R10005: LAND VEHICLE PLATFORM FAMILY

Christopher Wakeley (ME)
Andrew Krall (ME)
Steven Rois (ME)
Kenneth Smith (ME)
LV Family Roadmap
LV Family Affinity Diagram
Objective Tree
House of Quality
  - HoQ Summary
Non-Technical Risk Assessment
P10201: LV1 Platform Integration
P10202: LV1 Motor Module Manufacturability
P10203: LV1 Motor Controller Manufacturability
Outstanding Items
LV Family Roadmap

Land Vehicle Family Roadmap

- Gen 2 Motor Module P09203
- LV1 Motor Module Manufacturability P10202
- LV1 Platform Integration P10201
- LV1 Motor Controller Manufacturability P10203

Possible Future Projects
- Autonomous Navigation
- Individual Research Projects
- Scaling to LV10
LV Family Affinity Diagram

Land Vehicle Family
• Be open source.
• Be open architecture.
• Look professional and well organized.
• Easy for a first year engineering student to assemble and use.

LV1 Motor Module Manufacturability
• Perform at or above the level of the previous module.
• Cost less than the previous module.
• Be lighter than the previous generation.
• Be faster than the previous generation.
• Be easily manufacturable.

LV1 Platform Integration
• Interface with as many motor modules as possible.
• Be lighter than previous generation.
• Provide a means to secure a 1kg payload.
• Be equal in size or smaller than the previous generation.
• Be stable on a flat surface (i.e. tabletop).
• Be faster than the previous generation.

LV1 Motor Controller Manufacturability
• Cost less than the previous controller.
• Use space more effectively than previous generations.
• Perform at or above the level of the previous controller.
• Be easily manufacturable.
Objective Tree

LV1 Family

Affordable
- Module & Controller cost
- Manufacture

Ease of use
- Professional and well organized
- Modular

Size
- Volume
- Weight

Performance
- Motor Module
- Motor Controller
# House of Quality

<table>
<thead>
<tr>
<th>Customer Requirements</th>
<th>Mechanical compatibility</th>
<th>Electrical compatibility</th>
<th>Stability</th>
<th>Mass produced module unit cost</th>
<th>Motor module rate of manufacture</th>
<th>Mass produced motor controller unit cost</th>
<th>Effective use of space by motor controller</th>
<th>Motor controller rate of manufacture</th>
<th>All necessary documentation must be posted on the EDGE platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Be open source.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Be open architecture.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Look professional and well organized.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Easy for a first year engineering student to assemble and use.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Interface with as many motor modules as possible.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Be lighter than previous generation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Provide a means to secure a bigger payload.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Be equal in size or smaller than previous generations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Be stable on a flat surface (i.e. tabletop).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Be faster than the previous generation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Module Manufacturability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Perform at or above the level of the previous module.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Cost less than the previous module.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Be lighter than the previous generation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Be faster than the previous generation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Be easily manufacturable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Controller Manufacturability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Cost less than the previous controller.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Use space more effectively than previous generations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Perform at or above the level of the previous controller.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
House of Quality Summary

- Key Engineering Metrics
  - Ease of assembly and use
  - Motor Module/Controller cost
  - Efficient use of space by motor controller
  - Mechanical Interface/Compatibility
# Non-Technical Risk Assessment

