

9/25/2015

Byte-Back Team Agenda / Minutes

Attendees: Majed, Hatem, Kayden, Chad, Dr. Li, Dr. Johnson, Stephanie McDaid

**Action Items For Review: (15 min)**

AI:07 Kayden

Document our current list of possible solutions (as we know them today) **Done and ready for review by team. Is posted here on our Google-Docs page. Awaiting feedback.**

AI08: Chad 9/25

Build an interface cable for the encoder to a microprocessor. **Done**

AI09: Chad ~10/15

First deliverable will be to get RPM reading out of the Encoder.

AI10: Majed

Check on the ECE conference room for the meeting next Friday. **Done**

AI11: Chad

Resend the email asking for a key and access to the lab. **Done**

*Here is the response from Dr. Johnson:*

*At least one person on your team should get a key for the lab (BEL G10).*

*The safety procedures are very similar to the machines lab in GJL, except the Emergency Stop buttons in BEL in there only effect the model power system, not the machine you will be working with and there isn't a log book. We can talk more about it at your meeting on Friday, but we can also get the key request started early in the week.*

AI12: Kayden

Talk to JJ about getting access to Microsoft Project. **Done**

**Conduct Client Interview (30 minutes)**

Stephanie McDaid of SEL will be joining us for the first time. We will give Stephanie the opportunity to review the project with the team once more. Then, we will move through a question and answer session so that the team can get clarifications or further details as needed.

*Comments by Stephanie in this color.*

*Comments by Dr. Johnson in this color.*

The team asked Stephanie to recap the project.

*The project is a closed loop control system. The induction motor is driving the generator. (During load changes, the induction motor will slow down or speed up, depending on if the load increases or decreases.) We want a closed loop control system that will adjust the speed of the induction motor to maintain the generator output within specified limits.*

The team asked Stephanie to elaborate on minimum and maximum performance specifications.

*Stephanie asked for further clarification on the question, since she wasn't exactly sure what we were asking.*

*Dr. Johnson gave the following input: The ideal model in the VFD drive will actually control the speed almost perfectly. However, for other types of power system models, the power system will respond slower. Therefore, we want to be able to change the parameters such that we can model different types of power systems.*

Majed asked what Stephanie's role is.

*Stephanie told us she is a hardware engineer at SEL. However, she had a power track at WSU while a student. With respect to the project at hand, Normann of SEL envisioned this project and she is a liaison between Normann and our team to help guide the team in the specific deliverables that he is looking for out of the project.*

*Dr. Johnson also mentioned we have several customers in the project, especially since the system is going into his lab. Dr. Johnson talked about using the system in ECE422 Power Systems Analysis (Balanced and unbalanced faults, Zbus methods, transient generator models, stability analysis, fault analysis using commercial software, and introduction to power system protection. ). However, he is not expecting to be able to use the system next Spring unless it is at the end of the semester. We also want to analyze faults and introduce protection.*

*Kayden starts to recap what the team's understanding of the deliverables are. At some point, Dr. Johnson interjects some comments, so I am trying to capture all of the conversation but will attribute it to Dr. Johnson even though Kayden is also speaking:*

*There are two main core deliverables of the project. The power side of the project will be to implement a model of the system. The model will need to be parameterized so that governance works as well as possible. Dr. Johnson points out that the team working on flashing the field is also leveraging a model of the power system and we should work together. Majed, states our team has already been in contact with (Will) the team that is flashing the field on the generator. We will be working with them to make sure the model is as clear as possible. Dr. Johnson also recommends using Mike West and Andy Miles as resources for improving the model and determining any deliverables we can contribute to in conjunction with our own.*

*The second deliverable is a control system that will take the encoder output and feed a correcting signal back to the VFD.*

Chad mentioned that cleaning up the lab and making it look professional and nice is an objective we can work on as we go. This is an objective that Dr. Fischer has requested. Chad asked Dr. Johnson to think about things we could do as a team to help get that objective moving.

