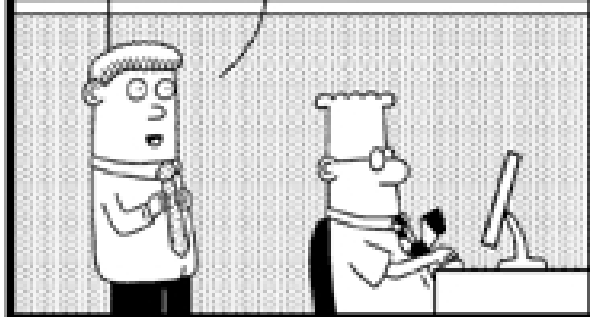
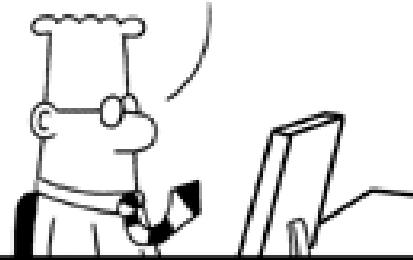


DID YOU LOOK AT MY POWERPOINT PRESENTATION?



www.dilbert.com scotiadams@aol.com

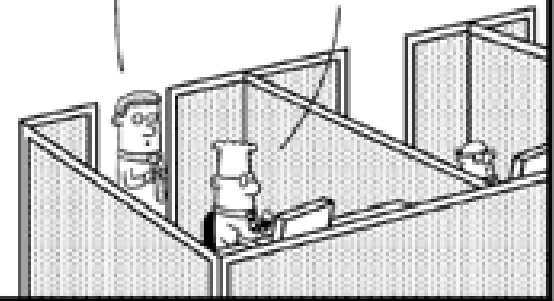
YES, IT'S A CONFUSED JUMBLE OF USELESS INFORMATION WITH A WINO'S SPITTLE OF UNSUPPORTED CONCLUSIONS.



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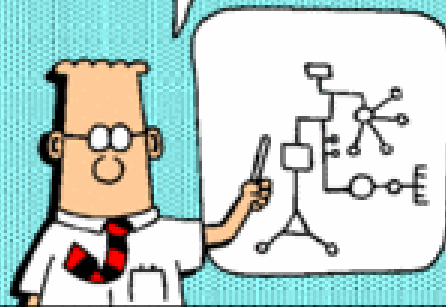
WINO'S SPITTLE?

YOU HEARD ME.



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AS YOU CAN CLEARLY SEE IN SLIDE 397...



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GAAAAH!



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"POWERPOINT" POISONING.



I-Guide

Intelligent Guide Robot

Joe Buckner & Nir Chezrony

Advisors:

Dr. Joel Schipper & Dr. James Irwin, Jr.

Sponsored By:
Northrop Grumman

BRADLEY
UNIVERSITY

Presentation Overview

- Project Summary
- Fall 2008 Accomplishments
- Components Removed
- Sonar Sensor Failure
- Barcode Scanner
- Kiosk Monitor
- Wall Follow Simulation
- ADC to USB
- Current and Future Work
- Workflow and Gantt Charts

Project Summary

- Autonomous Tour Robot – Pioneer 3
- 2nd and 3rd floor of ECE Department
- Utilize Elevator
- Localization - Barcodes
- Navigation – Topological Decomposition



Fall 2008 Accomplishments

- Selected Robot Platform
- Built ModelSim Environments
- Developed Flowcharts
 - Path Planning Algorithm
 - Navigation Algorithm
- Interfaced Development HID - Joystick

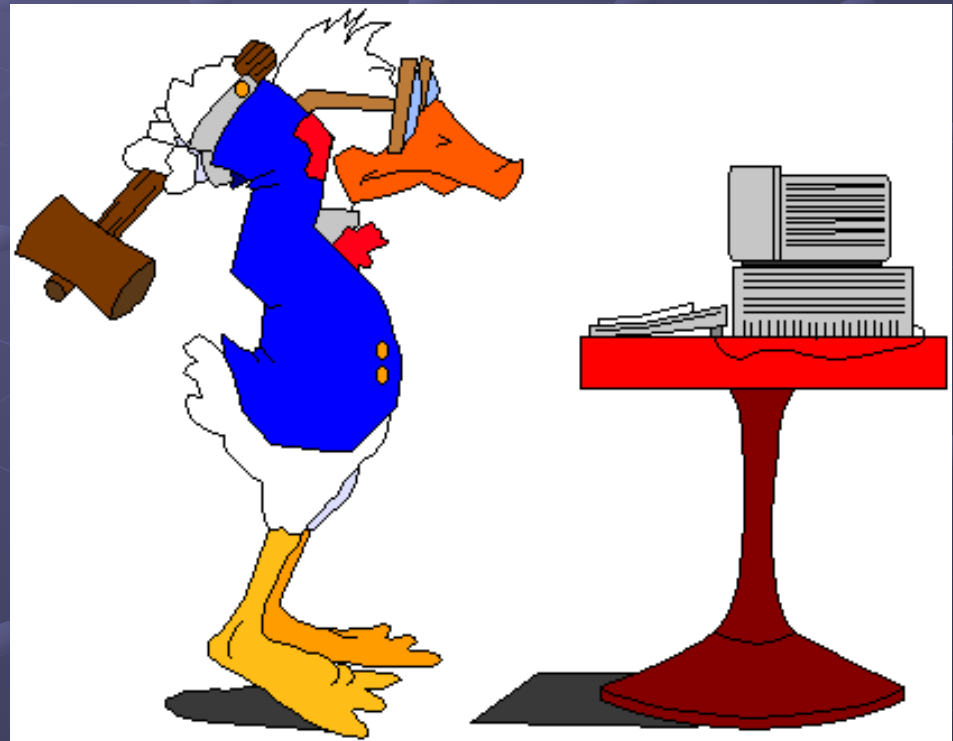
Fall 2008 Accomplishments

- Selected Localization & Navigation Sensors
 - Native Sonar Sensors
 - Barcode Reader
 - Digital Compass
 - IR Sensors