<table>
<thead>
<tr>
<th>Type of Risk</th>
<th>Risk</th>
<th>Possible Consequences</th>
<th>Probability</th>
<th>Severity</th>
<th>Total</th>
<th>Contingency/Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staffing</td>
<td>Sudden temporary absence of a team member.</td>
<td>Critical deliverables not completed in time.</td>
<td>L</td>
<td>M</td>
<td>LM</td>
<td>Assign primary and backup to tasks.</td>
</tr>
<tr>
<td>Staffing</td>
<td>Team member not carrying their load.</td>
<td>Critical deliverables not completed in time.</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Meet with member to discuss, address using team norms, take to faculty advisor if necessary.</td>
</tr>
<tr>
<td>Staffing</td>
<td>Consistently poor meeting/work session attendance by one member.</td>
<td>Team member, and thus team, falls behind on one subsystem or set of tasks.</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Meet with member to discuss, address using team norms, take to faculty advisor if necessary.</td>
</tr>
<tr>
<td>Vendor/Supplier</td>
<td>Critical part arrives late/becomes unavailable.</td>
<td>Unable to build/test on schedule.</td>
<td>M</td>
<td>H</td>
<td>HM</td>
<td>Source at least two vendors for critical parts.</td>
</tr>
<tr>
<td>Vendor/Supplier</td>
<td>Wrong materials/parts are sent by supplier.</td>
<td>Unable to build/test on schedule.</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>Communicate clearly with suppliers, request tracking, confirmation, etc. Order parts as early as reasonable.</td>
</tr>
<tr>
<td>Space/Facilities/Resource</td>
<td>Prototype damaged/destroyed by accident towards end of project.</td>
<td>Prototype not finished or much lower quality than previous.</td>
<td>M</td>
<td>H</td>
<td>HM</td>
<td>Use caution when tired/late or in unusual situations, such as visitors in lab. Develop official procedures for how to use/demonstrate hardware.</td>
</tr>
<tr>
<td>Space/Facilities/Resource</td>
<td>Lab unavailable when team needs work done.</td>
<td>Manufacture or assembly of subsystems/overall project could be delayed.</td>
<td>H</td>
<td>M</td>
<td>HM</td>
<td>Plan around lab availability, complete manufacturing tasks as early as possible, possibly use classes to produce components.</td>
</tr>
</tbody>
</table>
P10201: LV1 PLATFORM INTEGRATION

Andrew Krall (ME)
Project Overview

• Mission Statement
  – “To integrate current RP1 and future LV1 motor modules and motor controllers while improving previous robotics platform design in order to meet all required customer needs.”

• Key Goals
  – Create a platform or platforms that incorporate current RP1 and future LV1 motor modules and motor controllers
  – Allow for a 1 KG payload
  – Improve vehicle performance when compared with previous generations
Preliminary Customer Needs

- Must interface with Gen 2 and newer motor modules and motor controllers.
- Must look professional and well-organized.
- Must be lighter than the previous generation.
- Must provide a means to secure a 1kg payload.
- Must be equal in size or smaller than the previous generation.
- Must be easy for a first year engineering student to assemble and use.
- Must be stable on a flat surface (i.e. tabletop) throughout its operating range for a variety of payloads.
- Must be faster than the previous generation.
- Must be open source (all documentation published).
- Must be open architecture (COTS parts used).
# Required Resources

<table>
<thead>
<tr>
<th>People</th>
<th>Capital</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Faculty Guide</strong></td>
<td>• Approximate $1000 LV Project budget (to be split between P10201, P10202 and P10203 upon discretion of teams)</td>
<td>• Mechanical Engineering machine shop</td>
</tr>
<tr>
<td>Dr. Wayne Walter (ME)</td>
<td></td>
<td>• Brinkman Laboratory</td>
</tr>
<tr>
<td>Faculty Consultant</td>
<td>• All existing RP hardware including RP100, RP10 and RP1 robots</td>
<td>• Senior Design Floor</td>
</tr>
<tr>
<td>Prof George Slack (EE)</td>
<td>• All existing RP project documentation</td>
<td>• Electrical Engineering Laboratory</td>
</tr>
<tr>
<td>Primary Customer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Ed Hensel (ME)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Risk Assessment

