SUNY-Geneseo
Department of Physics and Astronomy
W 3:30pm
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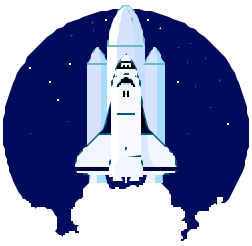
Experimental Physics
Rocket Project
(Phys 372)
Spring 2003



What am I doing here? This semester, you will conceive, design, build, test, launch, recover, and analyze the data from a rocket-based upper-atmosphere experiment. Two separate teams of students will manage projects in parallel. Although the scientific and technical mastery needed for this project is fairly low, time management and quality assurance will prove challenging. The course structure is modeled on common engineering management practices. Every student submission will be reviewed as if it were generated by a professional scientist or engineer. By the end of the semester, in addition to successful completion of the science project, you should understand project planning, teamwork, and documentation. There is no book for this course, and there are no exams.

How will I be graded? Your grade will be determined by:

Successful Completion of Project	20%
Scope of Work	10%
Weekly Reports	15%
Final Report (written & oral)	30%
Individual Journal	25%

The Scope of Work for each team is due by 6:00pm on Monday, February 3, 2003. It should define your proposed experiments, the details of your design, and your testing plan. It should describe the method of analysis of the results. It must include a detailed timeline (in the form of a Gantt chart; see the reverse side of this syllabus for an example) for every activity, which I expect to be updated weekly. You should indicate which steps, if any, are dependent on the completion of other steps before they can be begun.

Each Monday (by 6:00pm), the team leader for each payload project will submit a status report. Each team member is expected to contribute to the report. Reports are to be submitted to: \\boxes\inbox\Physics\Pogo. The weekly report must always contain:

1. A list of the tasks actually completed during the previous week. For each task, include the time spent (to the nearest ½ hour), and by whom. The purpose of this record is not to determine whether you are working hard enough, it is to enable us to plan for future courses. Tasks might include communicating with MARS, examining product catalogs, creating circuit diagrams, shock testing equipment, etc.
2. An alternative plan of attack for your future work when efforts have been unsuccessful. If you fall behind the schedule in your Scope of Work, you must include a modified schedule as part of your weekly report. Any changes to your science goals must also be documented.
3. A short summary or transcript of communications with faculty, vendors, MARS personnel, etc. during the previous week (includes meetings, telephone calls, email, etc.). Each item should be dated.

Each team must submit a final report by 12:00pm on May 15. This report should be a compilation of the major issues faced during the semester. The report should be formatted in such a way that it could be given to a group of freshman with the expectation that they could repeat the entire project without *any* other external consultation. It must include copies of all relevant FAA or FCC regulations, all relevant phone numbers, equipment costs, etc. Also, it must include a science analysis documenting the results of your onboard measurements.

Each team member must keep an individual journal. The journals will be your source of information for all the other submissions. This journal must document every project-related activity involving the author. Every entry must include a time and date. Team meetings, phone calls, and emails must be listed. Circuit diagrams, sketches, time tables, and rejected ideas must be included. Every page must be numbered. All entries must be in pen; no page or entry may be removed for any reason. Rather than deleting errors when they occur, annotate them to indicate the page number of the corrected version.

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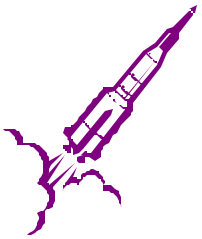
Stages of Payload Development



- **Conception:** Decide on a set of measurements to make, subject to the approval of Dr. Meisel. Measurements must include some method of correlation to rocket altitude.
- **Design:** Choose your specific instruments, subject to restrictions on space, weight, cost, and durability (low temperatures, low pressures, high accelerations, cosmic rays).
- **Construction:** Obtain and assemble the hardware.
- **Testing:** Verify that the payload functions. Verify that it functions in the specified environments. Modify the package in response to testing failures, and retest.
- **Launch and Recovery:** Although you are ultimately responsible for every aspect of the project, it is expected that MARS (http://www.marsclub.org/) will be able to assist you greatly in the details of launch and recovery. If you choose to include MARS, you are subject to any constraints that MARS club members place on you or the project (such as weight limits and schedules). You are expected to be present at the launch.
- **Analysis:** You must process the data generated by your experiment.

Gantt Charts

An example of a partial *Gantt chart* is provided (see the online syllabus for links to Gantt charts). In practice, Gantt charts are most useful for projects that require a substantial amount of time to complete, and which have tasks that cannot be begun until prior tasks are completed (such as your projects). Generally, tasks are colored as they are completed. The purpose of the chart is to constantly inform you of the consequences when your schedule is not maintained. They are only useful when they are detailed. Note that only the first 3 tasks of the example are appropriately sub-tasked. Your chart will, of course, vary greatly from this example.

Phys 372 Milestones (I. Student and R. Helper)

	Task Name	Est. Duration	September					October				November				December		
			2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16
1	**Review of Problem**	**5d**																
	• Read literature on electronics	3d																
	• Discuss current state of problem with Dr. Wingnut	2d																
2	**Determine hardware needs**	**4d**																
	• Measure accuracy of existing voltmeters	1d																
	• Determine minimum magnification	2d																
	• Compute focal length of lenses	0.5d																
	• Measure length of BNC cable needed	0.5d																
3	**Obtain missing hardware components**	**5d**																
	• Get prices on hardware	2d																
	• Write purchase requests and give to Dr. Wingnut or Mrs. Lawrence.	1d																
	• Make drawing for mounting bracket and give to Mr. Cross	2d																
4	**Assemble components**	**3d**																
5	**Make Measurements**	**7d**																
6	**Analyze Results**	**5d**																
7	**Repeat Experiment for failed runs**	**4d**																
8	**Perform Error Analysis**	**6d**																
9	**Create Poster**	**5d**																
10	**Make Presentation to faculty**	**3d**																