

**DATE & TIME:** 3:30PM-5:00PM TUESDAY 8 SEPTEMBER 2020

**MINUTE TAKER:** ANNIKA ESAU

**ATTENDANTS:**

ANNIKA ESAU

BEN RANDALL

JACOB THORNGATE

ZACHARY LAYMON

KAITLIN TABARACCI

COLE BRUSVEN (part)

EDWIN ODOM (part)

STEVE BEYERLEIN (part)

JACK GONZALEZ (part)

IAN GLASGOW (part)

BRUCE BOLDEN (part)

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**MINUTES**

- Introductions
  - Jack Gonzalez & Ian Glasgow are grad students we'll be working with
  - Other mentors, faculty, clients:
    - Steve Beyerlein (mostly administrative side? ME)
    - Edwin Odom (ME, will want to get hands dirty right off the bat--start building!)
    - Bruce Bolden (CS, will listen in from time to time but won't be too involved)
    - Bob Rinker (ECE/CS, might be working with Annika)
    - Spencer Martin (Marching band contact)
    - Herb Hess (ECE)
  - Ben Randall has already worked on this (until COVID hit)
  - Annika Esau is the only CS student; everyone else is ME
  - The student team: Annika Esau, Ben Randall, Jacob Thorngate, Zachary Laymon, Kaitlin Tabaracci, Cole Brusven
  - There's also an EE team working on this ("Band on the Run")
- Meeting times
  - Annika will send out a Doodle poll to see when everyone's free (for shop and for regular meetings)
  - Right now we're reserving 3:30-5 T/R, specifically R. That'll be the main time with Dr. Beyerlein
- Future meetings: content
  - Ben sketched out an agenda for next meeting
  - Shop meeting:
    - Be humble, the shop guy is cranky but experienced
    - Clean up after yourself
    - No wood, only metal and plastic
    - Wear pants & closed-toed shoes, can't get in otherwise
    - Limit 10 people (might be less)
- Jack's tips

- Get started immediately
- Develop ownership ASAP--it's ok to help & to ask for help, but have designated people assigned to each thing: shop, wiki, etc.
- Make boundaries: what do you have to do if you miss the meeting? Inform ahead of time, etc.
- Collab tools
  - Exchanged [contact information in a spreadsheet](#)
  - We'll use [Google \(drive\)](#) to share docs, etc. Annika will set that up.
  - Kaitlin will set up a [Slack workspace](#)--we'll include everyone, but have different chats for with-mentors, students-only, etc.
- Filled out "[team skills](#)" chart. No one was sure what some of the categories meant.
- Began to fill out [team contract](#). Kaitlin, Annika, and \_\_\_\_ will continue work on it Wednesday, 2:30pm, and the others will then review it & make any edits before submission.

**DATE & TIME:** 3:00PM-3:25PM THURSDAY 10 SEPTEMBER 2020

**MINUTE TAKER:** ANNIKA ESAU

**ATTENDANTS:**

ANNIKA ESAU

BEN RANDALL

JACOB THORNGATE

ZACHARY LAYMON

KAITLIN TABARACCI

COLE BRUSVEN

EDWIN ODOM

STEVE BEYERLEIN

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**MINUTES**

- We received these papers: [solidworks pg1](#), [solidworks pg 2](#), [encoder specs](#)
- Dr. Odom's schedule:
  - 1st semester
    - Unicoil to allow putting in & taking out screws without destroying threads
    - Need a new mounting bracket
    - Show business: if it's boring, nobody will look or care.
      - Annika--making circuits & lights based on how fast wheels are spinning?
      - Talk to Dr. Rinker
    - Battery box (4 of them)... How many amp hours do the band people want?
    - After we get it built, how do we get it to the dome?
      - 4 travel wheels where you can just pull out pins to disconnect
      - 15 seconds (or less!!) to get it set up
  - 2nd semester
    - Entertainment: txalaparta, combo, drums, etc.
- Osborn-Parnes problem solving method
  - Mess-finding
  - Fact-finding: background, about the wheels, wikipedia searching, EE team contacting, etc.
  - Problem finding
  - Idea finding
  - Solution finding
  - Acceptance finding
- Dr. Odom's suggestions
  - Get a prototype & wheels moved (deck should be on the web somewhere) → then we can figure out battery stuff
  - We need someone to volunteer to interface with the EEs--SOON! They're making big decisions without us! Schedule a meeting with them soon

- Have a meeting in the shop, we'll refurbish the wheels & talk--with Ian & Jack--next Thursday, 1 week from today, during the usual capstone time. Bring questions!
- 4 tires used to be equidistant, but they don't have to be. But they should be on the outside
- Encoder: allows for precise control because it's closed-loop: there's feedback
- It's lightweight, but with lots of inertia--stops like a ship; even when motor is turned off, it'll keep moving
- Battery might require a fan in the enclosure, based on the type chosen
- Motor might also need air current... we'll see
- Create an experience that's unique in your undergraduate career--that's on YOU!

