



Project Website Guidelines

**Masters in Robotic Systems
Development Project Course
(16-681 / 16-682)**

Questions?:
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I. Introduction

Each team is required to maintain a project website. This document contains general guidelines for its creation, content, organization, and grading. The website organizes and stores important data for your project and has multiple purposes:

1. It allows us a means of tracking your progress, and provides a common context for us to discuss issues.
2. It accumulates and summarizes information for the reports you have to produce throughout the semester.
3. It provides a permanent record of your project that can be viewed by the outside world, including potential employers.

Your website material should be refined over the course of the year. So, for example, although an initial problem description should be posted by the date given in Section 0 at the end of this document, it may need to be changed later to reflect new sponsor expectations, changes in scope, etc. Similarly, your system and subsystem descriptions will grow from initial conceptual drawings and general descriptions to photographs and detailed descriptions of actual hardware.

In 2012-2013, the website was combined into a single information repository containing what in the first MRSD year were two separate things: the project website and the team laboratory workbook.

A word to the wise: start early, start early, start early! Integrating content into your website takes time. It is easy to integrate new content into your website as you create it, but it will overwhelm you if you try to do it all at the last minute.

II. Setting Up Your Project Website

1. Upon formation of your project team, email the TAs your team members' names and their emails.
2. The TAs will give you access to your WordPress site with the format:
<http://mrsdprojects.ri.cmu.edu/2015teama/> (where 2015 is the starting year of your program and the last letter is your team letter)
3. Access to editing the page can be found by appending 'wp-admin/' to the url, like so:
<http://mrsdprojects.ri.cmu.edu/2015teama/wp-admin/>
4. From there, you will have the capability of creating and editing pages on the site to produce the content that you want.

Website Space Management

Although you can put a lot of files on your WordPress directly, sometimes it may be better to host large files separately. Large files (such as CAD models, graphics, and videos) may quickly exceed the space available provided by CMU. This section explains how to use alternative options for hosting large files, so that they may be linked to from the website.

AFS

Every person at CMU has an Andrew account, and with that comes AFS space. AFS (the Andrew File System) is a distributed file system between many of the computers at CMU. Each account, when

created, will have a `www/` directory in its home folder. Anything placed in this directory can be accessed from a normal web browser, and linked to from other websites. The path to any such file is: <http://www.contrib.andrew.cmu.edu/~andrewid/>.

Example of adding content using AFS

Any line starting with a `$` is a command to type in (not including the `$`). We will be transferring over the file `foo.bar`.

1. Open an ssh program:
 - a. Windows: Download and install [PuTTY](#)
 - b. Linux/OSX: Open a terminal, and use the command `ssh`
2. SSH to andrewid@unix.andrew.cmu.edu
3. `$ cd www`
4. `$ mkdir mrsd`
5. `$ logout`
6. Open an SCP program:
 - a. Windows: Download and install [WinSCP](#)
 - b. Linux/OSX open a terminal, and run the next command
7. Navigate to wherever the file `foo.bar` is to be found
8. `$ scp foo.bar andrewid@unix.andrew.cmu.edu:www/mrsd/`
 - a. If WinSCP, connect to `unix.andrew.cmu.edu` with the username `andrewid`. Then navigate to the `www/mrsd/` directory.
 - b. Then copy over `foo.bar`.
9. Disconnect

The file `foo.bar` can now be found at the URL:

<http://www.contrib.andrew.cmu.edu/~andrewid/mrsd/foo.bar>

Dropbox/Box/Google Drive

Create a shared folder with your team for any kind of content. CMU provides unlimited storage in your associated Box account.

YouTube

Obviously, this is only for videos. Start by uploading your video to Youtube. Then follow [How to share a video](#).

Imgur

Uploading image content to imgur can be a valuable way to get fast load times for images on your page. <http://imgur.com/>

III. Website Content Overview

By the end of the semester, your website should include the following components:

1. System summary
 - a. Problem description
 - b. Use case with system graphical depiction
2. System design
 - a. System requirements
 - b. Functional architecture
 - c. Cyberphysical architecture
 - d. System design description/depiction(s)
3. System implementation (full system and subsystems)
4. System performance
5. Project management
 - a. Schedule
 - b. Test plan (including spring and fall validation demonstrations)
 - c. Parts list
 - d. Issues log
 - e. Risk management
6. Media
 - a. Spring and fall videos
 - b. Picture gallery
 - c. Public presentation poster
7. Team page
8. Documents
 - a. Design brainstorming
 - b. Drawings, schematics, and datasheets
 - c. Component testing & experiment results
 - d. Software
 - e. Presentations

Each of these components is detailed in the following section.

IV. Website Content Details

The website content components given above in are described in more detail here. Go to the actual websites from earlier years in order to get a better idea of the overall layout and look and feel.

1. System summary

This should include the following components:

- a. Problem description
Include your project name and a description of the problem your system is trying to solve (the client's need). Focus on end results, not the details of the technology. Write it as if you were selling the system: be enticing, creative, and interesting.
- b. Use case with system graphical depiction
The use case is a narrative of the system's operation in the real world. It should tell a story about how an end user will employ and benefit from the system and describe a typical scenario

in which the system will be used. The use case should focus on the core capabilities you expect to achieve this year, though it may include ideal system features that you don't expect to achieve this year. The graphical representation shows the system in its use case/mission environment. For example, if you are creating an Explosive Ordnance Disposal (EOD) robot, the figure should show not only the robot, but the likely bomb site, the area to be traversed to reach that site, and the user interacting with the robot. Use the graphical representation to give a clear idea of how your system will be used. The system graphical depiction will be conceptual of necessity at the beginning of the year; as time goes on, you may be able to provide a photograph of the actual system.