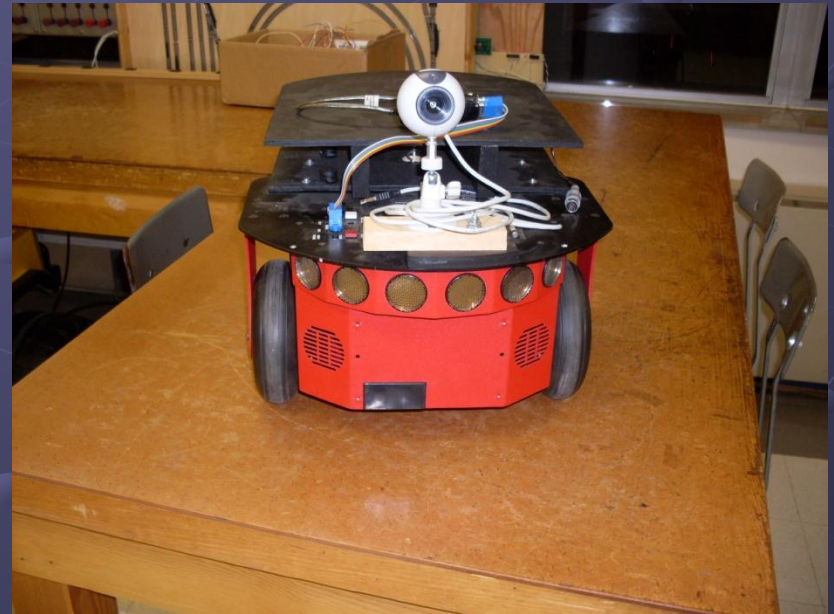
Components Removed

- Compass / Gyro
- Rear Sonar Sensors
- Touchscreen



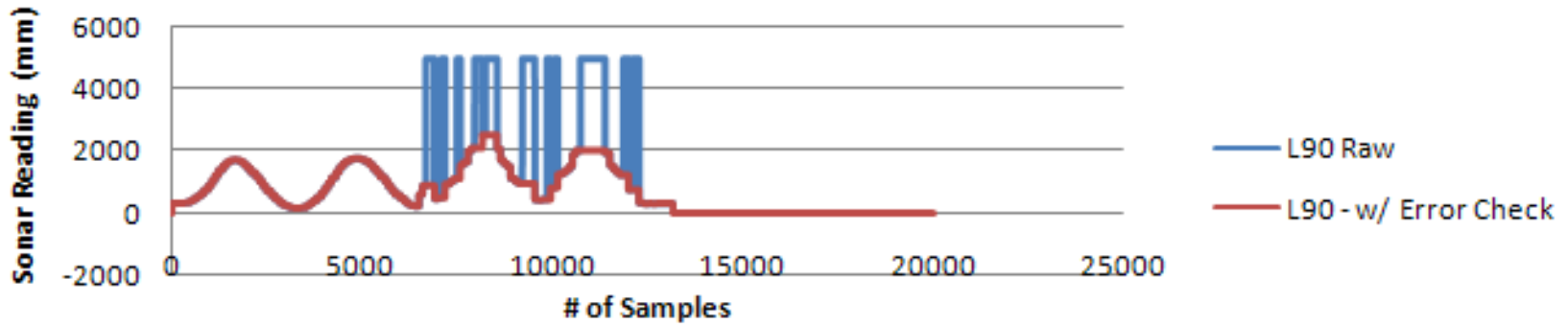
Sonar Sensor Failure

- Firing Order & Firing Rate
- Gain Potentiometer
- Simple Software Fix
- Complex Algorithm