**DATE & TIME: 9-9:30am**  
Tuesday, September 15, 2020

**MINUTE TAKER: Cole Brusven**

**ATTENDANTS**

**Zachary Laymon**  
**Ben Randall**  
**Kaitlin Tabarraci**  
**Jacob Thorngate**

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**MINUTES**

- Started figuring out our budget.
- Figured out what needs to be built, what materials will be used, how much of everything will be needed.
- We have the wheels, but need to build the platform, and all of the boxes for the electronics.
- We also got some of the Solidworks files for the platform from Dr. Odom
- Meeting with Odom on Thursday to further talk about budget, and to double check that we are not missing anything, or building something that we already have.

Meeting minutes:  
9/17/2020, from 3:30-4:15

Team Members present:

Ben Randal  
Zachary Laymon  
Jacob Thorngate  
Kaitlin Tabaracci  
Annika Esau

Mentors:

Ryan Gonzalez  
Steven Beyerlein  
Ian Glasgow

Started by going over recapping past meetings starting with the ECE meeting.  
What we need to looking into battery boxes, get all info we need for them.  
Who is going to be doing the wiring, the ECE team or us? Do we need enclosures for the wiring?  
Check for bend radii to make sure that the wiring will fit, and not snap  
The battery box must meet safety specs  
Work on attachment between motors and encoders  
How are we going to charge batteries?

Zack received most of the Solidworks parts from Odom,  
Team up with Jack and Ian about getting into the machine shop sometime next week  
Learn more about formatting our saved files  
Kaitlin started on Gantt Chart, more to be filled out next meeting  
We will be sourcing our metal from Alcobra Metals in Spokane, smallest sheet of 6061 Aluminum is  $\frac{1}{4}$ ", when we really wanted  $\frac{3}{16}$ ".

Gantt Chart:

Starts with the due dates for everything and will get more filled in the next meeting  
Don't just have the deliverables on it, have the design process on it as well  
Submit all assignments to Steven Beyerlein

Keep personal logbook of what you do, and what the team does, keep them separate  
Kaitlin will be sending the drive link to Dr. Beyerlein

Our max budget is \$2000  
Talk to Bob about lighting cost

Meet with Steven once per week  
Meet with team Tuesdays at 8:30am

Kaitlin and Ben will set up meeting with the ECE team and instructors to help with clarification  
We need to meet as a team to talk about the Solidworks files.

Tuesday, September 22, 2020  
8:30am-9:30am

Team members present:

Cole Brusven  
Kaitlin Tabaracci  
Ben Randall  
Zachary Laymon  
Annika Esau  
Jacob Thorngate

Clients:

Steven Beyerlein  
Bob Rinker

Topics:

There was a problem accessing Solidworks files from older version of Solidworks, solution was to email Beyerlein who would email Joel Perry about getting newer Solidworks download codes. Also need to get access to Sharepoint/Share drive

Bob Rinker joined to talk about the electronic side of things.

We oriented him on the project

He asked what the scope of the project was, how big, and how far are we going with it?

What would the control interface look like

We need to design the platform with the lights and electronics in mind.

Updated the budget to include the electronics cost

We decided that about \$500 should cover the amount needed

Annika and Bob will meet separately to talk about what has been done before, so we can figure out how to improve on them.

Talked a little more about the Gantt Chart, and what Snapshot 1 would entail,

Need to have another meeting with the ECE team

Added Project Tasks

Add some Progress Reports of Odom's 1st words

Design also for the wiring, will we need holes in any specific places?

Looking into the coupler between motor and encoder,

Ben Looked into this and found that the easiest way to build one would be with a key in slot coupler.

Need to figure out which size keys would work for both

Need to find out where exactly the encoder would go

The EE team might have the answer for that

Get Bill's input on the idea/design

Product Design Requirements:



Doing a thorough job with these will help with the design validation plans

Start working on base platform

Action Register-Everything that is an action item will be put on the Action Register to help with accountability and give updates.

Tuesdays, we will be meeting with Beyerlein at 8:30am

Action Items for next meeting

Ben-Encoder

Jacob-PDR

Kaitlin-Email Beyerlein, and work on file management scheme

Zachary- work on file management scheme

Cole - help work on file management scheme

09/24/2020 3:30-5pm  
In machine shop

Today we all started to disassemble the wheels, along with file the edges to reduce the chance of someone getting cut by holding the wheel assembly.

We also used the drill press to make a flat spot perpendicular to the wheel axles for the retaining clips. We did not get all the way done with the disassembly.

