Weapons
AND MATERIALS RESEARCH
Directorate
U.S. Army Research Laboratory

Experiments With Robotics and Perception
AIAD with Army Research Labs

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Class of 2006

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Agenda

- Problem Statement
- Materials Utilized
- Methodology
- Segway in Action
- Questions

Problem Statement

- Develop an algorithm that will allow a Segway RMP (Robotic Mobility Platform) to maneuver obstacles autonomously.

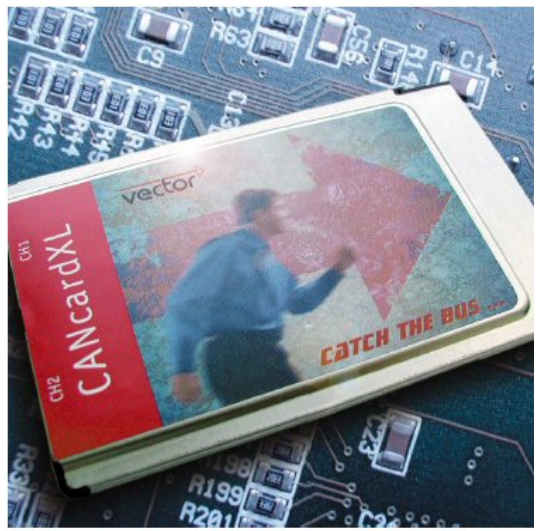
Materials Utilized

- Segway Robotic Mobility Platform

- SICK LMS (LADAR)

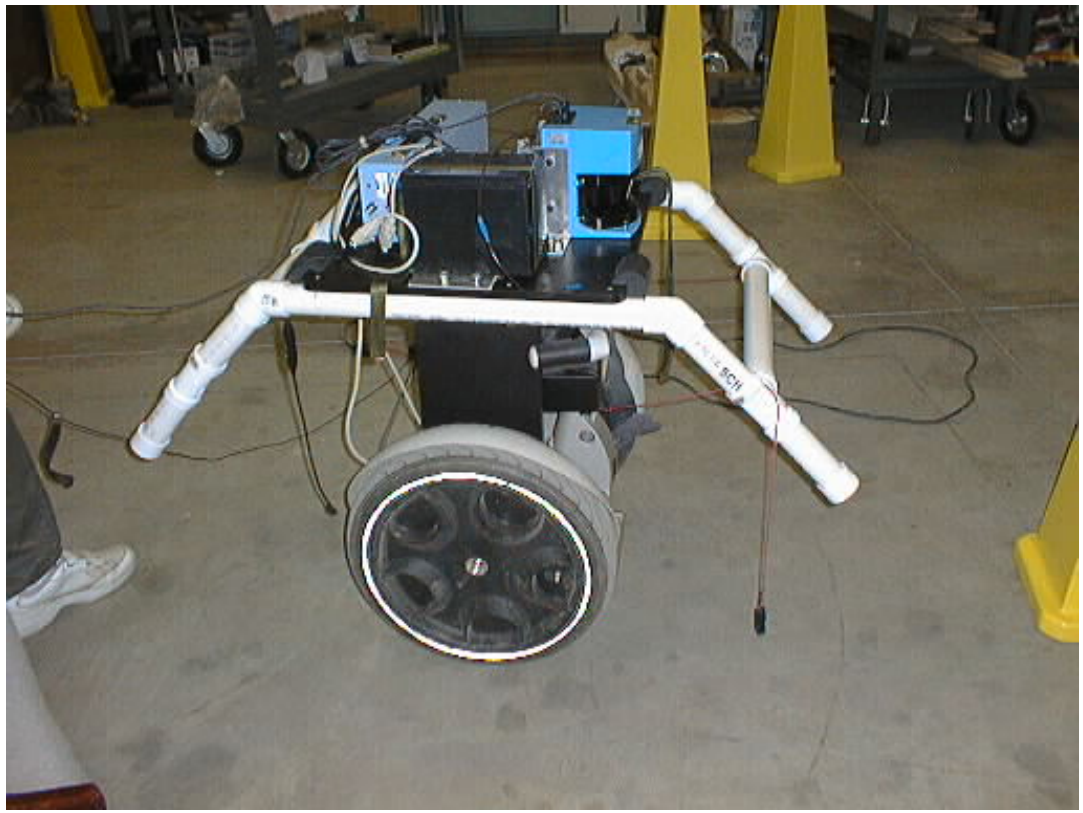
Materials Utilized

- **Hardware**
  - Personal Computer
    - Used for coding and execution of autonomous movement
  - CANcardXL & Accessories