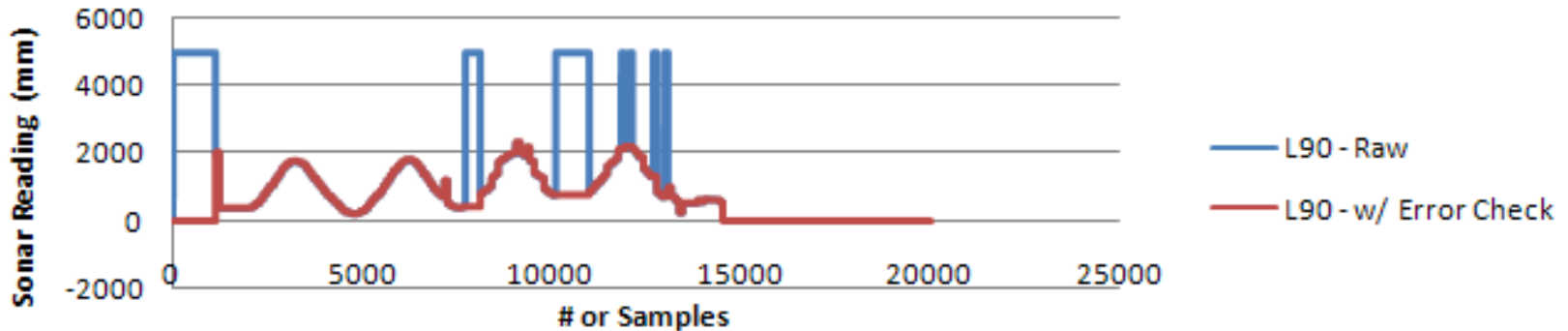


Sonar Sensor Fix Data

Left 90 Degree Sonar Sensor Data - Gain Pot Full Counter-Clockwise

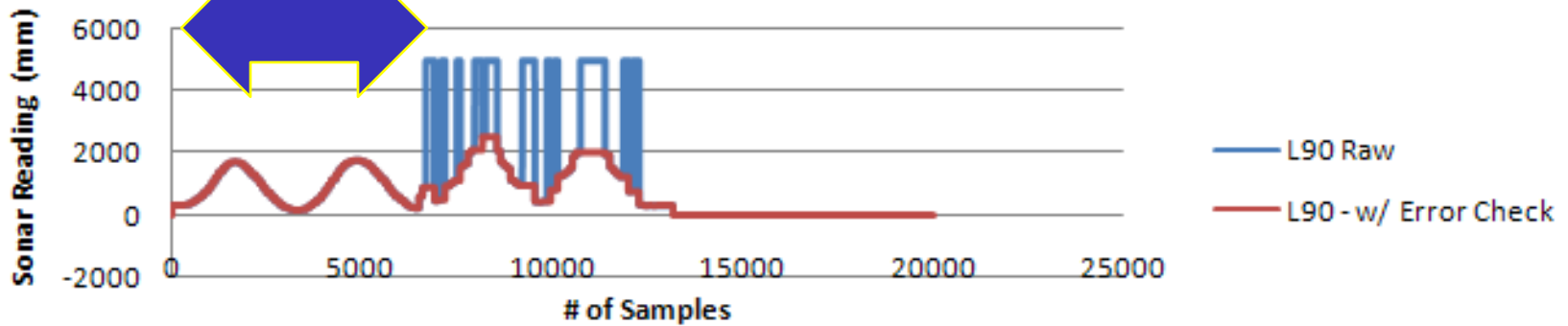


Left 90 Degree Sonar Sensor Data - Gain Pot Full Clockwise

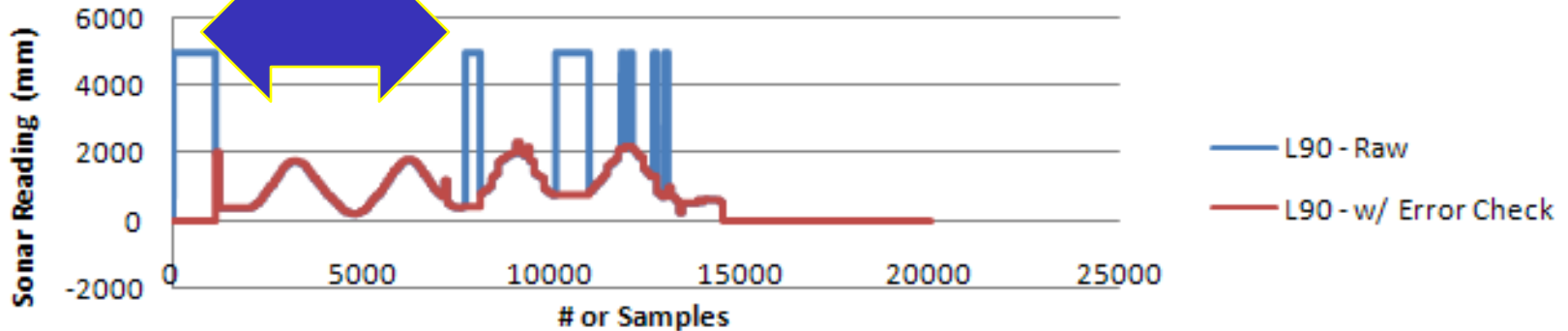


Sonar Sensor Fix Data

Left 90 Degree Sonar Sensor Data - Gain Pot Full Counter-Clockwise

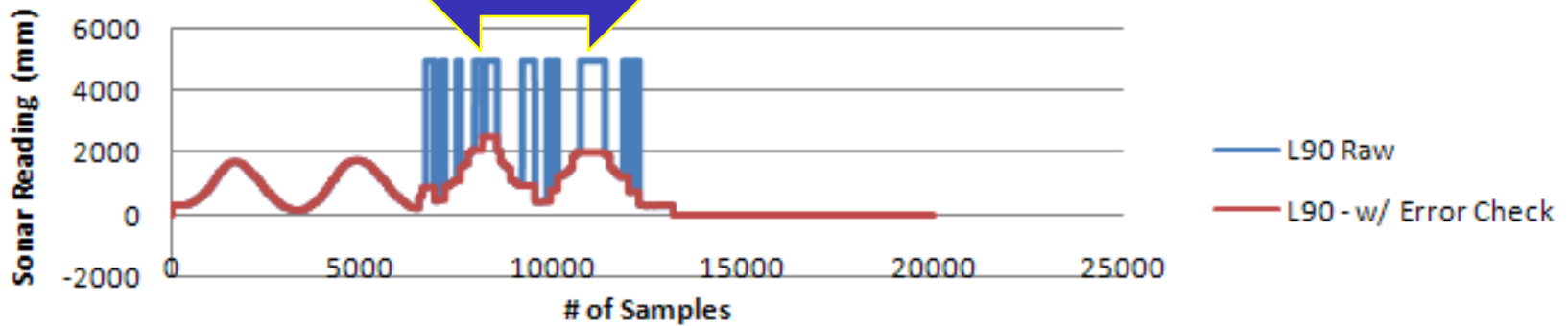


Left 90 Degree Sonar Sensor Data - Gain Pot Full Clockwise

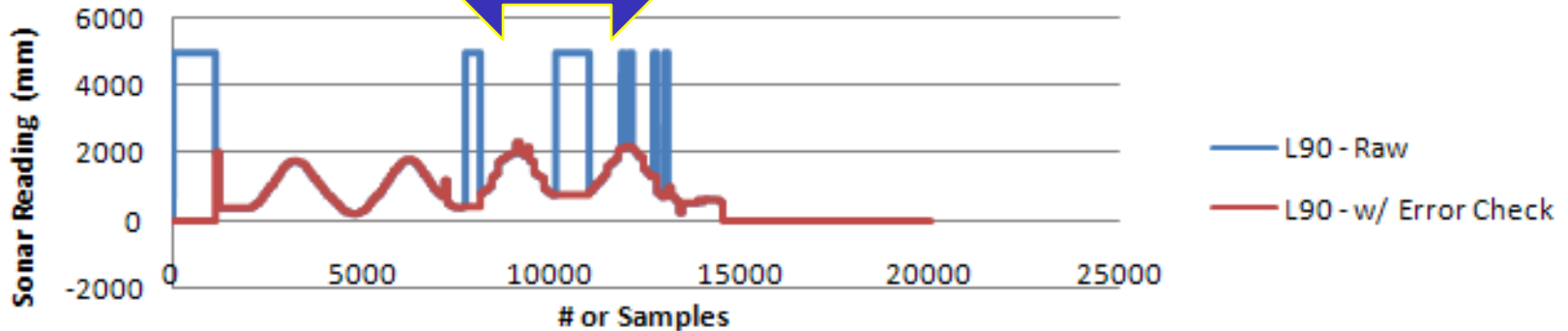


