Meeting Minutes - 20June2015
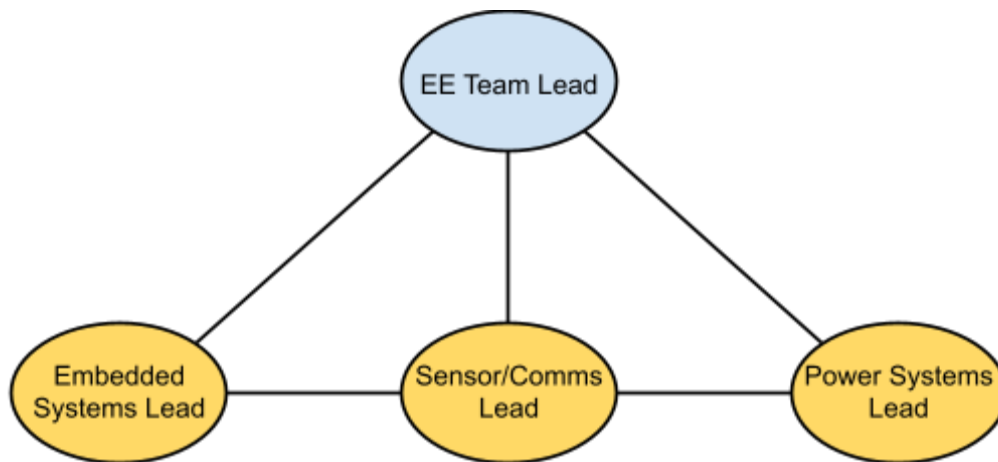
- ## Members in Attendance
    - Andy W. (awoerp)
    - Tom R. (ThortonBe)
    - Lars (KalasLas)
    - Alex
    - Paul
    - Luke
    - Richard (DanseMacabreD2)
    - Eric (fjdkf)
    - Lamine (pratow)
- ## Organization/Leadership

- Embedded Systems Group
    - Responsibilities: Interfacing between sensors, real time microcontroller units, and central processor; communication with software team; development of Software in the Loop test stand.
- Sensor/Comm Systems Group
    - Responsibilities: Sensor selection, communication protocols
    - This may be somewhat overlapping with embedded systems
- Power Electronics/ Batteries
    - Responsibilities: Power Conversion; interfacing with high power systems (compressor, chiller); battery selection/sizing.

Leadership roles will be discussed further at meetings where more can attend and vote but these positions were decided for the mean time.
Interim EE Team Lead: Andy W. [Awoerp]
Software Liaison: Tom R. [ThortonBe]
Compressor Liaison: Lars P. [KalasLas]

- ## Future Meeting Structures
    - We will break our work into 2 week chunks called sprints
    - High Level Meeting:
        - Discussion and assignment of high level goals for each EE subsystem team for the coming sprint and review of progress from last sprint. Will involve subteam leads and possibly one or two subteam members. Shall occur a minimum of every two weeks.
    - Low level meetings:
        - Meetings within EE subsystem groups. These meetings will occur after the high level meeting for each sprint. All of the low level tasks that will be necessary for the team to achieve their sprint goals (which would have been determined during the high level meeting) will be determined. Attendees will usually be as many of the subteam members that are available to attend and their subteam lead.

- ## Collaborative Software Tools/Strategies
    - Agile Methodology and how it could be applied to Hardware/Firmware design
    - Issue tracking software (JIRA, Axosoft)
   - Teamwork software (Trello, teamwork.com)

- ## External Electronics/Sensors
    - We determined that there will be a group of sensors that will be guaranteed to be in the pod. some include:
        - Accelerometers
        - Gyros
        - etc.
    - We also agreed that there will be a ton of sensors that will be dependent on requirements given to us by certain teams. (eg. Aerodynamics, structures, propulsion will need to get back to us on what measured values will be necessary to physically fly the pod)
    - We will assign liaisons to specific engineering teams who will speak to project leads. We will request that these subsystems leads organize a list of necessary sensors that their team will need.

