

Meeting Minutes: Senior Design
Meeting One
September 15, 2016

1. Action Items:

- a. Read the two-page project description provided by the team
 - i. Make sure to have notes and ideas
- b. Come up with a list of things that want tackled and the priority list of those tasks
- c. Make team schedule to plan meetings
- d. Start organizing the team portfolio
- e. Look into possible communication systems: possibly SEL

2. Tasks:

- a. Purchase log book
- b. Make a meeting agenda for next meeting
- c. Send class schedule to group email (whole group task***)
- d. Get a team portfolio

▪ Client Meeting:

- Proposed by the business group: 11:00
- Our ideal time for this meeting would be 10:00
- Looking into the security side of things:
 - What kind of communication are we looking into for communication so that we are secure when we are looking into stopping the lines?
 - Applicable in some situations but not all
- The faster that we can come up with things that fail the faster we can start coming up with solutions
- We need to look into exactly how far this project has already gone, and see where we need to go into this project.
- Talk with the client about the security of the sharing of documents:
 - Share drive folder? Is it a possibility for the project?
 - Are there any other options for file storing and collaboration?
 - Share drive,
 - Would need to request VPN from the IT desk from uidaho and can connect remotely from home, to the shared drive and personal drive
- Log books: we need to make sure that everyone has one and starts keeping track of the ideas and such that are required in the log book
 - Need to make sure they are bound and written in pen
 - One entry per page
 - Make sure it is constantly up to date and easy to access to make sure that it is an effective tool
 - Most of the log book should be focused on your personal ideas and what you personally will be working on

Minutes: Senior Design
Meeting Two
September 22, 2016

3. Action Items:

- a. Read the two-page project description provided by the team
 - i. Make sure to have notes and ideas
- b. Come up with a list of things that want tackled and the priority list of those tasks
- c. Make team schedule to plan meetings
- d. Start organizing the team portfolio
- e. Make list of questions for client meeting.

4. Tasks:

- a. Make a meeting agenda for next meeting
- b. Send class schedule to group email (whole group task***)
- c. Have a plan to present to the group of what we want to have done
- d. Have and write in log books

5. Meeting Notes:

- a. Thoughts on the grid defender:
 - i. Was it a previous project from last year?
 - ii. Agenda handed out for client meeting
- b. For the meeting make sure to wear business casual attire
- c. Potential Questions:
 - i. What is the legal aspect of this through the government regulation for dropping the lines to the ground?
 - ii. Do they actually have a built model? Or is it just a software model that we can look?
 - iii. We need specifications for the conductors and the forces and wood poles that we are going to be working with.
 - iv. How they want communication to change the behavior of the pole?
 1. What do they want the potential responses to be?
 2. Will the system be active or passive?
 - a. Could there be multiple behaviors for each of the individual poles depending upon the communication provided to it?
 - v. What about the other wires and other equipment on the pole? Can we have more clarification about this?
 - vi. What poles are we going to be specifically looking at? The ones with too many wires and such might create a problem?
- d. Discussed the system and how things should potentially operate
- e.

Minutes: Senior Design
Meeting Three
September 29, 2016

1. Action Items:
 - a. Make team schedule to plan meetings
 - b. Email George and establish the budget that we are working with

2. Tasks:
 - a. Make a meeting agenda for next meeting
 - b. Write in log books
 - c. Get a list of deliverables
 - d. Create tentative schedules for the individual groups and their design ideas
 - e. Set up specifications outline and be ready to present these specifications to the group

3. Meeting Minutes:
 - a. When looking into the forces and the mechanical portion of this: ask if this is something the business kids can look into?
 - i. Utilize all of the other people involved in this project
 - ii. We are just here for the technical problems
 - b. There are a lot of assumptions that have been made in the cost analysis of the project
 - c. The client transcript: describe what the deliverables should be
 - i. Explain that you understand what they are asking for
 - d. Five poles with three of the poles dropping
 - i. Four conductors
 - ii. Breaker on each side
 - iii. Five mechanical lowering devices
 - iv. Single cross arm
 - e. What exactly is the budget for this project?
 - i. Talk to the business department in order to establish how much we can spend on this project
 - ii. Keep in mind we have to make sure we have enough together for the end of the year senior design expo
 - f. The safety side of things:
 - i. Consider attaching things at the top so that its difficult for people to mess with everything
 - ii. There are different possibilities for the placement and covering of the cables
 - g. All installation could be retro fitted or could have a brand new pole
 - h. What would the benefit of the release mechanism being at the bottom be?
 - i. The release: there will be a gear that will hold everything in place, after a certain force the pin will break away and the poles will go down