Sonar Sensor Fix Data

Left 90 Degree Sonar Sensor Data - Gain Pot Full Counter-Clockwise

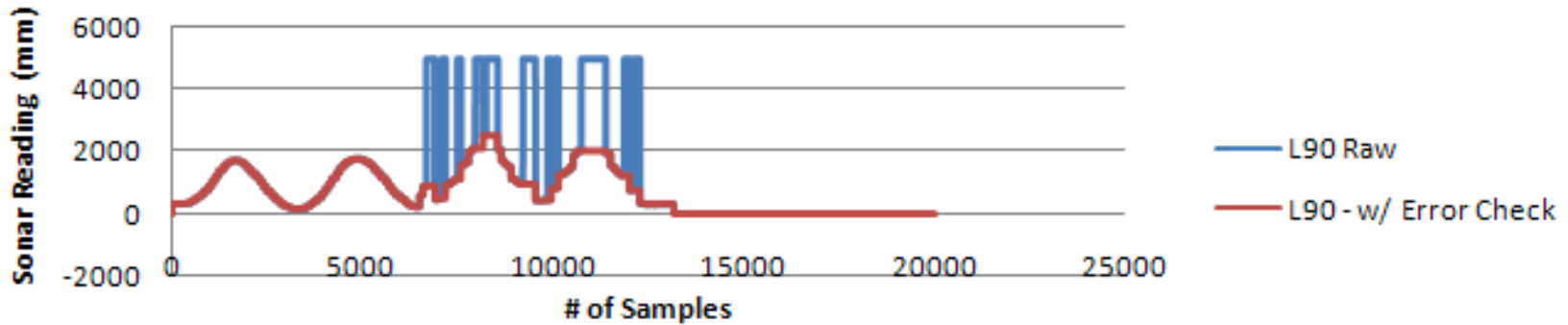


Left 90 Degree Sonar Sensor Data - Gain Pot Full Clockwise

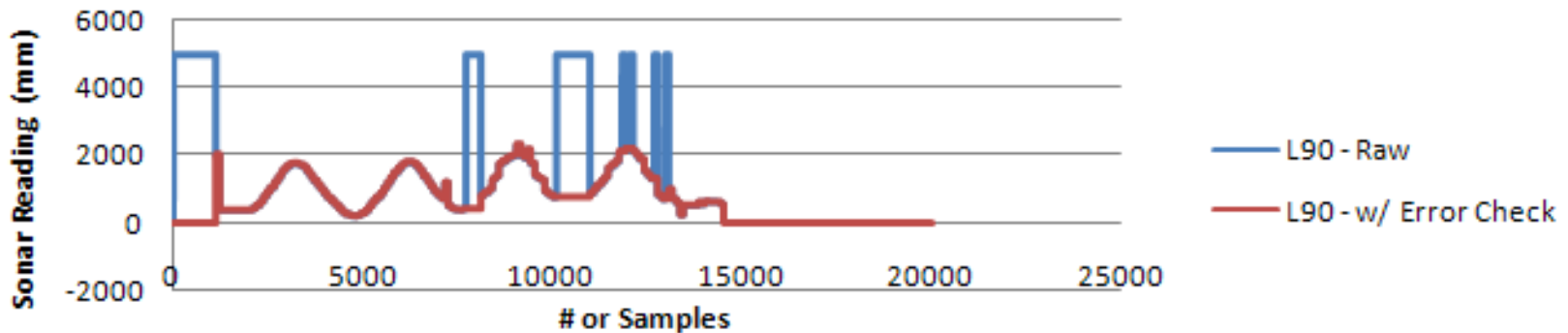


Sonar Sensor Fix Data

Left 90 Degree Sonar Sensor Data - Gain Pot Full Counter-Clockwise



Left 90 Degree Sonar Sensor Data - Gain Pot Full Clockwise



Barcode Scanner

- Sent Fuzzy Logic Scanner
- Verified Read Range
- Integrated into Software Release
- Resolving Hands-Free Operation