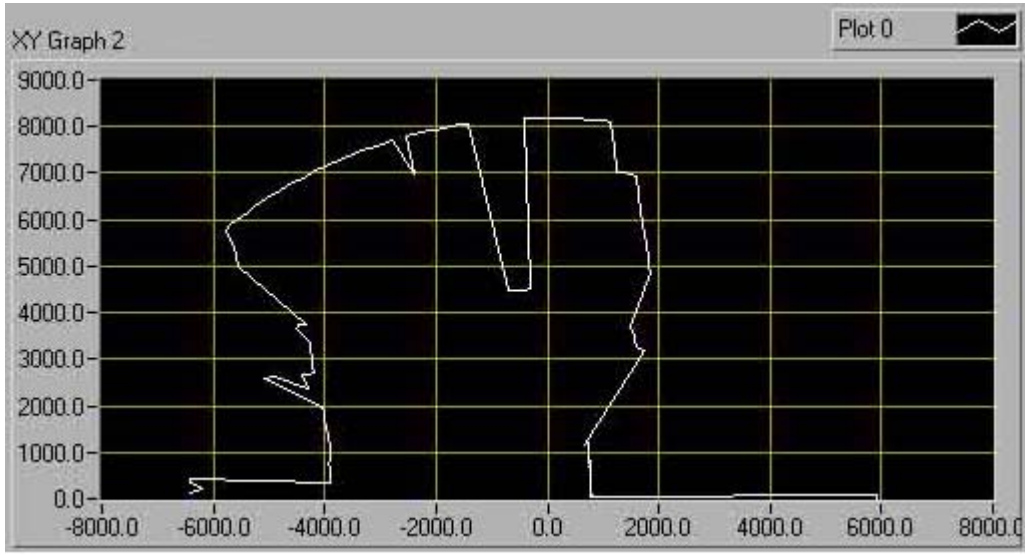
- **Software**
  - National Instruments LabView
  - Microsoft Excel

Materials Utilized



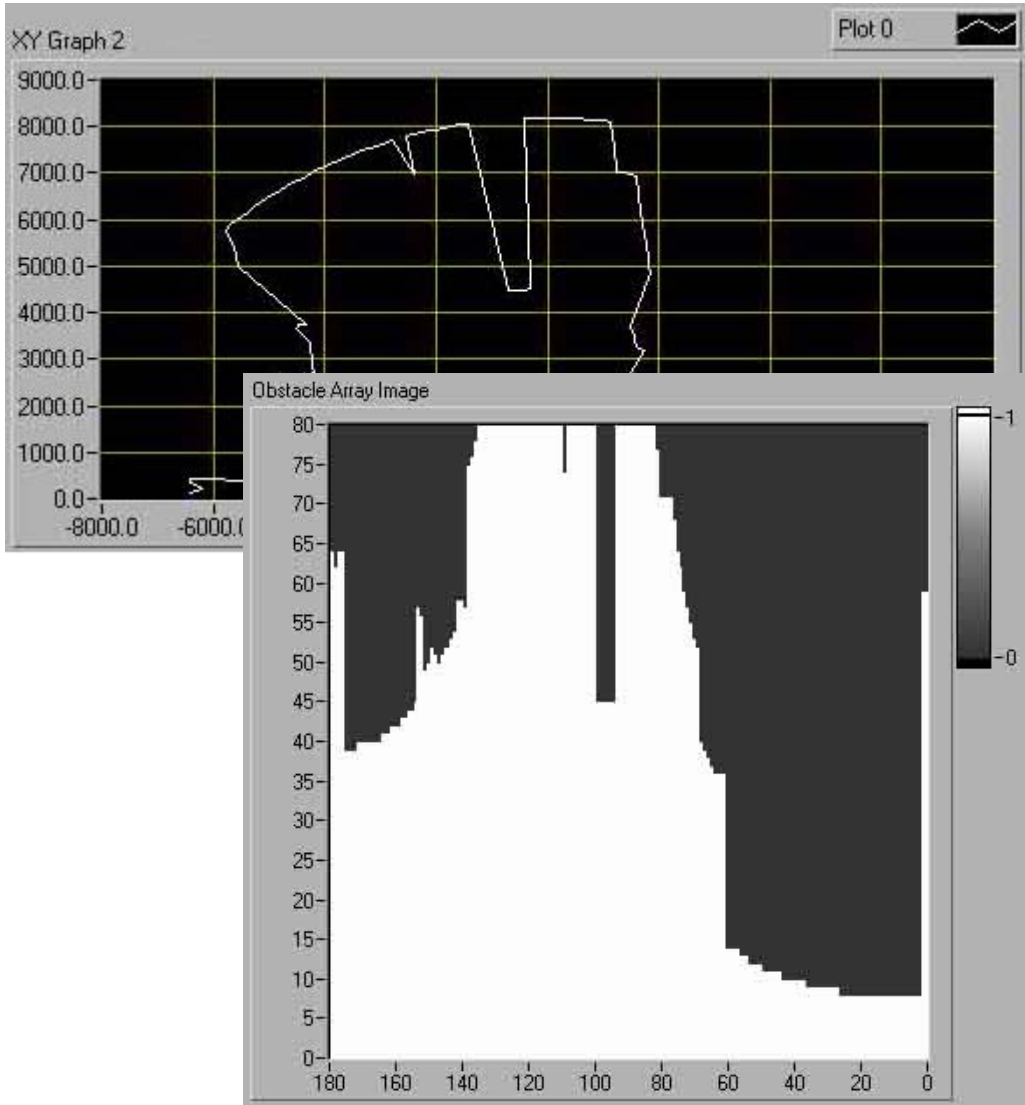
Methodology

- Sensing Obstacles
  - Using Ladar
  - Interpreting feedback from ladar
- Important Considerations
  - Platform size
  - Inverted pendulum behavior
  - Platform capabilities/ limitations