9/29/2020 8:30-9:20

Team Members:

Kaitlin Tabaracii

Ben Randal

Jacob Thorngate

Annika Esau

Zachary Laymon

Cole Brusven

Client:

Steve Beyerlein

Annika met with Bob Rinker, anything that we want to do we can, they have enough parts so we can prototype with. Now she can take apart a few things to get some physical hardware in hand to start. Everything ased off arduino. Possibly use a touch pd for controlling machine/light show, different user interfaces. For purchasing, buy everything, and then Bob will get a receipt and transfer the funds.

Kaitlin

**DATE & TIME:** 4:30PM-6:00PM FRIDAY 3 OCTOBER 2020

**MINUTE TAKER:** ANNIKA ESAU

**ATTENDANTS:**

BEN RANDALL  
ANNIKA ESAU  
GRAY [?]

EDWIN ODOM  
STEVE BEYERLEIN  
IAN GLASGOW

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**MINUTES**

- Batteries
  - We don't know size things, but everything else is bought & tested
  - They have a battery management system (BMS)
  - Each wheel has its own battery pack (multiple cells), BMS, and motor controller
  - One microcontroller for the whole thing--do we want multiple for redundancy? What if one breaks?
  - Can it come out as one piece--we don't want to worry about taking individual pieces and tangled wires out, etc.
  - The motor controller & BMS both have "honkin' heat sinks" (haha), but they do need a *little* airflow. The cells need to have a fan that runs for a little even after turning the thing off (it produces highly combustible stuff)
  - Might need to go on top of the platform--mightn't fit inside
  - 8 cells in series, 3 in parallel. 3-3.6 Volts
  - We want an option to add more power just in case
  - Grid of 2x3--just an example.
  - Nickel plates (welded on) make the connections b/ween cells to make it series & parallel. Doesn't conduct as well as they'd like.
- The ECE team is almost ready to go...
  - So we need to push the deck forward SOON--Zack & Kaitlin need to meet with Odom on Zoom with Solidworks to talk about the deck. Do housekeeping beforehand & narrow down at the meeting
  - With a load, there's something wrong with the chain/wheel--it goes clunk-clunk-clunk
  - They're gonna run the sim next week (with Dr. Law--maybe we can attend?)
  - Still need to choose & purchase wires & gauges
  - Still need to test nickel to be sure it's 100% nickel
  - They need from us: weight of platform, moment of inertia (translational & rotational--needs to be compared w/ flywheel)--BY NEXT WEEK. Includes coefficient of friction, etc.
- CS/lighting
  - Odom will interface with band director to arrange meeting via zoom, hopefully with Odom & Rinker too

- They now use ESPs instead of Arduinos: Wemos LoLin 32 (they're much cheaper)
- Arduino ide can use, but not recommended... faster but less control
- Annika borrowed one from Grey
- On Arduino IDE: drop-down menu choose "wemos lolin"
- Maybe use Platform 10 IDE, a Visual Studio extension (IDE inside an IDE...weird...)
- They have a crazy controller for the platform all set up--but contact Ben about the UI tablet idea: [ode18968@vandals.uidaho.edu](mailto:ode18968@vandals.uidaho.edu)
- To program the ESP you have to press button "enable" (the IDE will say "programming, programming, ..." until you do)
- Annika will send Dr. Odom an email w/ Tues morning meeting link
- The ECE folks have SW for the rotary controller set up

Meeting 10/06/2020

Team Members:

Zach

Kaitlin

Jacob

Annika

Ben

Cole

Adviser: Steve Beyerlein

Client: Edwin Odom

Went through what each person was doing, and what they were going to do

Zach and Kaitlin: Designed skeleton frame. Met with Odom, found wheels assembly and modeled the platform.

Kaitlin will send the ECE team the numbers they need for the moment of inertia. They are also trying to figure out an easier way to send files back and forth to have a more productive collaboration.

Annika: she is looking at 2 different circuit boards, she is also emailing the band instructor to talk about lighting possibilities. She is figuring out how to use a new board type.

Cole: Working on battery box, option for plexiglass, box covers up gear and sprocket also?  
8 batteries in series,

Jacob and Ben figure out about the gear motor, what happened? What caused it? Can we fix it?

All: Work on slides

## 10/13/2020 Meeting Minutes

Team members present:

Kaitlin Tabaracci

Zachary Laymon

Jacob Thorngate

Annika Esau

Ben Randal

Cole Brusven

Adviser:

Steve Beyerlein

Morning of Snapshot:

Ran through slides

-Changes that had been/need to be made

Re-Ordered a couple slides

Getting ready for snapshot by setting teams/splitting up our team to have 3 people in the room,  
3 people going to other snapshot presentations

-Add battery spec sheet to slide

10/20/2020

Team Members Present:

Kaitlin Tabaracci

Zachary Laymon

Jacob Thorngate

Annika Esau

Cole Brusven

**Advisor:**

Steve Beyerlein

Shorter Meeting today:

Kaitlin reorganized files, drawing tools, working with Dr. Odom to work on bearing blocks, on Monday met with Ian and Jack to work on the bearing blocks. Want to try and get the platform ready (spine welded, plates might not be ready.) in 2 weeks

Zach- worked with Kaitlin to work on bearing blocks

Steve Beyerlein shared snapshot results

Cole and Ben: talked about the new updated cylindrical battery box, and the requirements of it.