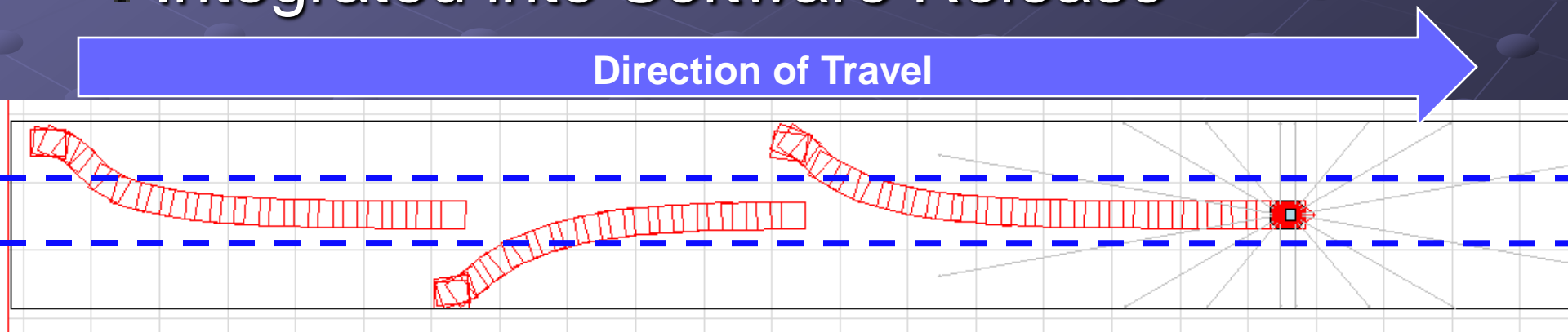
Kiosk Monitor

- Overvoltage Protection Circuitry
- Operating Range 8 – 13.2 VDC



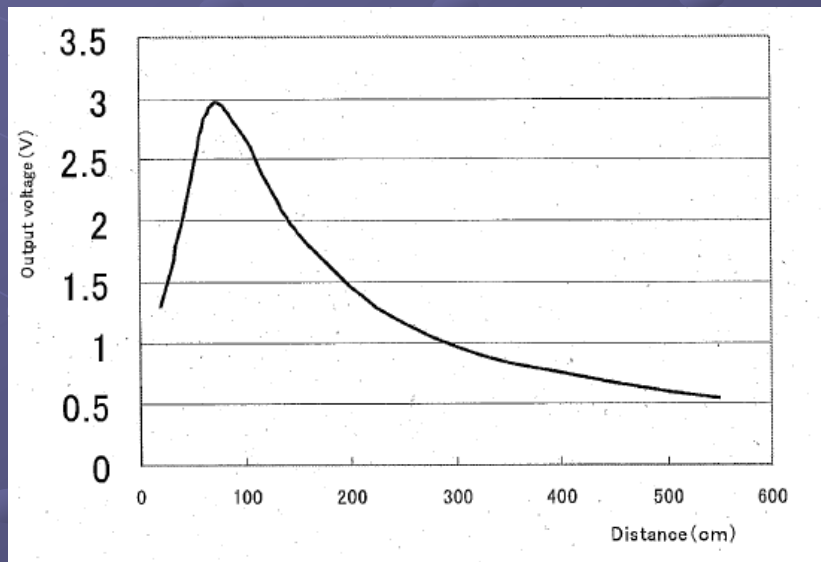
Wall Follow Simulation

- Uses L50 and R50 Sonar
- 'Center of Hall' Threshold
- Proportional Turning Rate
- Rate Limit Turning Rate
- Integrated into Software Release



ADC to USB

- Integrated into Software Release
- Universal Software Module
- IR and Bump Sensors



Current Work

- Barcode Scanner – Hands-Free Operation
- Monitor Overvoltage Protection
- IR Sensor Functionality
- Obstacle Detection / Avoidance Algorithm

Future Work

- Mounting Components
- Bump Sensors
- Navigation / Localization Algorithm
- Video Recording
- GUI
- Video Playback

ID	Task Name	Feb 2009				Mar 2009					Apr 2009					
		2/1	2/8	2/15	2/22	3/1	3/8	3/15	3/22	3/29	4/5	4/12	4/19	4/26	5/3	
1	Sonar Sensor Software Fix (Joe)	[Bar]														
2	Bump Sensor Software Interface (Joe)		[Bar]													
3	Wall Follow Algorithm Test – Simulation (Joe)			[Bar]												
4	Voltage Regulator Hardware Interface - IR (Joe)			[Bar]												
5	IR Hardware Interface (Joe)				[Bar]											
6	Wall Follow Algorithm Test – Experimental (Joe)				[Bar]											
7	Obstacle Detection / Avoidance Algorithm Test - Simulation (Joe)					[Bar]										
8	Obstacle Detection / Avoidance Algorithm Test – Experimental (Joe)						[Bar]									
9	Filming / Audio Prep (Joe & Nir)								[Bar]							
10	Final Run (Joe & Nir)												[Bar]			
11	Navigation / Localization Algorithm Test - Experimental (Nir)						[Bar]									
12	Barcode Read Test (Nir)					[Bar]										
13	Barcode Software Interface (Nir)						[Bar]									
14	ADC-USB Software Interface (Nir)				[Bar]											
15	Monitor GUI Software Interface (Nir)		[Bar]													
16	Monitor Software Interface (Nir)	[Bar]														

Acknowledgments and Questions

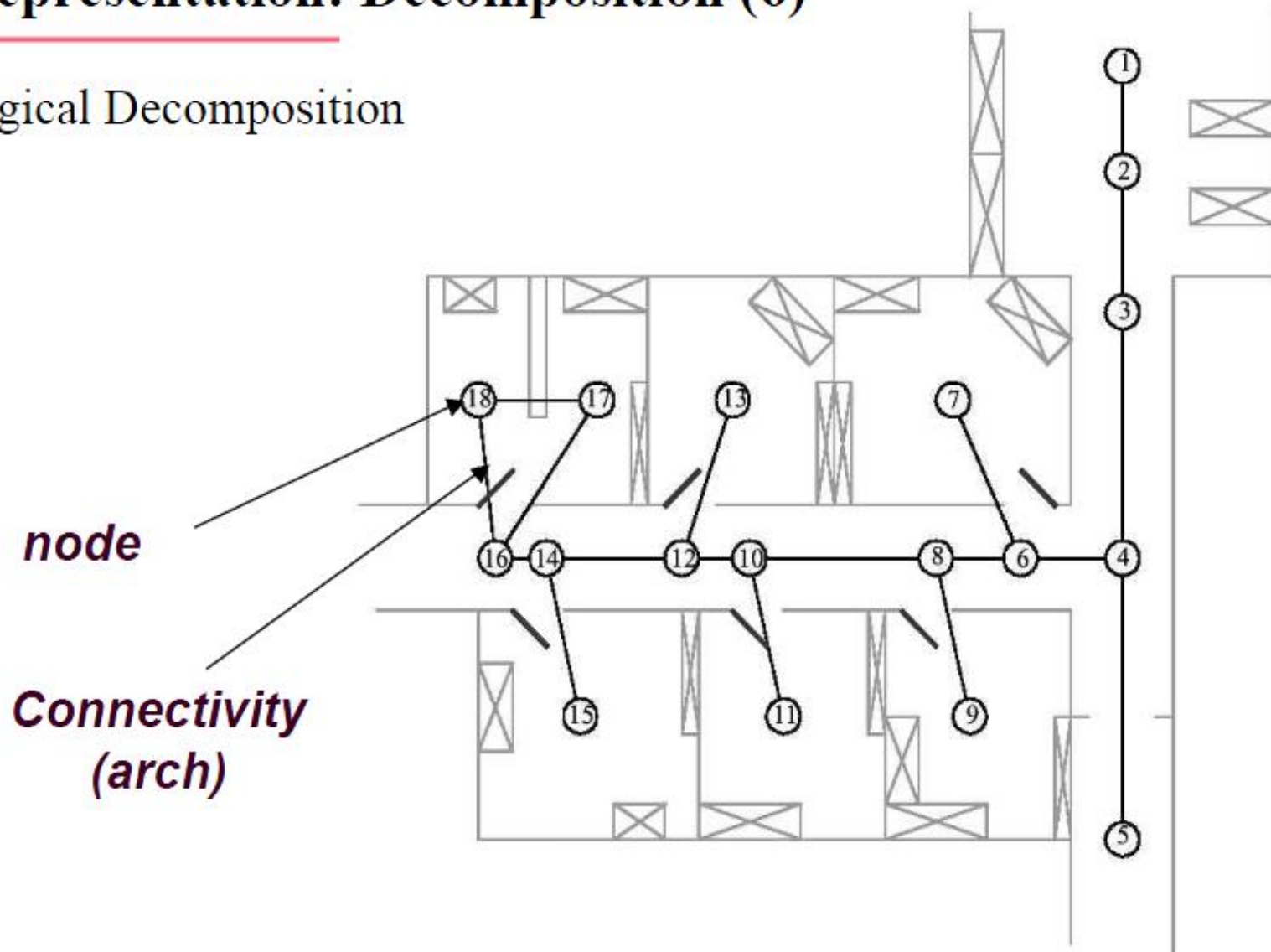
- Dr. Joel Schipper
- Dr. James Irwin, Jr.
- Dr. Aleksander Malinowski
- Dr. Gary Dempsey
- Mr. Steve Gutschlag