- j. We want to put everything at top so that there is no separation between the pieces
 - i. How do we passively engage it when it needs to be tripped?
 1. We want to have a sensor that will tell it that it needs to be tripped
 - ii. ****Ask the inventor to see if this will affect the patent that they have in place
 - iii. Will this affect the design enough to make the patent change
- k. For the sensors we need to be able to sense at 4,000lbs
- l. Need to look into the current rating
- m. Shared Drive is up
 - i. Can be accessed remotely
 - ii. Vandals.uidaho.edu (main university web page)
 1. In the vandal search "ITS self-help"
 2. Find VPN access under the security option
 3. Share drive access mounting
 4. Located on the senior design
 - iii. Located in the S-drive
 1. My computer: S (might need to tell it what letter when accessing it for the first time)
 2. Shared drive and U drive are in the same spot
 - iv.

Meeting Minutes
October 6, 2016

Action Items:

1. Start to get specific numbers for the apparatus
2. Update the schedule for the team shared drive

Tasks:

1. Set up individual meetings with our specific disciplines
2. Finish the client transcript by Oct. 7, 2016
3. Prepare for snapshot
 - a. Print all needed documents
 - b. Put together presentation
 - c. Attend Snap Shot

Meeting Notes:

1. We can order the cross arms, but need to be quoted
2. The bearings can also be ordered as well
3. Wanted the cable not in tension the entire time, otherwise they would have to specialize the bearing
 - a. These are at a reasonable price through a specific website
4. Top of the pole is around 21" on the top and the 38" base
5. The pole used in the current model is 10' tall as of right now but the main focus was on the design
 - a. Possibly look into different sizes of cross arms
6. Snapshot information
 - a. Shane will be printing the CAD drawing that will be put on the board
 - b. Austin will make the title team name members and sponsor
7. Meeting 4:30 on Sunday for the snapshot prep

Meeting Minutes: Senior Design
Meeting Five
October 13, 2016

1. Action Items:
 - a. Update Schedule(ALL)
 - b. Have a flow diagram that explains that communication system with the end points (CS/EE)
 - c. Look into ordering the parts that we know we will have (i.e. insulators) (M.E.)
 - d. Find prices of strain sensors (Daniel)
2. Meeting Notes:
 - a. Snap shot review:
 - i. We need to get a black board: looks more professional and will display the pictures better
 - ii. We did not have a lot of people come to our booth
 - iii. One or two should stay at the booth and the rest should be wandering around snap shot and determine what other groups are going
 - iv. Talked to Josh he wants to
 - v. Best Question: Can we have a fully dropped pole and non-fully dropped pole
 1. Current understanding: not allowed to have slack transfer, so one of them will not make it to the ground
 - vi. Question: Will we have to deal with thermal expansion?
 1. No
 - vii. Question: How will we be able to get the breakers to connect to the lines that are already in existence?
 - viii. How is the assembly going to work after years of being in the weather?
 - ix. How will we deal with the problem if someone or something affects the lines once the lines are already down?
 - x. Current plan: decide what is actually in our scope of work?
 1. Anything outside of our scope of work should just be noted as things to be considered.
 - b. Looking into the scope of work:
 - i. How are we addressing the sector with the GPS:
 1. Do we want it as the sector or pole to pole?
 2. Decided we want the pole at the end and at the beginning to have the gps because no matter what when this communication occurs the breakers will open
 - ii. For the poles in the middle;
 1. Must say that the pole has dropped
 2. We have to look into the Hall sensor to determine if the power has gone out
 3. We need the go over what should be going in and out of the system and what communications are necessary for this