<table>
<thead>
<tr>
<th>Description of Risk</th>
<th>Possible Consequences</th>
<th>Probability of Risk (H/M/L)</th>
<th>Severity of Risk (H/M/L)</th>
<th>Overall Risk (H/M/L)</th>
<th>Contingency Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team member missing for extended period of time</td>
<td>Components may be missing from final project</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Delegate times to meet and update all members on status of specific areas of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>research, good documentation</td>
</tr>
<tr>
<td>Parts/Materials arrive late</td>
<td>Delayed assembly and testing period, possibly miss deadline for completion</td>
<td>H</td>
<td>M</td>
<td>M</td>
<td>Design module so process does not hinge on ordered parts. Cite multiple vendors for</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>same components</td>
</tr>
<tr>
<td>Platform causes decreased performance of Land Vehicle</td>
<td>Speed, Stability and/or Weight do not meet customer requirements</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>Weigh customer requirements highly during design process</td>
</tr>
<tr>
<td>Platform drives cost of land vehicle up</td>
<td>Too few land vehicles are produced to meet project specs</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>Pitch project family idea to investor with more capital</td>
</tr>
<tr>
<td>New platform fails to integrate with concurrent and past projects</td>
<td>No working vehicles can be produced</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>Hold regular meetings with concurrent teams to ensure integration, and base all</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>designs off of older components</td>
</tr>
</tbody>
</table>
# Staffing Requirements

<table>
<thead>
<tr>
<th>Name</th>
<th>Discipline</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Wayne Walter</td>
<td>Electrical Engineering</td>
<td>Faculty Guide, Will work closely with the team on an on-going basis to facilitate success.</td>
</tr>
<tr>
<td>Prof. George Slack</td>
<td>Electrical Engineering</td>
<td>Faculty Consultant, Will provide discipline technical support on an intermittent basis.</td>
</tr>
<tr>
<td>TBD Grad Student</td>
<td>TBD</td>
<td>Teaching Assistant</td>
</tr>
<tr>
<td>TBD Student</td>
<td>Electrical Engineering</td>
<td>Student Responsible for interface and electrical connection between motor modules and platform</td>
</tr>
<tr>
<td>TBD Student</td>
<td>Electrical Engineering</td>
<td>Student Responsible for interface and electrical connection between motor controller and platform</td>
</tr>
<tr>
<td>TBD Student</td>
<td>Electrical Engineering</td>
<td>Student Responsible for general layout and connection of electrical components on platform as well as wiring layout</td>
</tr>
<tr>
<td>TBD Student</td>
<td>Mechanical Engineering</td>
<td>Student Responsible for mechanical interfacing with motor modules</td>
</tr>
<tr>
<td>TBD Student</td>
<td>Mechanical Engineering</td>
<td>Student Responsible for mechanical interfacing with motor controllers</td>
</tr>
<tr>
<td>TBD Student</td>
<td>Mechanical Engineering</td>
<td>Student Responsible for main structural analysis and design of platform as well as payload interface</td>
</tr>
</tbody>
</table>
## Week 0->1 Tasks
- Team Introductions
- Review project readiness package created in DPM
- Meet with faculty Advisor/Consults and Customer
- Meet with P10202 and P10203 project groups

Assignments:
- Begin learning EDGE server
- Download and become familiar with SVN Client
- Load contact information to EDGE
- Begin research on RP project family
- Schedule weekly meeting between P10201, P10202 and P10203 project groups

## Week 1->2 Tasks
- Conduct formal interviews with stakeholders and customers
- Review preliminary customer needs
- Analyze previous RP hardware
- Meet with P10202 and P10203 project groups

Assignments:
- Consider task placement for team members
- Continue background research
- Post updated information to EDGE server

## Week 2->3 Tasks
- Continue analysis of previous RP hardware
- Refine and finalize customer needs
- Meet with P10202 and P10203 project groups
- Begin brainstorming preliminary design
- Assign team member specific tasks
- Plan weeks 4-11

Assignments:
- Begin work on specific tasks
- Continue background research
- Continue brainstorming
- Schedule follow-up stakeholder and customer interviews
P10202: MOTOR MODULE MANUFACTURABILITY

Steven Rois (ME)
Mission Statement: The mission of this project is to produce multiple motor modules at a reasonable price, and to develop those modules so they are compatible with hardware from past and concurrent MSD projects.

Description: The MSD team will work to improve the manufacturability of the existing motor modules, as well as reduce the cost of production so that multiple modules can be made and used by the KGCOE. The module must retain all functionality present in the current version, while satisfying the primary goals of the project.