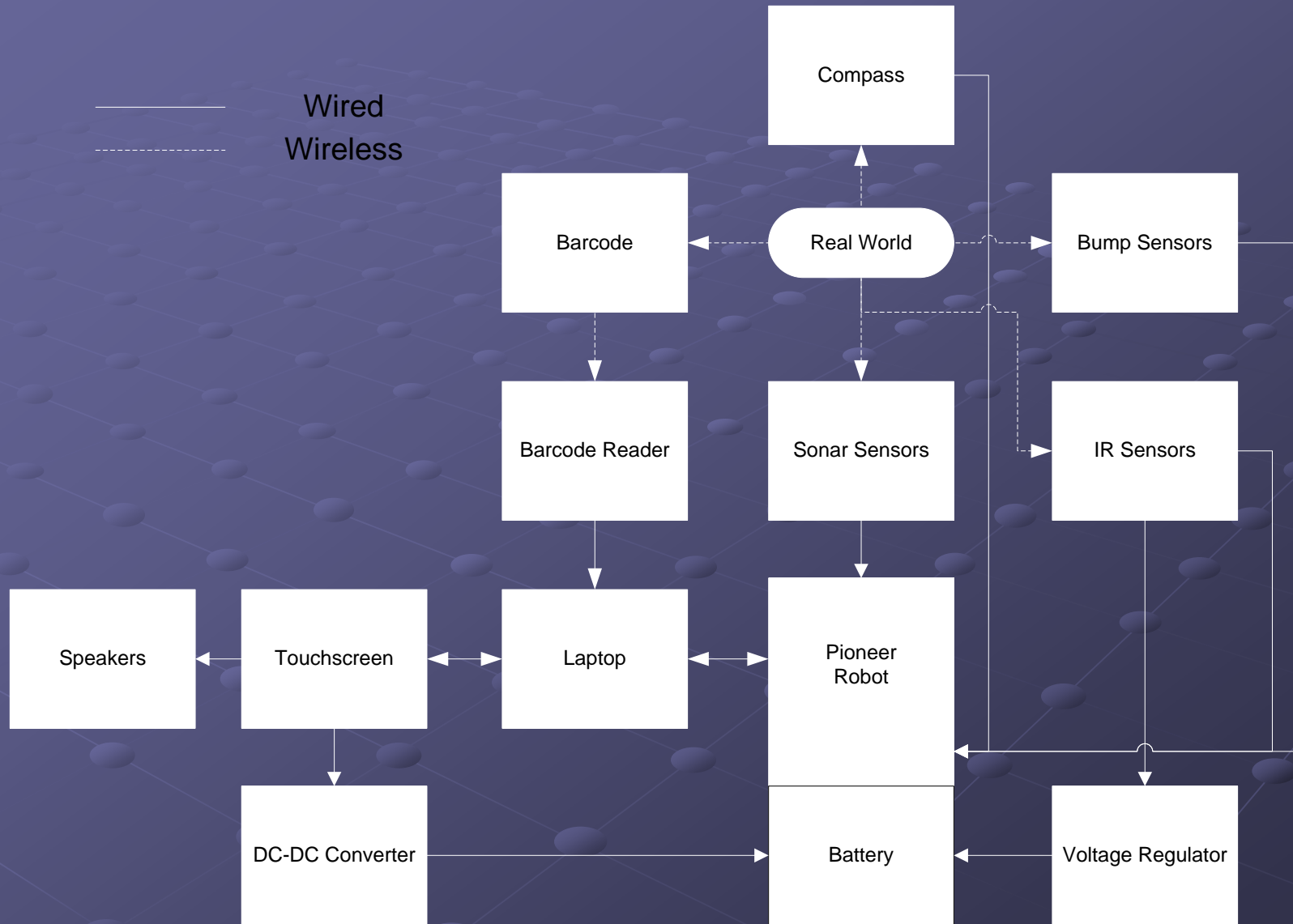
End of Presentation: Supplemental Slides Follow

Map Representation: Decomposition (6)