- iii. The collar right now is just a band of metal with screws attached,
 - 1. Can we drill directly through the pole
 - 2. Or possibly add a piece of metal that attaches to the pole that it will sit on top of
- iv. Maybe like a pen and then it would be modified to support something more than it already is
 - 1. Rather have a bracket that sits on top so that it is stronger
- v. The release means and the wench assembly
- vi. Do we need to start identifying materials to ask the business kids to look into?
 - 1. Maybe the insulators
- vii. Quick clamp system and the insulator
 - 1. Each insulator is a specific cost
 - 2. Start getting these ordered: ask the business kids to look into ordering these things
 - 3. They are all prefabricated and could just be put together
 - 4. Should have data on the cost and should know how much it costs
 - 5. Has to have something that would allow slack transfer
- viii. Need to look into the loads of static versus dynamic
 - 1. Where do we go to find something to introduce the necessary load that we will have
- ix. Look into a strain sensor instead of a force sensor
 - 1. Have to make sure it is outside of the plastic deformation stage
 - 2. Look into the pricing of these
- x. The communication on each pole is going to be to drop the mechanism
 - 1. Have to look into powering this communication system when the power goes down

Meeting Notes:
October 20, 2016

1. Action Items:

- a. Need to look into the Factor of Safety for the real life industry for this stuff
- b. Send out the information about the strain gauges
- c. Look into the problems associated with lightening striking our system
- d. Look into the power we will need the in order to operate all of this stuff (is this in the scope of design for our project)
- e. EE/CS:
 - i. continue to look in the breaker options
 - ii. Continue to modify and elaborate on the control flow diagram
- f. ME:
 - i. continue the work on determine the gauges
 - ii. Continue wench assembly and determine which wench to use
 - iii. Determine if we can have a force sensor or a strain gauge
 - iv. Finalize a cable size: make sure that the cable factor of safety is within industry standard

2. Meeting Notes:

- a. EE are looking into a different type of breaker because of the problems associated with the air breaker
 - i. They are not rated high enough
 - ii. Need to find either an alternate type of breaker or look into a higher rated air breaker
- b. EE: communication:
 - i. Need communication between the poles to indicate that the poles are dropping
 - ii. Need the redundant signal from the GPS when the signal is sent out either by the operator
 - iii. Need to drop: we have to have the communication that it was dropped and power will be cut by the breakers
 - iv. Still need communication back and forth
- c. CS:
 - i. SEL communication would be a blue tooth pole to pole connection
 - ii. Need to per pole for the bi-directional signals being sent
 1. Would send ID and what needs to happen
 2. Do not need to include the GPS signal in the middle of the poles just on the ends
 3. Does the encryption for us
 4. Needs a connection like plugging in a monitor,
 5. Needs its own individual power supply
- d. The ME's are looking into the strain gauge:
 - i. Instead of breaking at a certain force we would look at breaking at a certain strain
 - ii. Problem: how do we test all of our prototypes?

- iii. We would need a force sensor and need a vehicle that would be a lot larger than the load
- iv. Have to calibrate the sensor
- v. If we had an extra pole we could potentially use the pole to create the forces
- vi. If we know the weight of the pole and size and dimensions you could determine force and center of mass and calculate the forces on everything
- vii. Calibrate it to a specific type of metal
- e. ME:
 - i. Prices have been established, everything besides the pole and the cross arms have been determined
 - ii. Instead of having a solid steel piece we have a steel tube
 - iii. Machining from the aluminum
 - iv. Researched the cable diameter that we are using and we can use an even smaller cable based on the ratings that we have
 - v. The plate to make the pulley out of it is \$250 and we have the capability to machine most of this stuff
 - vi. Have to change some of the dimensions' results
- f. ME:
 - i. Strain gauges have been researched
 - ii. Cheaper to go with this option
 - iii. Can a strain gauge be developed for a higher capacity?
 - 1. Calibration will be very difficult but once one is calibrated then the rest can just fit the same settings
 - 2. Everything would be matched to this
- g. Single apparatus for machining is \$828 but still more costs to look into
 - i. Have to consider the communication costs
 - ii. Electrical costs

Meeting Minutes
November 3, 2016

Action Items:

3. Update the schedule for the team shared drive
4. Look into the design of the breaker for the device
5. Finish the design for the winch

Tasks:

4. Set up individual meetings with our specific disciplines
5. Finish the Wiki page
6. Turn in Log books by next Tuesday
7. Collect research on the specific breaker that is being asked to design

Meeting Notes:

