# Rover Electrical Team Minutes

Date: September 1st 2018

1. Goal for this year: Communication
   1. Make sure that all disciplines are in on what is occurring (Mechanical, Finance, Science, etc)
   2. Proper connections between different areas of the rover using industrial connectors
   3. Deadlines for different project phases
   4. Weekly progress meetings
      1. expectation of 30 second explanation of where you are at in your project

For progress and if you are hitting a wall, let me know

* 1. Monthly milestone meetings
     1. develop a milestone to hit and at the meeting, go over how that milestone has been completed

Make a plan of design and implementation (when do I thing it will get done).

1. Potential Projects
   1. Proper Rover wiring
      1. Creation of electrical boxes, addition of connectors, ease of use, etc
      2. Reduce lag and bus use of lower priority equipment
      3. Separating different data types to different communication paths
   2. Attachment electrical boxes
      1. Arm box, Drill box, Bucket Box, Misc Boxes
      2. Standard box size creation as well as a standard back plane so the layout of electrical components can easily be changed without changing the box
      3. Ideally there would only be need of connecting power and comms
   3. Documentation
      1. Use of free 2D drawing software
      2. Keep up an electrical document that we can use to troubleshoot problems
   4. Indicator lights
      1. We have no way of telling if different parts of the rover are even powered
      2. Research and development of adding indicator lights to the system (motors, PIs, Jetson, etc)
   5. Proper cable management
      1. Labeling all cables properly so we know what cables go where
   6. Setting up a 900 MHz comms system
      1. Look into the feasibility and possibility of this alternative.
      2. Reasoning is that 900 MHz has more directional power and less reflection due to terrain
   7. Determination of best communication protocols
      1. Research into the different communication protocols
         1. USB, I2C, UART, CANBUS, etc
      2. Recommendation on which to use
      3. This will allow the design for cables to be correct
   8. Battery Management Board
      1. Total redesign is required
      2. Goal is to charge the battery at the same time as powering the rover. Is a separate charging IC required?
      3. Require a gauge IC, and another IC to switch the IC we have from a low side power transistor system to a high side
      4. We want to be able to read power flow as well as battery charge remaining (ties into our goal of communication)
   9. Testing Boards
      1. Each attachment and motor will require a test bench
      2. How to go about doing this?
   10. Drill attachment (Science)
       1. Need to help with PCB creation
       2. Discuss with science on how to manipulate their input signal to get a proper output to be read by a teensie (and research into if teensie is the best microcontroller for this application)
   11. Changing of the motor controllers
       1. Either create a smaller one specific to our needs or purchase one
       2. Research into the different types of motor controllers and discuss with computer if it will work (communication type and if the hall effect sensors are present)
   12. Embedded arm camera, laser distance measurement IC, motors and LEDs
       1. Communicate with mechanical on how to approach creating a detachable end effector (like Oregon state at CIRC) and look into getting power and comms to it to power small motors, laser distance measurement IC, camera, LEDs and maybe a small microcontroller.
   13. Create a temp-dependant switch to turn on the fans
       1. Research into an appropriate sensor
       2. Wire up something to turn the fans on when a certain temperature occurs
2. First-year engagement
   1. How to make first-years involved?

Proper wiring, creation of connectors.

* 1. What projects are suitable for a first year?
     1. Can have them help with wiring (connectors have a lot of wiring that needs to be completed), building led drivers for indicator lights, etc.
     2. Tutorials: crimping, soldering, KiCad, PCB design and creation, electrical engineering design practices, etc
  2. First year projects:
     1. Cable connections
     2. Indicator lights
     3. Temp-dependant switch
     4. Embedded arm control in end effector
     5. Drill Attachment
     6. Testing board

1. Milestone Development
   1. Determination of feasible due date for research completion

Mid october

* 1. Determination of feasible due date for design completion

November

* 1. Date for electrical team design review

November

* 1. Determination of feasible due date for test equipment purchasing

Ordering beginning of december

* 1. Determination of feasible due date for final equipment purchasing

March

* 1. Assembly

March-April