ME 72

Critical Design Review (CDR)

Due Friday, January 28,2011-
(time to be scheduled for each team)
(worth 15% of your overall grade)

In any large system engineering project, the next major step in the design process after the Preliminary Design Review (PDR) is the *Critical Design Review* (*CDR*). The CDR is the final check before the serious fabrication, testing, and demonstration processes start. The goal of the CDR is to determine if the system design architecture and component designs have a high likelihood of meeting the initial design requirements, and if enough essential data and experimentation has been gathered to enable key design decisions to be finalized.

By the time of the CDR, a design team should have made all of the major design decisions about the system architecture, should have completed enough analysis to ensure that the proposed design can meet its goals, and should have gathered the essential data (via measurements, experiments, or prototyping) that is needed to inform and support the system design. While the goal of the PDR was to assess if you have a viable concept, and the goal of the mobility demonstration was to coerce you into gathering initial data on your mobility design, the goal of the CDR is to ensure that your concept can be engineered to meet its goals, and that you are ready to embark upon detailed fabrication and testing for the remainder of the quarter.

Like the Preliminary Design Review last term, the CDR will be conducted in 25 minute sessions with the course instructors on Friday, Jan. 28, 2011. In addition to class time, we will offer a liberal schedule of meeting opportunities so that you can work in the CDR around your other classes. In the CDR you will present the final design and the final set of design analyses, and the prototype. During these sessions we will review your designs and analyses to ensure that you have enough understanding of your system's potential to meet the contest guidelines and to successfully compete. We will assess the thoroughness of your design and analysis and design report.

Presentation

You should formally present your work; we suggest that you use slides and allow about 5 minutes for questions. For the CDR presentation you should prepare *at least* the following:

- ***A Detailed Diagram of your System Architecture****.* You have already prepared such a drawing, but your ideas may have changed significantly after the mobility demonstration. If your design has changed appreciably, include this diagram.

- ***Design diagrams of your scoring syste****m.* Describe how your device(s) will gather scorable items and place them in the scoring receptacles. Your diagram(s) should be more than a crude sketch. The key components and their function should be clearly articulated.

- ***Mock up of your scoring system****.* You may wish to build a crude working model of your scoring concept (it need not be constructed from contest-approved materials).

- ***Strategy Analysis.*** Consider all of the possible different scoring/defending strategies that you are likely to face in the competition, and describe how your design will handle each of these strategies.

- ***Develop a Performance Model****.* Develop a model to predict the steady state top speed of your vehicles. Measure or estimate the parameters necessary to make a quantitative speed prediction. Based on this analysis, estimate how quickly you will transit the contest arena to the scoring zone(s).

- ***List of Experiments/Results.*** What experiments could/would you perform to answer important open questions about your vehicle(s)or your strategy?

Design Report

The design report is to be handed in at the CDR. It should contain:

- A cover page containing a title, names of team members, course name, term, and date of submission.
- objective, materials, approach (design analysis, construction methodology), results and discussion, summary, and reference.
- Budget. Updated budget should be included in the report. The budget should include a description of the items bought, the cost, and vendor details (name, location, etc).