1. Each of the disciplines update where they were at with the progress of their individual portions of the project
2. Need a breaker that will specifically fit the apparatus that is being built
3. More research needs to be done so that the breaker fits the specifications described by Dennis
4. Need to have a reliable transmission method for communication
 - a. Look into the communication devices that DTS would be willing to provide for us
 - b. They come with the necessary software to program the communication between our poles
5. Mechanicals are almost finished with the design in CAD
 - a. Need to look into the sizing of the poles, they could potentially be smaller than what we are currently designing for
6. Need to look into a way to power the release means
7. Break away system at the top of the pole is probably an unrealistic plan because it would be impossible to reset the device
 - a. Need to be able to manually reset all of this without having to climb to the top of the pole
8. The purpose of the Hall Effect sensor is to read that the current has been cut if a conductor falls to the ground
 - a. Need to make sure that everyone is safe if a line breaks
 - b. The hall effect sensor would be used in case the breaker is disconnected from the rest of the system because a conductor breaks
9. The design of the breaker can be shipped to a place where it can be tested
 - a. There are several labs that would take the breaker and test it for us because we do not have the capability to do this
10. Security issues were discussed, potentially look into the security side of things once the communication devices have been established and set up
 - a. There is always a security risk

Meeting Minutes
December 8, 2016

Action Items:

1. Get all wiki information into Elizabeth by DEC 8 NO LATER (ALL)
2. Everyone needs to look at the portfolio and what needs to be included in this (ALL)
 - a. The wiki page and the portfolio is due on DEC 9
3. Start designing the small electrical system for the top of the poles (EE ALL)

Tasks:

8. EE:
 - a. More detailed control flow diagram (Lexi)
9. ME:
 - a. Order parts before leaving for break (Justin and Daniel)
 - b. List of tests for the apparatus (ALL ME)
10. CS: (Elizabeth)
 - a.

Meeting Notes:

- Control Flow Diagram:
 - The system can be broken down into different subsets
 - This can create a more visual display of the function of the device
 - The mechanical portion can also be added to the control flow diagram
- Pricing of the things that need to be purchased:
 - Need to get things ordered so that everything gets here by the end of break
 - Ordering now will get here over the break and be ready to be built over the
 - Bill of materials was created
 - Do we order or does business team order?
 - Ask George about the budget stuff.
- Snapshot:
 - Look into the dirt that goes on the lines, does this affect the lines go onto the ground
 - Look into the harvesting power off of the lines, in order to charge the battery
 - Maintenance is a concern that we need to look into: maintenance schedule
- Wiki page:
 - The wiki page has been updated
 - Looks good
- Portfolio:
 - Look into the design analysis of different ideas
 - Alternative designs should be added
 - Focus on what we are building and designing
 - Why did we choose to go the route we did?

Meeting Minutes: Senior Design
Meeting Ten
January 19, 2017

1. Action Items:

- a. Determine the power that is needed for the circuit – Lexi
- b. Come up with a list of things that want tackled and the priority list of those tasks – Whole Group
- c. Set up meeting with power professor – Austin
- d. Set up meeting with machine shop mentor- Daniel and Justin
- e. Figuring out size of box for the communications: Elizabeth
- f. Distance between GPS and other electronics and wires – Lexi

2. Tasks:

- a. Make a meeting agenda for next meeting – Lexi
- b. Have and write in log books – Whole Group

3. Meeting Notes:

- a. Looking at the communication there is some variations in the amount of power necessary to work everything
- b. Knowing how much power is needed to power our little system
- c. Looking into potential meetings:
 - i. For sure the usual Thursday Meeting time: shoot between 3:15 and 3:30
 - ii. Tuesday meetings at 3:30- if there is class then we will meet up quickly after the session
 1. Location: Senior Design Lab
- d. Daniel is the designated purchaser for the group!!
 - i. We give the form to Daniel once it has been completed
- e. Next steps:
 - i. Computer science would like to start focusing on the computational device
 1. Going to be needing some various specifications
 - a. Such as power
 - b. Such as amount of space needed on the pole to mount this
 - ii. Starting machining the pieces of the device
 1. Everyone can participate in the machine shop pieces
 - iii. Start creating the hardware that is needed to run our circuit
 - iv. This testing will be to see if the middle one touches the ground
 - v. Finding something that we can see if our device fits on a pole and can be used
 1. Four-foot pole would be great so that it would be easy to see how the apparatus looks and fits together

2. The winch assembly will not be able to mounted on something that is this short
 3. Could use the same pole differently to test the winch assembly
 4. Can we attach something to the pole itself so that all the force goes through the pole
 5. Determine the actual height of the pole that will be needed and then we can ask George
 6. The more we can do to test it out the more we can change stuff and fix it in the machine shop
- vi. Computer Science Options:
1. Writing out what the system could use and documenting the communications that should go on the pole in real life
 2. Developing a software interface that demonstrates a simulation that shows visually all of the inputs and outputs of the systems and shows the results of each of these
 - a. Visual representation that is software based that has a few line of codes that shows each of the different parameters that could be happening to the system
 - b. This will show all of the things that are actually on the system prototype
 - c. Knowing what statuses should be needed when the full scale model goes in
 - d. Help figure out what the scope of this project is and show the numbers that could be sent to the
 - e. Could show in real time displaying the information that the prototype should be showing and what else could be done on the prototype
 - f.

