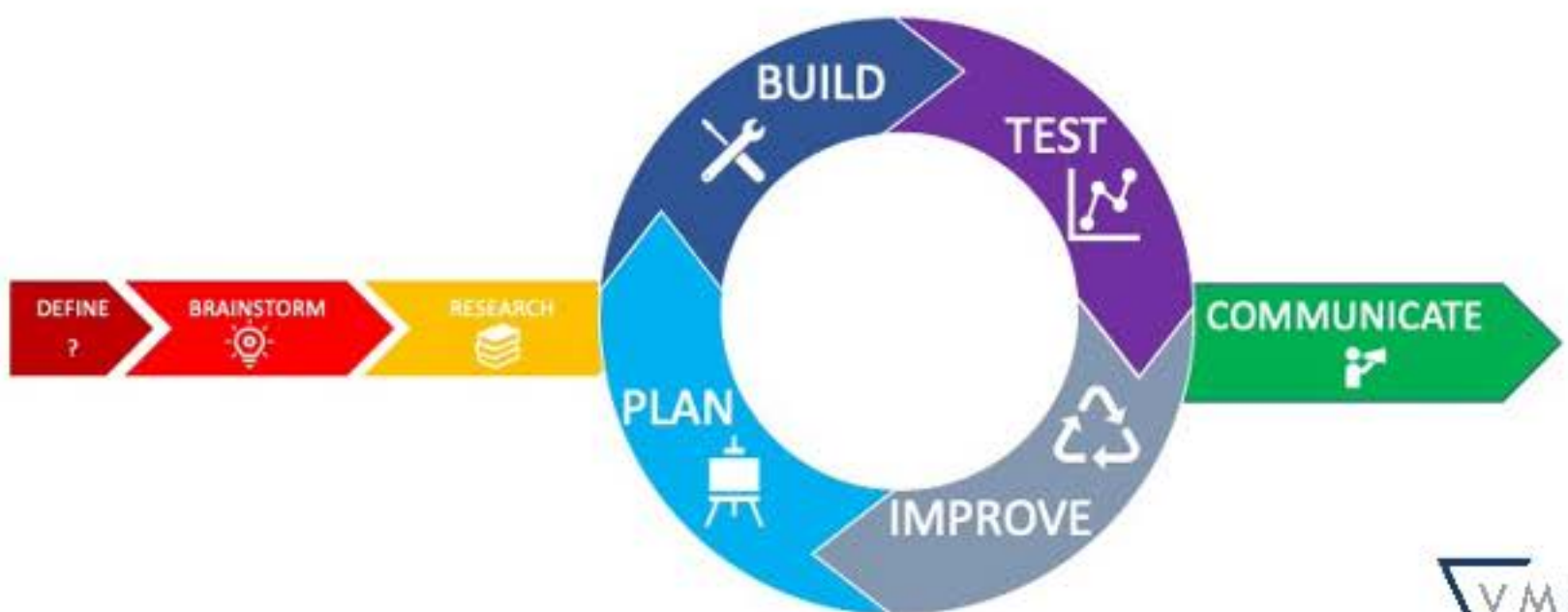
Project Management Plan

**Team
Member
Roles**

**Team
Goals
&
Timelines**

**Team
Member
Tasking**

Sketches & Design Planning



Notes

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