CDR Minutes

Pre-demonstration:

- The cooling system was not working last year but the car still functioned properly.
- Cabling requirement was changed last year that's why new cables were ordered.
- Why is the dyno software running on Linux and Windows?
  - Current software has a part that depends on Linux and the other that depends on Windows. In the future we would want to move from Linux to Windows.
- What was wrong with the TSI board last year?
  - Didn't want to continue an incorrect or non functional design
  - New components needed to meet new rules with a simplified new design
- Are we using the same GLV board? - Yes
- Check trace at 24 V connection, even if GLV works is might not be reading anything!
  - Russell used a resistor to cover up a trace. Not sure if this is the same trace being talked about
- Task for fabrication of TSV boards - why is it not complete?
  - Waiting for boards to arrive
- Should we get rid of John Gehrig board?
- Generic boards vs customized boards

Post-demonstration:

TSV
- 200 A fuses to be replaced with 300 A
  - Vendor claimed that 300 A would hold given our constraints
  - Recommend sticking to 250 A or even 200 A to be safe
- Measure voltage drop from bus bar to cell to check tolerance
  - Check 2017 website for measurements
- Why did cell die in pack 1?
  - Doesnt charge all the way
- Do we have extras? - Yes
- How to replace dying cells?
  - Consult cell replacement procedure documentation from previous years website
  - Note error in figure 2 of document
- Torque specs are not present
  - Need to be as clear as possible at all times as we don't know who will be handling hardware in the future
- Why is motor spinning so slow?
- Can we meet all the safety requirements?
- Need better communication on issues that concern both ECE and ME
- Do we have testing plans for Dyno?
  - No new plans, previous tests to be used
  - Shouldn't limit ourselves to previous years' test plans!

- How do we know we are ready for competition?
    - Rules checklist
- How many engineers go to competition?
    - Only those who signed up
- Is chassis same as last year?
    - Things broke last year and duct tape was required
- Need to think about how to tie down cables in car
    - Safety issues and weight issues
- Need to measure actual required length of cables in car and remove excess cabling!
- Firewall integration for TSV from PDR - why was it scrapped?
- How are we going to go about verification of software/VSCADA?
    - Could be a sticking point
    - CAN bus slightly too sensitive right now
    - Need to make TSV software less sensitive
- How has AMS board been tested?
    - AMS View for AMS boards
- How have PACMAN boards and CAN bus data been verified?
- What was the issue with watchdog timer? How was it solved?
    - Communication errors/ monitoring errors causing reset due to increased sensitivity
- PACMAN board is running several threads - How to verify that the watchdog is monitoring individual thread status?
- What are the possible outcomes of the peer evaluation?
    - Feedback on what to fix in order to make it to competition
- Might need to replace bus bard to make room for amphenol connectors
- What is the purpose of LCO portion of port?
    - Don't need to connect right now but may be used in the future
- How close are we to 03/09 dated tasks for the TSV?
- Was the charging algorithm verified by the team last year?
    - Regardless, we should verify it
- Overview of charging algorithm:
    - Cells are ranked high to low
    - Algorithm tries to close biggest gap
- Last year's team may have verified it but still need to check.
    - Must do a full charge and discharge cycle and collect data
- Do we have a safety mechanism in case one cell dies faster than others?
- Had to measure voltages for each cell in ESF
- Is there a threshold that detects voltage discrepancies in cell/ PACK voltages?
- Last year's team forgot to account for internal resistance last year!
    - Need to account for that otherwise car won't run properly
- How many charge/discharge cycles have been done?
    - Need to do multiple and record data!
- Consider replacing Lithium ion cells altogether

- To document procedures just record videos - much better than text of images
- Having more documentation is always better than less
- Connection of TSV to motor controller (analog signal)
  - Have we checked for interference in this signal and other analog signals?
  - What about interference from outsdie? Radio signals, etc.
- Do we have error thresholds for our sensors?
  - Need error bars!
  - How many sig figs can we actually get from sensors
- Need to check shielding for all analog signals
  - Characterize sensors and noise
- Attitude of getting to competition vs following guidelines and testing/documentation
- Just do informal testing!
  - Capture information wherever possible

TSI
- Has software been developed yet?
  - CAN bus data and sensor data has been tested
- Has load testing been done?
- Was SCADA dealing with all data?
  - Everything but TSI data
- Is there additional bandwidth available for SCADA?
- Are drive states determined by software?
  - No, buttons and brakes will trigger states
- What is monitoring button states and brakes?
  - Microcontroller on TSI
- How many boards?
  - Real board and backup board (in progress)
- Does Peter have experience working with these boards?
- Test plan for boards?
  - Test plan for old board will be used as a starting point
- How do we know how long assigned tasks will actually take?
- How do we know we can actually accomplish something in a given time?
  - Set smaller deadlines to determine time frame for bigger deadlines
- Weekly meeting with MECH END team is a good idea

GLV
- Panels have wires hanging on back - might need enclosure!
- Measure cable lengths!
- Are control panels going back in the car?
- GLV has connectors held on by single bolts, other loose connections and things falling out
  - Need to add GLV tasks to WBS!
- Try to make GLV unbreakable

- Some traces have been blown. Has the connector been fixed to prevent it from blowing up?
  - Yes that is the resistor that was added by Russell

SCADA
- What has been showing on display for MECH ENG
  - Only basics like temperature/voltage etc.
- Do we need to display speed?
  - Apparently not
- Need to check if there are any rules for display standards!
- Current is being displayed from pack? - Yes
- Are data spikes coincidental?
  - No they are from data outside set ranges
- Spikes in network or spikes in sensors?
  - Sensors spikes
- We don't want car to completely stop for data spikes
  - PACKs reset and data stops but we dont want car to shutdown
  - Finite opening/closing of safety loop
- Can VSCADA control the safety looop?
  - No but we might want to implement that
- Difference between drive mode exit and tripping the safety loop
  - Can use E-stop
- What in the system was not working to see the demo to its full potential?
- How do we know it won't go wrong 3 weeks from now?

Interconnect
- Are we going to coordinate cell swap for the TSV with black cable?
- Are we replacing both ends of PACKs with amphenol connectors
  - Need to use test cables or ITC connectors
- Do we change cables each time we are connecting different PACKs?
- Do we really need to key the packs?
  - Some attempt was made in the past to reduce keying to allow for better testing
- Last year's rules stated that the car should be able to run on fewer than four packs
- Are we talking about strain relief between containers or strain relief inside the chassis?
  - Everything
- TSV has a 37 pin connector - does it have strain relief?
  - We will definitely need it based on last year's experience
- Need strain relief for GLV also!

Budget/Q&A
- How much over budget is each team going to be? - Not sure
- Hopefully we don't need to buy extra amphenol connectors
- Use videos for procedural tasks

- Be careful about using specific terminology for future groups (abbreviations, etc.)
- What are the plans post-competition?
  - Documentation
  - Alumni race day??
- Documentation can be scratch notes etc. or even pictures
- Make sure to document process
  - Laying out goals over short periods of time to avoid wasting time
  - Explain why things were done while documenting! Not just what was done.
- We might want to create a "steps for next year" document
- How do we find the balance between just "getting it done" and testing/validation?
  - Need a balance
  - Validation is actually a part of "getting it done"
  - Our goals should determine the balance between these two
- How do we know our system works without an ATP?
  - Still need an informal test plan!
- Do we dedicated time for testing/acceptance?
  - Yes, 3 weeks after peer evaluation
- Need to make sure everyone is always on the same page