Meeting Minutes: Senior Design
Meeting 11
January 24, 2017

1. Action Items:
 - a. Determine the power that is needed for the circuit – Lexi
 - b. Get in contact with the transmission power harvesting project people - Austin
 - c. Finish developing a plan for machining – Justin/Daniel
 - d. Contact Dennis about computer science changes - Elizabeth

2. Tasks:
 - a. Make a meeting agenda for next meeting – Lexi
 - b. Have and write in log books – Whole Group

3. Meeting Notes:
 - a. EE update:
 - i. We talked with Johnson and he gave contact information for the power harvesting
 - b. ME update:
 - i. Talked to the machining prof and he said outsourcing the docking yoke might have to be an option
 1. Consideration: redesign
 2. Could potentially be cut by WSU but to build it here is just too big
 - ii. Could rivets potentially work?
 - iii. Currently thinking of new ideas in order to make this idea possible
 - iv. Everything else should work, the pulley needs to be re-dimensioned
 - c. CS update:
 - i. Talked to CS prof for senior design-security threat assessment for the patented idea that will be put on the market
 - ii. Seems to be the best application of the skill set for the project

Meeting Minutes: Senior Design
Meeting 12
January 24, 2017

1. Action Items:

- a. Start machining - Justin and Daniel
- b. Finish the last models that are needed – Shane
- c. Follow up with contact for energy harvesting – Austin
- d. Determine the exact operation of the GPS – Lexi
- e. Talk to Professor Hess about creating a small circuit model – Lexi
- f. Talk to George about Avista contact for the pole – maybe Elizabeth/Lexi
- g. Send email update to Walter – Daniel

2. Tasks:

- a. Make a meeting agenda for next meeting – Lexi
- b. Have and write in log books – Whole Group

3. Meeting Notes:

a. EE update:

- i. Talked with professor Johnson and got a contact for the power harvesting
- ii. Sent an e-mail to the contact to ask about the project and how it will operate with our system
- iii. Does the distance between the GPS and the receiver need to be a set distance?
 1. Determine how the GPS works and how the receiver is getting the location for the GPS
 2. How will this affect the rest of the system?
 3. Does the system send and receive the signals to the receiver or is it just based on the system?

b. ME update:

- i. Met with the machining mentor
 1. Pulley spokes will be removed
 2. The doking yoke arm the hole where cable goes through needs to be moved because it is bad for the integrity
 3. Have to do some stress tests in order to determine where the holes could go
 4. Could the weld seem potentially be moved?
 5. It will be a little difficult with the size of the doking yoke but he said that it will be doable
 6. The big portion of the doking yoke will not able to be done here
 - a. Potentially removing some of the metal
 - b. Instead using lots of bolts

- c. Still working on a plan: comes down to what will be cheaper, could be outsourced to WSU
- d. Using bolts and spacers which is more expensive than rivets but the sheet metal is more expensive
- e. Only trouble is to figure out the tapered ends, if the end can't be bent something else will be determined, possibly an L shaped something that can be riveted in, just that it doesn't get hooked on the edges
- f. Can the cables get hooked onto any part of this device?
 - i. There are flanges that are in place to prevent this from happening
 - ii. Could we attach something to the cross arm that would stop from rotating
 - iii. The flange is three times as large as the rounded edges of the bar
 - iv. Hopefully it will align itself so that won't become an issue
- c. CS update:
 - i. Meeting set up with a CS professor and George in the next day that will set forth the next steps for the CS portion of the project
- d. Next week's meeting will be back at the normal meeting time of 3:15
- e. Moving forward for the ME's:
 - i. Will actually get into the shop and start making the pieces
 - ii. They will finalize the designs that need to be fixed
 - iii. The final models will be completed in solid works
 - 1. Shane is still working on finishing the break-away design
 - 2. Deciding what sprocket to use for the break away
 - 3. Working on weatherproofing
 - a. Will be using a cheap material that will be able to
 - iv. Pole mounting will be part of the next steps as well
- f. Moving forward for the EE's:
 - i. A model of the power system that will be needed for this system will be created that will demonstrate the power that is needed for the circuit
 - ii. A system for the power harvesting will be needed and once contact is made this system will be able to move forward