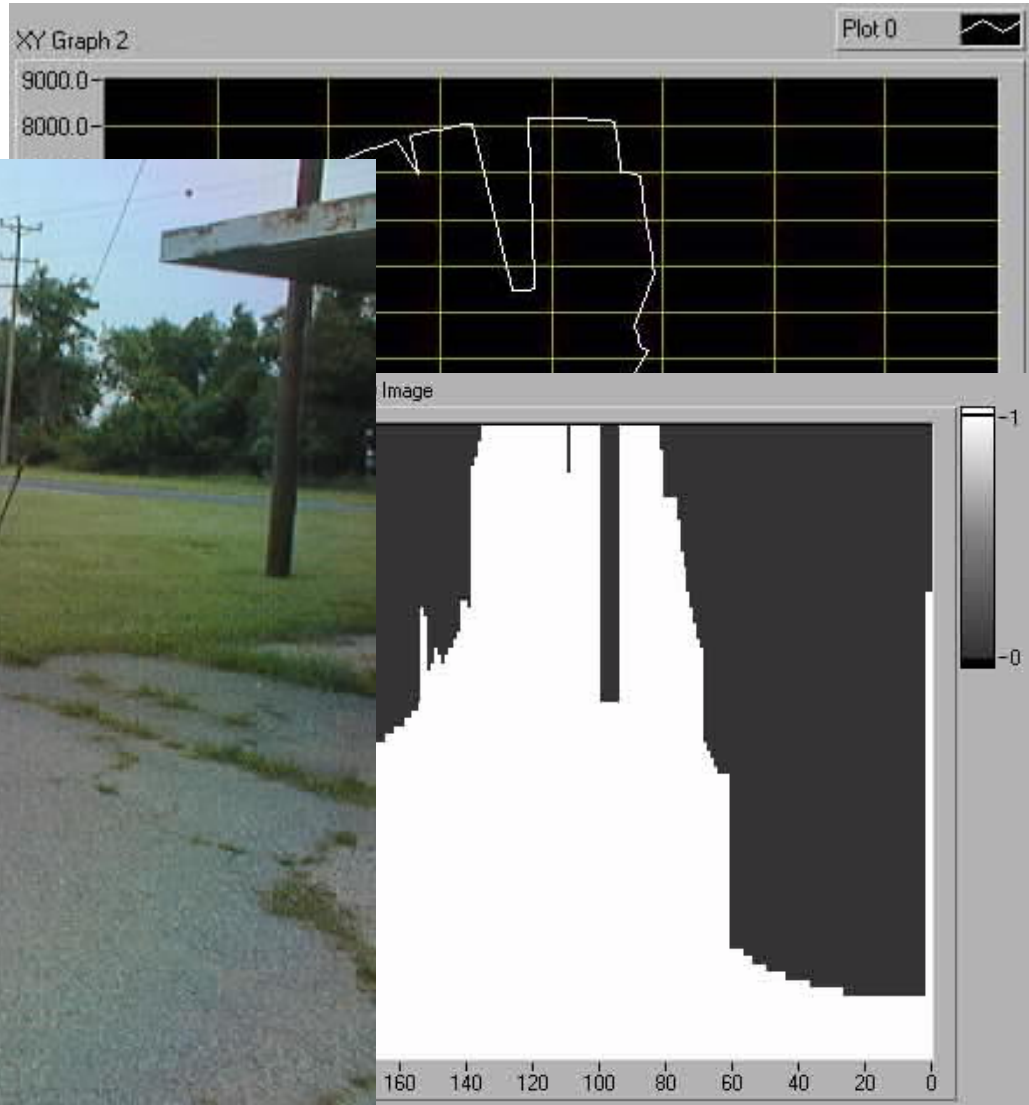


Methodology

- Interpreting Data
  - Convert the Range Fan into an array of data
  - Understand the new data
- Goals
  - Allow the RMP to travel the best available path
  - Make the RMP travel the center of this path
  - Avoid Obstacles by variable distance n



Methodology



Segway In Action

Weapons and Materials Research Directorate
U.S. Army Research Laboratory

Questions

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Thank You

- Army Research Labs
- USMA- Department of Civil and Mechanical Engineering
- Dr. Stephen Wilkerson
- MAJ Nathan Wiedenman
- … and a special thank you to Mr. Raymond Von Wahlde