Plan

Functional Decomposition:

Risk Assessment: 1/29-end of MSD1

- 1/29-2/7 establish a first cut of categorized risks, with likelihood and severity ranking, as well as steps to mitigate risk (TEAM)
- 1/29-2/7 Research Robot safety Standards, OSHA, etc.(TEAM)

Benchmarking:1/24-2/7

- Research different robot configurations and benchmark(TEAM)

Feasibility:analysis, and benchmarking critical technology: 1/29-2/11

- Research gripping methods of different robots and benchmark(ME)
- Research ways to make solution more portable(ME)
- Research Power distribution methods for system(EE)
- Research motors for Arm and benchmark(EE)
- Research microcontrollers and motor control shields, benchmark both(EE)

Concept generation:2/5/19-2/11

- Compare benchmarks of robot configurations(TEAM)
- Research Fusion 360 capabilities and G-code generation(EE)

Concept Selection:2/7-2/21

- Determine subsystems(Team)
- Get input on benchmarks and pick best robot configuration for project(Team)

Systems Architecture: 2/5/19-2/21

- Establish subsystem roles(Team)
- Generate a plan for subsystem completion(Vincent)

Test Plan:2/17-2/21

- Generate subsystem plans(team)

Refresh Skills and strengths:1/29-2/21

- Review Motor Design Torque(ME)
- Review solidworks,creo,autodesk(ME)
- Review Programming languages

Individual Plan

Team level goal for next phase:

- Research Robot configurations, EE subsystems and ME subsystems
    - Refresh skills and apply those skills to determine subsystems and what needs to be researched
- Complete benchmarking of comparable robots, benchmark critical subsystems
- Generate potential concepts with benchmarking and research to support each concept
    - Make a team based decision of the best concept with some kept as close and adaptable back ups if a system won't work
- Explore the risks and come up with solutions to mitigate risk and turn it into a problem to be solved

Vincent Individual Plan:

What do I plan on doing to ensure that my team has a successful review at the end of the next phase?

- Research Motors, Microcontrollers, and motor control shields and benchmark
    - Pay attention to power requirements and group devices into groups of compatibility
    - Coordinate with the ME guys to get motor torque requirements
- Refresh programming skills and benchmark languages to use for microcontroller and pc driver
- Coordinate with EE guys about potential electrical subsystems and more dedicated subsystem roles
- Research power supplies and isolation methods
    - AC/DC converters and or other power supply solutions to power motor and microcontrollers

- Improve the team schedule and keep updated as more activities and tasks are found

Jon Individual Plan:

What do I plan on doing to ensure that my team has a successful review at the end of the next phase?

- Research microcontrollers and motor control shields, benchmark both
- Research Fusion 360 capabilities and G-code generation(EE)
- Create and maintain the “Risk Assessment” Excel doc that will be presented for Phase 2
    - This is the physical doc that we will be talk from during our second review and will include both ME and EE risks
- Create and maintain the “Benchmarking” Excel doc that will be presented for Phase 2
    - This is the physical doc that we will be talk from during our second review and will include both ME and EE benchmarks
- Creating the block diagram of the PC systems to microcontroller (ex: Fusion to com app to microcontroller to motors)

Aaron MacWilliams Individual Plan:

What do I plan on doing to ensure that my team has a successful review at the end of the next phase?

- Research Motor For arms and Benchmark
    - Determine starting motor specs and power requirements for arm
    - Determine other considerations such as heat generation and power requirements and restrictions as well as compare cost and weight.
- Research Motor control shields and Microcontrollers
    - Find Control shields information in order to benchmark different types as well as include the robot configuration in order to have the best control method for the decided on robot configuration
- Research Robot Configurations
    - Research different software control methods for different configurations of robots in order to benchmark complexity when comparing robot configurations.
- Research Power Distribution Methods for system
    - Obtain info on good and safe methods to distribute power to the system
- Research OSHA electrical safety standards and “Kill Switch” implementation
    - Obtain info on industry standard for “Kill Switch” implementation for safety

Jesse Fronckowiak Individual Plan:

What do I plan on doing to ensure that my team has a successful review at the end of the next phase?

- Research ways to make solution portable
    - Determine feasibility of caster wheels vs. other transportation methods
    - Determine other considerations of portability; power supply, weight, etc.
- Research gripping methods of different robots and benchmark
    - Vacuum suction? Gripping cups? Hand-like mechanisms?
- Perform risk analysis of design candidates for mechanical subsystems
    - Should we go with the lowest risk design?
    - Should we strive for a more innovative solution? Or one that we have more confidence in?
- Ensure effective communication between team members by updating the status current team practices
    - When are we meeting?
    - What are the expected deliverables for meetings?
    - Who is uploading things to edge? How do we ensure we aren't doing redundant work?
- Determine how to measure and quantify engineering requirements for mechanical characteristics

Brad Individual Plan:

What do I plan on doing to ensure that my team has a successful review at the end of the next phase?

- Research different types of linear/rotational motion to be used on arm
    - Linear slides, Rotational motion
    - Look to other arms for inspiration and methods of motion
    - Analyze the cost effectiveness of linear motion methods
- Research designs for carts/portability of system
    - Feasibility study to find if buying a cart vs building one would be effective
    - What are the risk of building your own vs buying?
    - Analyze the structural aspect of each
- Assist in converting over from Edge to Confluence
    - Make sure everyone has access including guide
    - Educate teammates on how to use confluence
- Assist in the research of motors and the mounting methods
    - How will the motors attach to the components of the arm?
    - See if there is prefabricated solutions available

- Research materials arm itself can be made from
    - Use 3D printing technology as inspiration
    - Create a feasibility study of three different material types
    - Do a cost analysis of the different types of materials