Meeting Minutes: Senior Design
Meeting 14
January 31, 2017

1. Action Items:
 - a. Start Machining – Justin and Daniel
 - b. Finish the last test models that are needed - Shane
 - c. Determine exact operation of the GPS – Lexi
 - d. Talk to Professor Hess about creating the small circuit model – Lexi
 - e. Send email update to Walter – Daniel/Lexi
2. Tasks:
 - a. Make a meeting agenda for next meeting – Lexi
 - b. Have and write in log books – Whole Group
3. Meeting Notes:
 - a. Updates ME:
 - i. Still working on the breakaway
 - ii. Welding piece on the top of the docking arm in solid works and trying to do analysis on this
 1. The solid works model wasn't working
 2. Have to determine if it will be supported
 3. Still looking into different options for this will try out different things and see what will be strong enough to hold this
 4. Stress tests will be performed in order to see what option will work the best
 - b. Updates EE:
 - i. Got in contact with the Idaho Power guy and we are pretty sure that the solar panel is going to be the option for
 - ii. Starting to build the model of the circuit needed for the project
 - c. Updates CS:
 - i. Still looking into the poles from Avista
 - ii. Joel specifically asked for a four-foot pole for testing stuff
 - iii. Agreed that there should be a table top model of the communication system
 1. For example, with Arduinos (maybe six) for building the communications

Meeting Minutes: Senior Design
Meeting 16
February 2, 2017

1. Action Items:
 - a. Start Machining – Justin and Daniel
 - b. Finish the last test models that are needed - Shane
 - c. Determine exact operation of the GPS – Lexi
 - d. Talk to Professor Hess about creating the small circuit model – Lexi
 - e. Send email update to Walter – Daniel/Lexi
2. Tasks:
 - a. Make a meeting agenda for next meeting – Lexi
 - b. Have and write in log books – Whole Group
3. Meeting Notes:
 - a. Made a lot of head way on the break away and winch models that are being used
 - i. Going to have a threaded bolt through with two springs on each side and instead of a pin rotating
 - ii. Will be finished with the models
 - iii. With one spring you'd have to rotate the whole pin and we don't want to have to machine that
 - iv. Will be easier to do it with the two different springs and get it machined as much as possible in order to test it soon
 - v. With the angle you know how much force and you can assume friction and you can build it without the springs and then calculate the forces
 - vi. All tension in the line and forces should all be ball parked in order to determine the forces on the different pieces
 1. Lots of math needs to be worked on in order to determine all of the forces
 - vii. We are hopeful for a water tight and air tight
 - b. Spent some time with the mentor for the machining the pulley
 - i. Next Wednesday that pulley should be completed
 - ii. Also designing the docking yoke arm
 1. Need to see if new design will be strong enough
 2. Still working on the solid works
 - iii. Docking yoke and docking yoke arm are going to be the most difficult portions of this machining
 - c. Still working on the model for the CS
 - i. Talked with one professor about API that is out there
 - ii. Easier to do the communications through an alternate source
 - iii. Potentially looking into that?
 1. Haven't accessed the potential security problems behind that

Meeting Minutes: Senior Design
Meeting 17
February 9, 2017

1. Action Items:
 - a. Continue Machining – Justin and Daniel
 - b. Finish the last test models that are needed - Shane
 - c. Working on creating the small circuit model – Lexi
 - d. Prepare for design review – ALL
2. Tasks:
 - a. Make a meeting agenda for next meeting – Lexi
 - b. Have and write in log books – Whole Group
3. Meeting Notes:
 - a. Mechanical Update:
 - i. The pulley has officially been machined
 - ii. The brake has the wrong shaft diameter so the attachments are having to be redesigned so that it will fit properly
 - iii. There are several different ideas that are being tried in order to determine the best option
 1. A T channel is going to hold this together
 2. Once its spring loaded then we need to determine the best way to hold this all together in order to make sure everything stays
 3. FEA analysis needs to be done on these pieces in order to make sure that the forces are being taken into account
 - a. This can be done in the solid works by defining different parameters and then you can see the different force distributions
 - b. Try to apply a force to one individual place at a time and see what happens with the rest of it
 4. The added pins do not get in the way of the rollers
 5. How are we going to add that bend?
 - a. Whoever cuts it might have to do it if they have the capability?
 - b. If too expensive we will have to go a different route
 - c. Talk to the facility
 - d. Cut option with the spacers
 - i. Grid pattern with four poles that gets attached to the pole
 - ii. All in pieces and then must be put together when being assembled
 - iii. Have it assembled and ready to go at ground level and then put it on the pole
 - iv. How is it going to be assembled?