Past Projects: P09203
- Team will use design of previous generation as a starting point for their own design (make improvements to reach cost and mfg goals)

Concurrent Projects: P10201 and P10203
- Must interface with motor controllers and chassis from parallel projects as well as interface with past chassis and motor controllers (backwards and forwards compatible)
Design a motor module that is...

- Low Cost
- Materials, machining processes, design for manufacturing

- Easy to Mass Produce
- Design for mass mfg, materials

- Robust/Durable
- Materials, fasteners, interfaces

- Easy to use/integrate
- Interfaces (mechanical/electrical), number of parts

- Able to perform at or above level of previous generation
- Motors, servos, gears, materials, interfaces
Required Resources

- **Faculty:**
  - Dr. Walter
  - Dr. Hensel

- **Labs:**
  - Computer labs for CAD modeling and simulations
  - Brinkman lab for mfg and prototype production

- **Equipment:**
  - CNC or similar machine for mfg modules
  - Machine shop equipment for prototyping
  - Hardware from previous generation as a reference
<table>
<thead>
<tr>
<th>Description of Risk</th>
<th>Possible Consequences</th>
<th>Probability of Risk (H/M/L)</th>
<th>Severity of Risk (H/M/L)</th>
<th>Overall Risk (H/M/L)</th>
<th>Contingency Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team member missing for extended period of time</td>
<td>Components may be missing from final project</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Delegate times to meet and update all members on status of specific areas of research, good documentation</td>
</tr>
<tr>
<td>Parts/Materials arrive late</td>
<td>Delayed assembly and testing period, possibly miss deadline for completion</td>
<td>H</td>
<td>M</td>
<td>M</td>
<td>Design module so process does not hinge on ordered parts. Cite multiple vendors for same components</td>
</tr>
<tr>
<td>New module is less expensive but fails to meet performance specs</td>
<td>Lack of performance makes modules awkward and decreases allure to students</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Consider alternative power supplies and motors when ordering parts for modules</td>
</tr>
<tr>
<td>New module costs the same as previous generation</td>
<td>Too few modules are produced to meet project specs</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>Pitch project family idea to investor with more capital</td>
</tr>
<tr>
<td>New module fails to integrate with concurrent and past projects</td>
<td>Nothing to attach modules to. No working vehicles</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>Hold regular meetings with concurrent teams to ensure integration, and base all designs off of older components</td>
</tr>
</tbody>
</table>
Staffing Requirements

- Faculty Advisor: Dr. Wayne Walter
- Technical Advisors: Professors familiar with cost reduction analysis/manufacturing processes, engineering machine shop/Brinkman lab instructors to aid in production
- Student Team Members:
  - 2 MEs
  - 2 ISEs
  - 1 EE
Staffing Requirements

- **ISEs**: Oversee cost reduction analysis, and help MEs develop a design which reduces cost and makes the module more easily manufactured.
- **MEs**: Develop new design for motor module with the help of ISEs. Designs should keep Mfg and cost reduction in mind while not sacrificing performance.
- **EE**: Oversee integration of electronic components from past module (motor, encoder, servo) as well as integration with P10201 and P10203 hardware.
<table>
<thead>
<tr>
<th>Group Goals</th>
<th>Week 0-&gt;1</th>
<th>Week 1-&gt;2</th>
<th>Week 2-&gt;3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Team introductions</td>
<td>Procure past hardware/begin initial analysis</td>
<td>Begin considerations for cost reduction</td>
</tr>
<tr>
<td></td>
<td>Review DPM documentation and team values/norms</td>
<td>Meet with stakeholders to review primary needs</td>
<td>Meet with advisor to discuss ideas/solutions</td>
</tr>
<tr>
<td></td>
<td>Set up meetings with P10201 and P10203</td>
<td>Assign tasks and specific responsibilities</td>
<td>Finalize customer needs</td>
</tr>
<tr>
<td></td>
<td>Begin background research</td>
<td>Meet with P10201 and P10203 teams</td>
<td>Plan tasks for weeks 4-11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Meet with advisor(s)</td>
</tr>
</tbody>
</table>
P10203: MOTOR CONTROLLER MANUFACTURABILITY