Majed asks "What is a design review?" Answer: You will be finishing up project learning, recapping the objectives and specifications, and present options for two or three ways on solving the problem. This gives the client the opportunity to give feedback on which option might be preferred. The second design review will be more focussed on functionality that is

being delivered and how the implementation is going. The timing of the design reviews is driven by the senior design course schedule. The first happens in November, the second in the February time frame.

### Brainstormed questions for the client (Stephanie Hunter)

1. The big questions on everyone's mind is what is the maximum and minimum performance that you are looking for from the system?
  - a. *Precision of regulation (within .1 hz, .001 hz, etc..., time constants and response will need to be established, how are we going to define that response. For governors, 5 - 10 seconds would be considered fast. We might be able to find capability specifications in the ABB drive manual.*
  - b. *For the characterization team, one of the things you will need to figure out is an inertial time constant for the rotor of that machine. Dr. Law might already have the value for the induction motor on the system.*
  - c.
2. What is Stephanie's position at SEL?
3. What is her role in the company?
4. Understanding that two major deliverables of the project is closed loop control and a model of the power system, are there other deliverables you could list?
5. What would you like from us...
  - a. *Weekly Kayden will send Stephanie login credentials for the GOOGLE doc account we are using to track the project (meeting minutes and agendas mostly)*
  - b. *Monthly*
  - c. *By December design review 1 will occur in November and then another in the Spring, likely around Feb 01 - 15.*
  - d. *By May Capstone presentation, poster presentation occurs about 7 - 8 weeks into each semester.*
6. What is an aspirational goal you might have, something that would exceed your expectations?
  - a. *If we could implement the system on different generator governors, and have corresponding systems models*
  - b. *Bring up the rotor angle measurement*
    - i. *One of the challenges of finding rotor angle is that it needs to be relative to a known values, in this case relative to the stator (on the generator) terminal voltage. This is the effective electrical rotor angle.*
  - c. *Be able to automatically synchronize the generator to the model power system (i.e. Avista) and have the breakers lock in.*
7. How might SEL use our work to benefit its work in the future?
  - a. *To help parameterize synchronous generators.*
    - i. *Follow up is to talk to Mike West and Andy Miles for their input on further work they might want us to do.*

**We will review Kayden's first pass Gantt and add further items. Updates on items below that are coming due or are due.**

**Brainstormed tasks that are near term**

1. Research PID control ~ Kayden and Chad
2. Build RS422 cable to interface from encoder to computer ~ Chad
3. Read ABB User's Manual ~ Hatem and Majed
  - a. Develop a list of characterization inputs for the VFD
  - b. Create a list of parameters (Sept 25)
    - i. Use the IEEE standard and Kundar Stability Book.
  - c. Write a test procedure for each parameter needing characterized (Oct 09)
4. Decode Greycode Methodology ~ Kayden (Converting with success adds <https://www.youtube.com/watch?v=v1PV36O2ZWY>)
5. Complete RSCAD tutorial ~ Majed, Hatem, Chad (Oct 16)
6. Research IEEE models ~ Majed, Hatem (Oct 16)

AI:13 Majed 10/2

Go to the ECE conference room and request a key. Power Lab G8, G9 and G10. Speak to Ali. When key is acquired ask Dr. Johnson about getting lab safety rules overview.

AI:14 Chad 10/2

Invite Mike West and or Andy Miles to the team meeting to talk about work they would benefit in our investigating as part of our parameterization and control efforts.

AI:15 Kayden 10/2

Ask JJ to install Microsoft Project on the computer in the ECE conference room

AI:16 Hatem and Majed 9/28

Brainstorm list of upcoming tasks concerning the modeling of the system as well as dependencies of those tasks on others (for MS-Project Gant chart).

AI:17 Kayden (ask Amanda) 9/28

Group Picture! Look into getting SEL t-shirts. (Hatem says only students in the picture!)

AI:18 Kayden 9/28

Send Stephanie McDaid login credentials for our Google Docs account