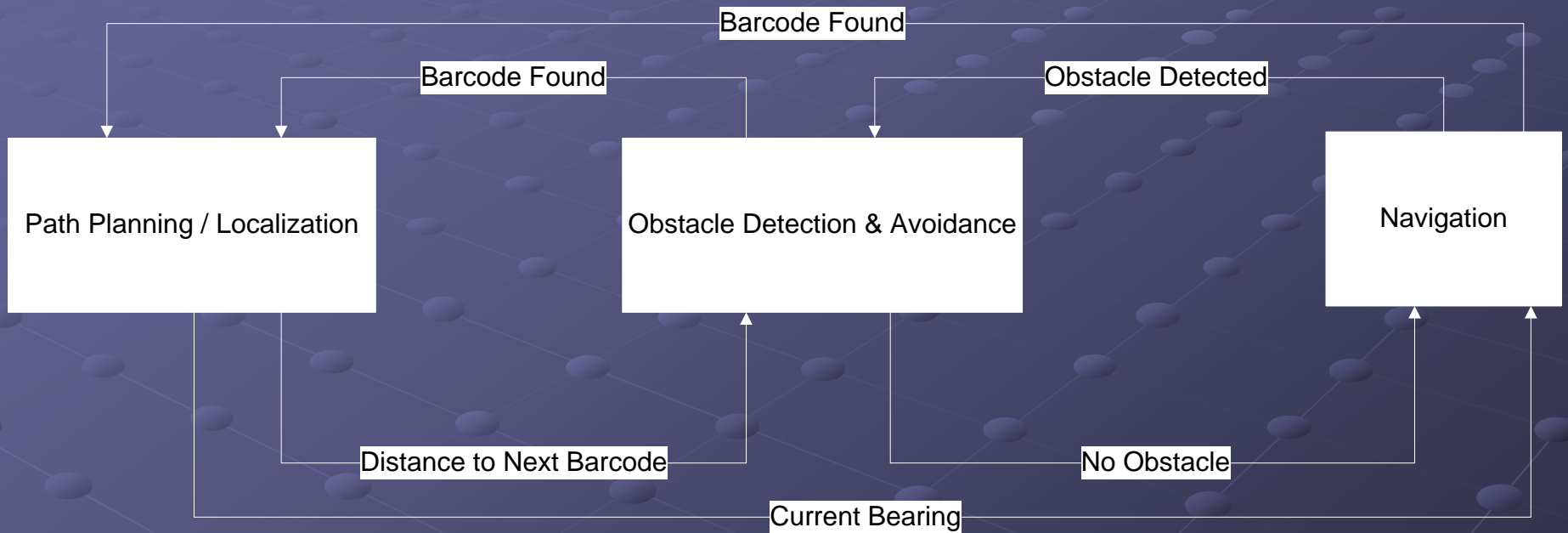
- Topological Decomposition



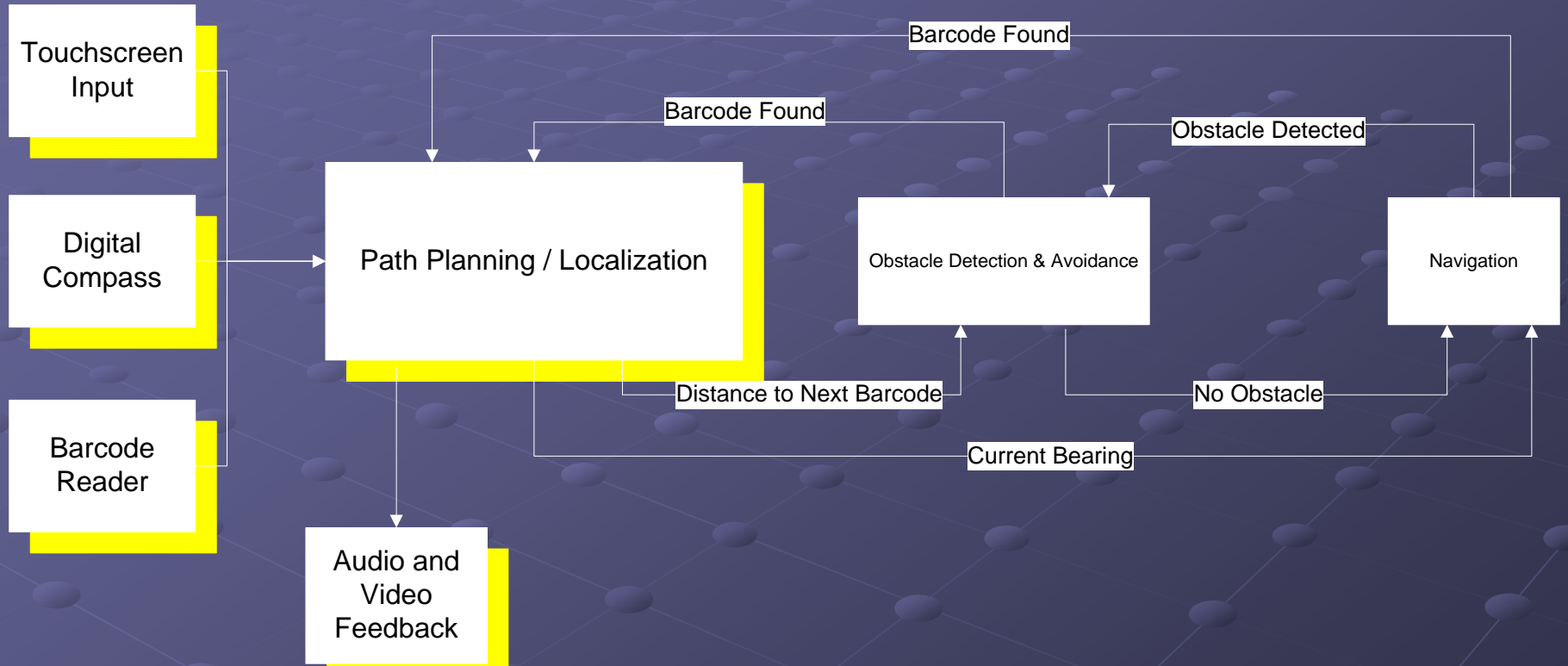
System Block Diagram



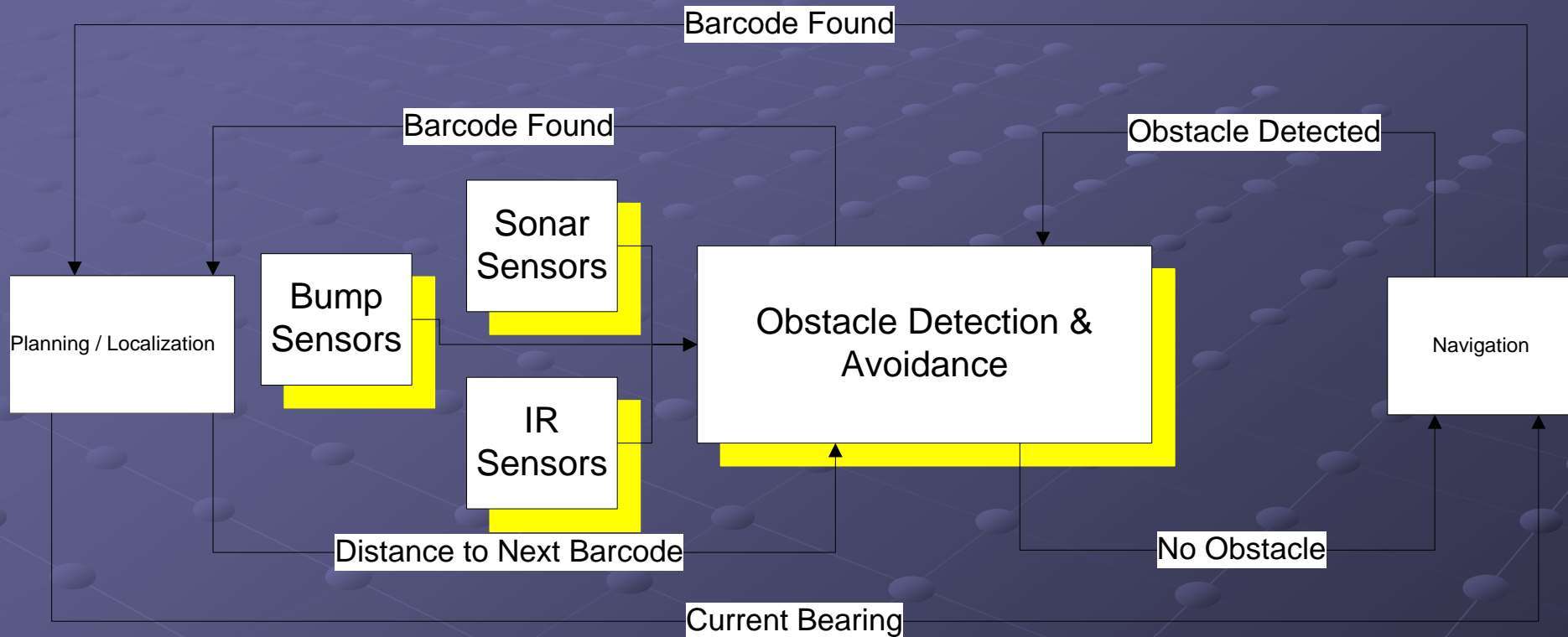
Software Flowchart



Software Flowchart

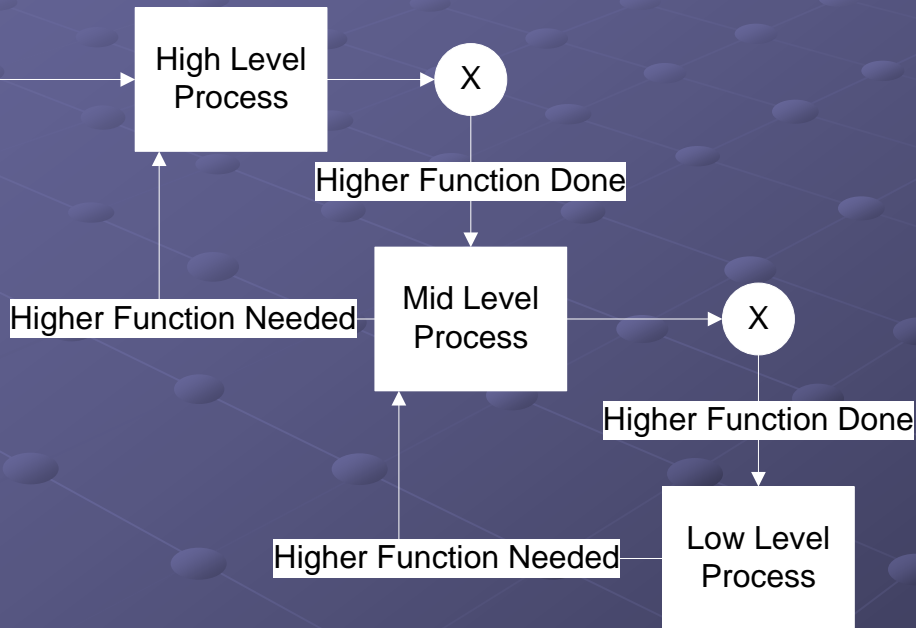


Software Flowchart

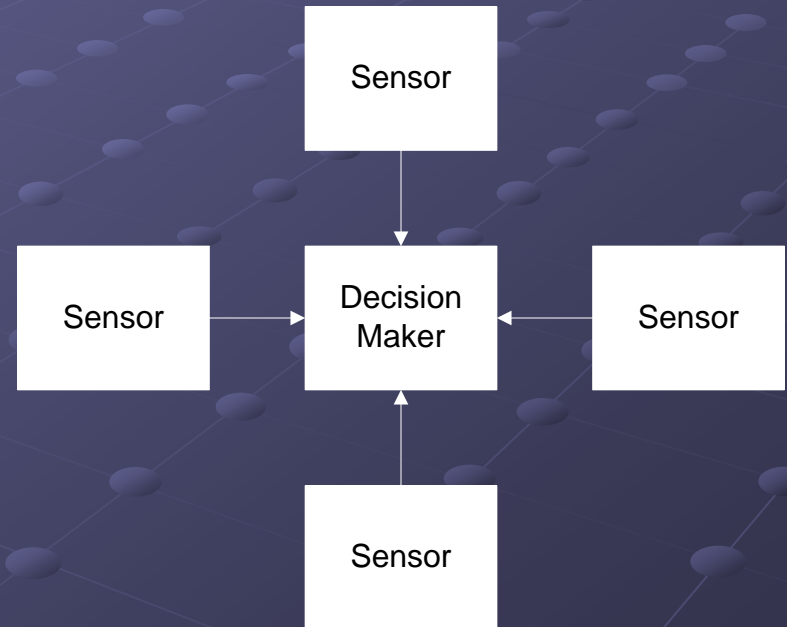


Subsumption vs. Blackboard Architecture

● Subsumption



● Blackboard



High Level Goals

- Successfully navigate the ECE Department
- Identify key points throughout a tour
- Provide accurate information to the user
- Provide a means for user input

Full Requirements (1)

- Must reach intended goal within a 4' radius
- Avoid all obstacles, moving or stationary
- Must detect when battery is at 10% of max charge
- Additional range sensors added to the Pioneer 3 must have a minimum range from 6" to 10'

Full Requirements (2)

- Additional range sensors added to the Pioneer 3 must have a measurement accuracy of 5"
- Must allow user to select one of 28 locations or one of 3 complete floor tours
- Additional compass sensor added to the Pioneer 3 must provide an accurate magnetic bearing within 10°
- Must have a complete software loop faster than 180 ms

Full Requirements (3)

- Must have a complete software loop faster than 180 ms
- Must maintain an average speed of 31.5 in/sec during transit