Kenneth Smith (ME)
To design and build the motor controllers that control the motor modules on the LV1 Land Vehicle platform.
Design and build a motor controller that can control the steering and speed of the LV1 land vehicle platform (P10201) by controlling the motor modules (P10202). Work closely with P10201 and P10202 projects to ensure proper integration. Use previous software and improve upon previous designs in order to reduce cost and space requirements, while still meeting all of the technical specifications.
Motor Controllers

Integration
- Compatibility with LV1 motor module
- Utilize minimal space on LV1 platform

Costs
- Reduce overall unit cost

Performance
- Perform at or above the level of the previous generation
- Utilize previous software
- Use hardware more efficiently

Different materials and hardware

Increase lot size
Required Resources

- Existing RP Hardware & Software
  - RP1 Gen 2 motor modules, motor controllers, and platform
- Existing Documentation
- Faculty consultants and advisors
- Computer Labs
- RIT Senior Design Center
- 3rd Floor EE Lab
- Robotics Lab
- $1000 across all 3 P1020x projects
## Risk Assessment

<table>
<thead>
<tr>
<th>Description of Risk</th>
<th>Possible Consequences</th>
<th>Probability of Risk (H/M/L)</th>
<th>Severity of Risk (H/M/L)</th>
<th>Overall Risk (H/M/L)</th>
<th>Contingency Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not function properly. Fails to control motor modules</td>
<td>Land Vehicle will not function. Entire project fails.</td>
<td>L</td>
<td>H</td>
<td>L</td>
<td>None. This is the basic requirement of the controller. This requirement must be met.</td>
</tr>
<tr>
<td>Fail to reduce costs from previous iteration</td>
<td>Large scale manufacturability may not be possible. May not meet requirements for desired end use.</td>
<td>M</td>
<td>H</td>
<td>M</td>
<td>Continue to search for other ways to reduce costs, so large scale manufacturability is possible.</td>
</tr>
<tr>
<td>Integration with motor modules and platform is not improved</td>
<td>Modularity will be effected. Wiring may be sloppy. The space used may be greater than desired.</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>Use previous project's method of integration. It will work, but it may not work as easily or look as nice.</td>
</tr>
<tr>
<td>Fail to reduce space requirement</td>
<td>Vehicle platform may need to be larger than specified</td>
<td>H</td>
<td>L</td>
<td>M</td>
<td>Vehicle will be larger than desired. Work to decrease board size in the future.</td>
</tr>
<tr>
<td>Previous software not used.</td>
<td>More time to develop new software. You rely on unproven software, which may not be as affective.</td>
<td>M</td>
<td>L</td>
<td>M</td>
<td>Develop new software that is capable of controlling the modules and interfacing with the input device.</td>
</tr>
</tbody>
</table>
Staffing Requirements

- **EE**
  - Hardware selection
  - PCB board design
- **EE**
  - Power Supply
  - Wiring
  - Motor Module Interface
- **CE – Software Lead**
  - Research and understand previous software
  - Make any necessary improvements
- **CE – Software Coordinator**
  - Coordinate EE and CE areas
  - Assist with software development
- **ME – Integration Specialist**
  - Communicate with other LV1 projects
  - Interface with platform
Staffing Requirements

- Dr. Hensel – Primary Customer & Consultant
- Dr. Walter – Faculty Advisor
- Professor Slack – Faculty Consultant
- Dr. Sahin – Technical Consultant
Work Breakdown

- **Week 1**
  - Introductions and Ice Breakers. Learn areas of skill and interest for each team member.
  - Learn EDGE
  - Begin Background Research
    - Thoroughly review DPM project readiness package

- **Week 2**
  - Update user info individually and the project description on EDGE
  - Communicate with other LV1 projects. Learn how you will need to work together and stay on the same page.

- **Week 3**
  - Begin project design and planning
  - Assign areas of focus for each team member
  - Determine First Deliverables
Outstanding Items

- Continue to update EDGE project pages
- Update DPM EDGE page with project family information
- Complete individual project readiness packages
- Hold breakout meeting with faculty guide to review DPM
- Complete marketing video
Questions?