Meeting Minutes: Senior Design
Meeting 18
February 16, 2017

1. Action Items:

- a. Continue Machining – Justin and Daniel
- b. Finish the last test models that are needed - Shane
- c. Working on creating the small circuit model – Lexi
- d. Prepare for design review – ALL

2. Tasks:

- a. Make a meeting agenda for next meeting – Lexi
- b. Have and write in log books – Whole Group

3. Meeting Notes:

- a. Talked to George about getting the test pole and we have gotten the contact information for the test pole
- b. The grid defender video is completed
- c. Mechanical Update:

- i. The spacers have been machined
- ii. The shaft is going to be a press fit on the pulley
 1. The shaft that we have is press roll steel and it has a lot of variation on the diameter throughout the shaft
 2. The the spacers need to have holes bored in order to fit the shaft
- iii. Concerned about how the welds are going to happen for the pulley
 1. They are welded onto the bracket
 2. Possibly use guide holes in order to make the proper welds
 3. Could we put the pulley on afterwards and first weld?
 - a. Do it with a mallet rather than the press machine
 4. Will only spin after it releases so the press fit may or may not matter
 - a. Better if it's not free to spin because it can spin it has a gap and then there is the ability to wobble
 - b. If you tilt too far the cable can jump off the pulley which is bad for the whole system
 - c. All critical parts must be checked in order to put the system back up
 - d. Just two channels cutout
 - e. The long support is made of the same material as the rest of this
 - i. Needs to have a machined edge in order to make it smooth
 - f. The right spring values and the range of compression need to be considered, need to have a rough estimate of what this will be
 - g. Will be bolted through the material

- iv. the last of the models are being completed:
 - 1. the idea is to use super strength bolts, they can hold insane amounts of force
 - 2. is the force on the pin going to start to wear the holes out?
 - 3. Instead of having a channel, put the supports on one side that will ride up against it and keep it going straight
 - 4. Is there a way to show the compression of the springs?
- d. Electrical Update:
 - i. Still looking into the proper sizing of the solar panel and the proper battery to use
 - ii. Depending on the solar panel, it could potentially take a long time to charge the battery and with rolling outages this could be a problem
 - iii. Circuit is being worked on

Meeting Minutes: Senior Design
Meeting 21
March 9, 2017

1. Action Items:
 - a. Order the parts-Daniel
 - b. Need to calculate the forces being put on the second and third shaft in the winch assembly. – Shane, Justin
2. Tasks:
 - a. Small scale Mach up for design review?
 - b. Order the rest of the materials and fasteners for the mechanical portion of the project.
 - c. Questions for the ME's about if this current design is still in the scope of what this apparatus needs to be for real world application.
 - d. Put all completed documents in the correct folder in the shared drive for the portfolio.
3. Meeting Notes:
 - a. Mechanical Update:
 - i. Acquired the test pole (80 inches tall, 10 inch top diameter). We have to build a base for it to make it stand straight.
 - ii. How are we going to keep it steady if we load it for testing?
 - iii. How should we activate the prototype for expo? Possibly having the breakaway triggered manually? Or add a force to have it activate. Just lesser the load needed to release.
 - iv. Putting bearings on the highest rpm shaft. Possibly collars for the second fastest shaft.
 - v. Possibly using the old drum that we already have to use as a collar as for the pole.
 - vi. Research possible force gauge for measuring the force applied for release on the breakaway. Thinking about mounting the breakaway and a sprocket to a plate and using a chain and force sensor to the sprocket, applying a force to find if it releases in the correct range of values.
 - vii.
 - b. Electrical Update:
 - i. Need the parts to get ordered. Hopefully Daniel can get this done before spring break.