ASEN 3200 Research Report

SATELLITE ATTITUDE DETERMINATION AND CONTROL SYSTEMS

Assigned: 4 March 2005
Report Due: 18 March, 22 or 29 April 2005

OBJECTIVES

• Investigate the design of an attitude determination and control system for a specific satellite
• Understand attitude requirements, design of basic approach
• Understand system performance issues including cost, weight, power, size, etc.
• Find information on your own
• Prepare and present your findings
• Evaluate presentations by other groups

ASSIGNMENT

Working in groups of 2-4 you are to select a specific satellite and investigate the design and performance of the attitude determination and control system. You will prepare a PowerPoint presentation on your findings and present it to the instructors and your peers. The presentations are graded based on technical content, style, and clarity.

PRESENTATION CONTENT

Your presentation must include the following items:
1. Cover sheet – title, group members, date
2. Satellite mission overview – i.e. What does the satellite do?
3. Attitude requirements – What are the requirements for pointing control and pointing knowledge? Why?
4. Attitude determination hardware/software
   a. Principles of operation
   b. Costs, weight, power, size, mounting constraints
5. Attitude control hardware/software
   a. Principles of operation
   b. Costs, weight, power, size, mounting constraints
6. On-orbit performance (if applicable)
7. Bibliography – give a list of the reference material you used, at least 2 should be other than the web

LOGISTICS

You may select your own group of 3 students for this assignment, the satellite you plan to study, and your preferred presentation date (listed above). Once you have identified these 3 items, please send an email to Kristin Larson with the following format:

SATELLITE –
GROUP MEMBERS -
PREFERRED DATE -
LAB TIME: early (11) or late (1)

Ms. Larson will post approved groups and topics to the class web site. Dates and topics will be approved on a first-come, first-served basis. You must pick a unique satellite to study, so please check the web site before submitting your topic.

The presentations will be 5 minutes per student + 5 minutes for questions (so 20 minutes for a group of 3). Each student in the group must participate in the presentation. Groups are also responsible for grading presentations during their session.
POSSIBLE REFERENCES
SMAD 10.2, 10.4.2, Wertz; Journal of Spacecraft and Rockets; Journal of Guidance, Navigation, and Control

Example Grading Sheet

Presentation

Presenters
Graders

Technical Content
Mission and requirements                  Poor   Fair   Good   Very Good   Excellent
Attitude determination hardware/software   Poor   Fair   Good   Very Good   Excellent
Attitude control hardware/software         Poor   Fair   Good   Very Good   Excellent
Performance                               Poor   Fair   Good   Very Good   Excellent   NA
Response to questions                      Poor   Fair   Good   Very Good   Excellent

Style/Clarity
Organization                               Poor   Fair   Good   Very Good   Excellent
Materials                                  Poor   Fair   Good   Very Good   Excellent
Oral presentation                         Poor   Fair   Good   Very Good   Excellent

Comments