- ## Computing System

While no final decisions were made, we discussed a system such as the one that follows
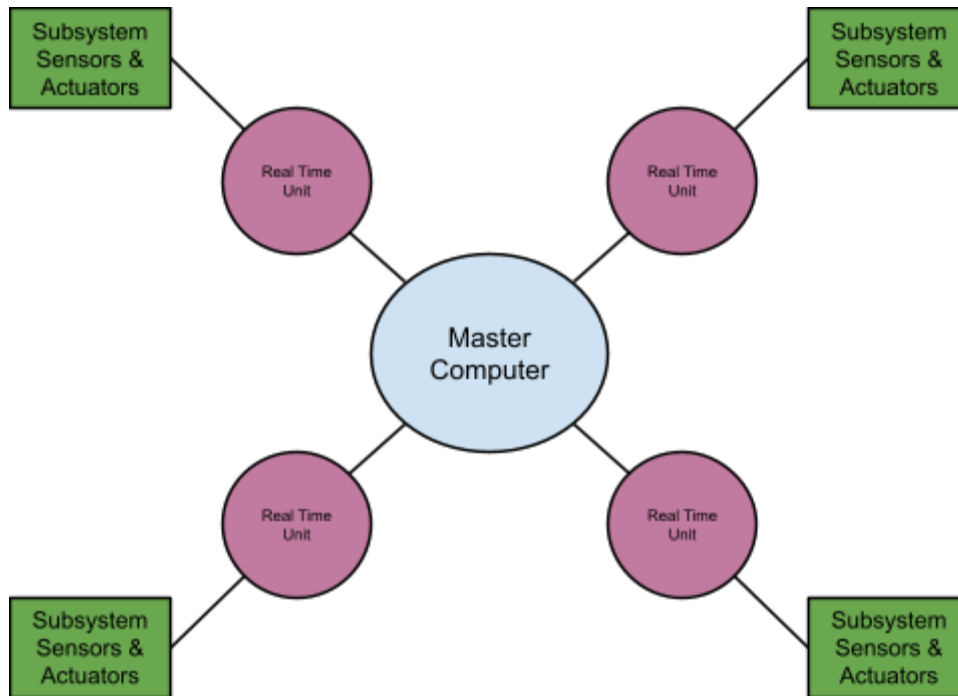
- Master Computer
  - Computer which processes data and makes decisions. It receives data from, and sends commands to the real time units
  - We discussed using a BeagleBoneBlack
- Real Time Unit
  - microcontroller or FPGA which is responsible for collecting data, executing commands sent to it by the Master Computer.
  - Discussed using Teensy 3.1 (Arduino Variant) microcontrollers, Terasic DE 0-Nano FPGAs, PICs
  - After further discussion, I believe we are leaning towards using a microcontroller which can be programmed using C/C++, as these languages are more commonly known compared to VHDL/Verilog (HDL's)
- Subsystem Sensors & Actuators
  - Self explanatory

- External Circuitry
  - We briefly discussed power requirements of other subsystems, sensor requirements, and telemetry
  - We decided to hold off on telemetry development since very little is known about what communications systems will be in place within the tubes
- Standard Operating Procedures

- ○ It was determined that engineering subteam communications (eg. asking the compressor team what kind of sensors they will need) will be done by an appointed member of our team, typically a liaison, contacting the Engineering Subsystem Team Lead (eg. head of mechanical systems) through personal message. Our hope is that the team lead would then facilitate a discussion with his/her team members discussing their needs. This will make sure they are all on the same page.
    - ■ We shall NOT make a subreddit post asking for other groups for information about sensors, power consumption, etc.
  - ○ We need to create standard documents to provide information about:
    - ■ Basic meeting structure/requirements
    - ■ How to request information from other teams
      - ● Will reduce redundant and vague communication

- ● Software in the Loop Teststand
  - ○ A software in the loop teststand is a tool we may choose to develop that will help to validate software that will be flying the pod. All of the sensors and actuators would be replaced with something like a microcontroller, which would allow us to inject signals into system and determine how it responds. You are basically tricking the flight software into thinking it is flying the real pod. With this system, you are able to test many of the failure modes that could occur during flight.

- ● Action Items
  - ○ Read the NASA Hyperloop paper:
    - ■ https://mdao.grc.nasa.gov/publications/AIAA-2015-1587.pdf
  - ○ Pay attention to slack page for updates, meeting times, and surveys