To: KNW 2300 Engineering Robotics Teams

From: The Professorial Staff at SMU/NASA

Date: September 18, 2017

Re: Sprint 2

Recently, you presented your high-level design to tackle some of the greatest challenges we have thrown your way. Building a prototype of an autonomous robotics system is challenging; designing and presenting that design to a tough review team with only a week's preparation is almost impossible. We applaud your hard work!

This week, you will move into Sprint 2 of your design challenge. During this sprint, you will begin implementing and testing various design ideas that you developed during the High Level Design phase. Sprint 2 will culminate in a demo of your robot doing some tasks, which are defined in the next page of this memorandum. This will take place in class during the week of October 2nd.

It is reasonable to consider your robotics system as a collection of cooperating subsystems such as mobility, electrical, sensing, etc. Some teams in the past have been successful in breaking into sub teams and tackling the more detailed design, prototyping, testing, and final implementation of a subsystem. We offer this as a suggestion about how to move forward with your design.

Your TA's will be available to help you work through design thinking, debugging issues, etc. Of course, help will still be available during your regularly scheduled class time as well.

In the remainder of this memo, we will provide you with details and expectations for the upcoming demo day. You have two more weeks until the deliverable date for Sprint 2. *So start early and work hard!* Lastly, the information contained in this memo is important to your success in the competition as well as contributing to your team's Coefficient of Confidence that is part of the competition scoring metric. Please make sure to read and follow all of the instructions that have been set forth.

Good Luck!

Sprint 2:Demo Day Deliverables

In class during the week of October 2nd, your team will demonstrate some basic functionality of your robot. As you know, building a robot is easier said than done, and it is better to focus on simpler and smaller tasks before combining everything into one system. Through the process of iterations, your team can combine already working components into larger systems, with more understanding of how these components work. As such, we will base the requirements of the demo on how well you can control some key components of your robot. For the demo, you will need to do the following set of tasks:

- Have a prototype frame built. Note that this does not have to match what you showed in your high level design presentation, but it will likely be similar.
- Have a detailed mockup for the intended final structure of your robot. This should be in more detail than what was presented in your high level design presentations, including exact dimensions, materials, etc. It should represent the intended final design that your prototype is working towards.
- Have a properly wired electrical system on your frame. This includes:
    - A properly wired and charged battery
    - Having it connected to a fuse block
    - A properly wired kill switch
    - Having one of the power outputs being regulated to 5V
    - Having any components that require power be connected properly to this system. This includes motors, servos, Arduinos, sensors, etc.
- Have your rover move forward for 3 meters. Success in this task relies both upon how close to 3 meters your rover moves, and how much it deviates from a straight line path
- Have a redesigned and complete bridge design drawing
- Have a servo move to an angle specified by a Reviewer, and have it return to its original position
- Read two distances: one greater than 30cm and one less than 30cm, to be determined by a Reviewer
- Have a motor run indefinitely until a bump sensor is triggered by a Reviewer
- Have a temperature probe circuit completed and properly calibrated. You will hold the probe in an area of unknown temperature, and your control program should accurately display the temperature.
- Have a working prototype of **either** a conductivity or anemometer probe.

Note that the tasks do not have to be done all at once. As in, each task can be done independently with separate programs for each task if necessary.