Begin working on Coupler between motor and encoder on Thursday



10/27/2020 - 8:30-9:00

Members:

Cole Brusven

Kaitlin Tabaracci

Zachary Laymon

Annika Esau

Jacob Thorngate

Steven Beyerlein

Meeting agenda:

Annika: met with Gray and Rinker and talked about lighting possibilities: Going to test some lights in the Kibbie Dome to ensure brightness. Gave some lighting spec requirements to Gray. Working on Value Proposition.

Kaitlin: Worked more on the bearing blocks drilled some holes for bolts. Next is to drill the through hole for the motor to sit in. Working on Gearbox mounts today, and the gussets for plate for frame.

Jacob: Working on Design Validation Plan.

Cole: Talked about where we are at with the battery box, and what we need to accomplish for it.

Zachary: Working with Kaitlin on the bearing blocks.

11/3/2020 - 8:30-9:15

Members:

Kaitlin Tabaracci

Annika Esau

Jacob Thorngate

Zach Laymon

Cole Brusven

Ben Randal

Adviser:

Steven Beyerlein

Send designs to Dr. Odom to get feedback

Ask the ECE team what kind of battery monitoring system do we need?

Kaitlin worked more on the bearing blocks

Annika talked to Dr. Rinker and the ECE team discuss lighting. She also is planning on testing lights in the kibbie dome some weekend, Rinker's schedule is busy so she will do it alone, or with another team member. Needs to give details to Gray, and order lights. Working on value propositions, and gave updates.

Jacob is working on the Design Validation Plan.

Design Review is 11/10 at 8:30am, we need to invite Dr. Odom, and Dr. Rinker, and ECE team members.

Annika will send out the invitation email.

Members Present:

Cole Brusven  
Kaitlin Tabaracci  
Annika Esau  
Jacob Thorngate  
Zachary Laymon  
Ben Randal

Dr. Beyerlein

Agenda:

Zachary and Ben finished machining couplers on Monday

Odom wants to start assembly this afternoon.

Annika continuing to work on wiki page

Friday's meeting between Odom and Will talked about concerns about battery box

Annika got lighting stuff and played around with it to figure out how to make it light up, testing it tomorrow in the Kibbie dome.

For the Snapshot day the Friday after break, one slide for the whole presentation, assigned times same link as design review

Battery box, Cole will meet with Odom today to talk about how to go forward with the battery box.

12/1/2020

Members:

Cole Brusven

Ben Randal

Zachary Laymon

Annika Esau

Jacob Thorngate

Adviser:

Steve Beyerlein

Most of team met early with Beyerlein to talk about snapshot #2. We discussed what was being looked for. We went over team member citizenship reports, and what is due at the end of the semester. Machining the weekend before went well as they got the frame done with some time to spare.

Zach is putting together a slide for snapshot 2.

Jacob is looking into what is needed for the portfolio.

Battery box is still a lingering problem, what state do we want to try and reach?

12/8/2020 - 8:30-9:20

Member:

Cole Brusven

Zachary Laymon

Jacob Thorngate

Kaitlin Tabaracci

Ben Randal

Annika Esau

Adviser: Steven Beyerlein

Talking about where things should be for our Portfolio and wiki:

Problem Definition at top, with background following.

Put a picture of wheel for the latest ECE team

Final Design will come right before subsystem

Background, Specifications, Deliverables, Requirements

What is project learning? They are attributes, skills, and knowledge that you have gained with working on the project.

This could be put into the sub-system development

Could be understanding previous layouts

What we learned:

Battery box- limit the number of photos, do not go through every minor detail, and make sure to have useful info with the pictures.

Keep the documentation links.

Add drawing package to documentation

Put meeting minutes into PDF

Cole fills out Battery box info

Kaitlin and Zach work on frame info

Start planning purchasing for next semester,

Start thinking about buying wood, lighting, and the battery box.

No meetings during break, 1 more meeting next Tuesday

Meeting 10/06/2020

Team Members:

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Kaitlin

Jacob

Annika

Ben

Cole

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Tuesday, September 15, 2020

**MINUTE TAKER: Cole Brusven**

**ATTENDANTS**

**Zachary Laymon**  
**Ben Randall**  
**Kaitlin Tabarraci**  
**Jacob Thorngate**

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