

# Assistive Devices Future Roadmap

YEAR 1

YEAR 2

YEAR 3



GEN 1



GEN 1



GEN 2



GEN 2



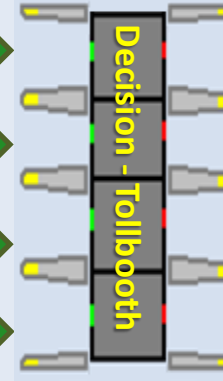
Grasping Device Project

Usability Testing

ISE Ergonomics – 3<sup>rd</sup> Year



ME Foundations – 1<sup>st</sup> Year



Difficult – Multidisciplinary Senior Design



Moderate – 3<sup>rd</sup> Year Level



Simple – 1<sup>st</sup> Year Level



Student Teams



MSD Projects

**Purpose:**

- Past projects within NSF grant have been independent and discrete. Lack of integration amongst various projects. Ex) Motion Tracking System, Air Muscle Artificial Limb, Balance Training Bicycle
- Some projects require multiple iterations in order to further develop and improve on existing projects.
- Proposal of a Roadmap to structure the integration of various projects under the NSF grant.
- **Goal 1: Development of enabling technologies**
  - Some technologies common to multiple projects are developed independently. Allow for clarification and development of enabling technologies (universal technologies that can be developed and used for future projects).
  - Pre built/developed enabling technologies save time and money on future projects.
  - Enabling technologies would be developed across multiple iterations of one project to the point where it can function independently and become adaptable to other projects. Examples:
    - Motion Tracking System can be integrated with various projects to collect motion data.
- **Goal 2: Expansion of NSF projects across year levels in engineering**
  - Expand NSF projects outside of Senior Design to 1<sup>st</sup> through 4<sup>th</sup> year RIT engineering students as well
    - Incorporate smaller projects or parts of larger projects into classroom activities/smaller scope design projects.
    - Allow for the creation of a database of ideas on projects that can be withdrawn from for Senior Design.
    - Elicit interest from younger students for design and development projects within Assistive Devices.
- **Ultimate Goal**
  - Be able to apply the concurrent engineering roadmap concept to various families and tracks within the RIT Senior Design department using the Assistive Devices Roadmap as a fundamental base.

Level of Difficulty	<u>Simple</u>	<u>Moderate</u>	<u>Difficult</u>
<b>Goal</b>	Provide students with a rudimentary real world problem with defined scope Hands-on application of theory while either creating or furthering an interest in engineering	Students to solve an open-ended design problem with given constraints Students will develop some items of PD (i.e. technical drawings, organized needs) Small budget will be supplied	Students can use archive of problem solutions from other tracks for support during MSD Allows for effective time management Used for building blocks to solutions Evolution of projects
<b>Outcome</b>	Provide numerous solutions to given problem. Solutions will be archived for future use.	Develop a database of solutions for use by MSD teams for common problems	MSD projects can use historical projects as references/support for current project allowing for further project completion
<b>Foundations</b>	Draws on foundational math and science courses Physics and Calculus	Draws on Simple Project Track plus early foundational Engineering courses	Draws from Simple Project Track and Moderately Difficult Project Track
<b>Projects (Examples)</b>	<p><b>AY 2009</b></p> <ul style="list-style-type: none"> <li>•Develop a device to reach a grasp an object and complete trial tasks (ME)</li> </ul> <p><b>AY 2010</b></p> <ul style="list-style-type: none"> <li>•Ponytail tying device or process for person with disabilities (ISE or ME)</li> </ul> <p><b>AY 2011</b></p> <ul style="list-style-type: none"> <li>•Develop a device to assist someone to put shoes on</li> </ul>	<p><b>AY 2009</b></p> <ul style="list-style-type: none"> <li>•Conduct usability tests for the Portable Motion Tracking System (ISE)</li> </ul> <p><b>AY 2010</b></p> <ul style="list-style-type: none"> <li>•Develop a touch screen to read a patient's heart rate (CE)</li> </ul> <p><b>AY 2010</b></p> <ul style="list-style-type: none"> <li>•Develop a devices that opens and closes a door using an electric motor</li> </ul>	<p><b>AY 2009</b></p> <ul style="list-style-type: none"> <li>•Nazareth Clinic Equipment Repair and Process Improvement ← Fall 09 DPM</li> <li>•Wheelchair with 1-arm Operation</li> <li>•Mechanical Spine Test Platform-</li> <li>•Portable Motion Tracking Device</li> <li>•Video-Game Based Balance Training</li> </ul> <p><b>AY 2010</b></p> <ul style="list-style-type: none"> <li>•2<sup>nd</sup> iterations of above projects</li> <li>•Use solutions from lower project levels to assist for next generation</li> </ul> <p><b>AY 2011</b></p> <ul style="list-style-type: none"> <li>•Add grasping device to wheelchair</li> <li>•Begin new/continuation MSD projects</li> </ul>