2. System design

This should include the following components:

a. System requirements

Provide a list of system-level design requirements with quantitative performance metrics derived from your analysis of the problem description.

b. Functional architecture

The functional architecture should show in block diagram format the functions the system must perform, the subsystems that will perform them, and the sequencing and information flow involved. Among other things, this will help you formulate your state machine and give guidance on what inputs (sensors and interrupts) you will need and where the human operator will fit in.

c. Cyberphysical architecture

The cyberphysical architecture should show the major cyberphysical components (hardware and software) and connectivity used to implement the functional architecture.

d. System design description/depiction(s)

Provide a) at least one clear graphical depiction of your full system design coupled with a concise verbal description of it; b) descriptions and depictions of each of the subsystems. All figures should be labeled to identify components and should have captions. Justify your design choices; briefly describe any design alternatives considered, but discarded.

Prior to 2012, the design concept/description and overall system depiction were listed as separate items, so older websites may not include a description.

3. System implementation

Show the progress made over time in your subsystem and full system development. You should make sure to break down the system into its subsystems and components. All subsystems should make logical sense (e.g., organized by discipline or function) and should be described clearly yet concisely. At the end of the fall semester, this section should document the final status of each subsystem. Use photographs, drawings, plots, videos, and any other illustrative means to show your progress and status.

The following page and the pages to which it links show a good example of this section: <https://sites.google.com/site/mrsdproject201213teame/project-progress>.

4. System performance

Highlight the system's performance results against the system requirements, especially the Spring and Fall Validation Demonstrations, as well as its general capabilities. Describe and evaluate your system's performance results with respect to the system requirements and test plan metrics. This includes metrics in your system (and subsystem) requirements and test plan that are either supplementary or intermediate to the validation demonstration metrics, or take too much time to test to be able to show in the limited time available for the validation demonstrations.

5. Project management

This should include the following components:

a. Schedules

- Include a round-robin list of presenters for each of the Progress Reviews
- Include a Gantt chart or other clear representation of your team's development schedule

b. Test plan

- Spring and Fall Test Plan documents
- Descriptions of Spring and Fall Validation Demonstrations: These can be your SVD and FVD 1-pagers, but it is good to include illustrative graphics

c. Parts list

Keep track of the parts you acquire or purchase and the money you spend.

d. Issues log

Maintain this document as a spreadsheet, adding an entry for each design issue or important decision during the semester so that at the end of the project you have a complete list of the progress of your design.

Include the following information in the issues log:

- Item number – unique identifier for each entry
- Date initiated – the date the issue or need for a decision arose
- Date resolved – the date of resolution
- Participants – andrewID(s) of the person(s) responsible for the resolution
- Description – brief description of the issue to resolve or decision to make
- Options – what alternatives were available/considered?
- Resolution – description of the changes or decision made. If not resolved, put a note like "Pending" here.
- Justification – supporting information for why this solution or decision was deemed best

e. Risk Management

Perform risk management using:

- A Risk Management table with Risk ID, Risk, Requirement, Type, Likelihood, Consequence, Mitigation.
- A Risk Likelihood-Consequence Table.

6. Media

This should include the following components:

a. Spring and Fall videos

Along with other videos you may create (for example, in the “System implementation” or “System performance” sections), you must create a summary video for each semester and post it here. Each video should:

- Be 2-3 minutes
- Start with a good teaser:
 - Spring semester: Show as much as possible of the system operating, performing spring validation demonstration-type activities (the footage doesn’t have to be from the validation demonstration Progress Review itself);
 - Fall semester: Show the full system operating, performing fall validation demonstration-type activities (the footage doesn’t have to be from the validation demonstration Progress Review itself)
- Give an overview of your full-system design
- Give views (footage, CAD renderings, simulations, or other graphical depictions) and descriptions of the main subsystems and their operation
- Be interesting and enticing: Start with the results (item ii) and only then proceed to explaining how you achieve them
- Fall semester only: Be posted to YouTube (as well as the website). Use the following naming convention on YouTube: "CMU MRSD 20[XX]: Team [Y] - [Team name]", e.g., "CMU MRSD 2012: Team A – Seawolf". The year should be the calendar year of the Project Course.

The links for past project videos can be found at:

http://www.ri.cmu.edu/ri_static_content.html?menu_id=456.

b. Picture gallery

Create a picture gallery of your team and project at various stages of development. Some good examples are at <https://sites.google.com/site/mrstdproject201213teamc/media/pictures>, <https://sites.google.com/site/mrstdproject201213teamg/updates/image-gallery>.

c. Public Presentation poster

Add this at the end of the fall semester. Here’s an example from 2012-13:

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbntcnNkCHJvamVjdDIwMTIxM3RIYW1hfGd4Ojc5OGMzMmZiMDUxYTQzNzM>.

7. Team page

Include your team name and a brief bio for each team member. The bios should include a picture, background, expertise, and project responsibilities.

8. Documents

These are documents principally for your and the instructors’ reference in order to track project progress and examine project details. The Documents portion of the website is meant to be like a Lab Workbook that teammates and course staff can refer to for a snapshot of the current status of the project. It is not supposed to be a diary, but instead a living resource of material; the content should be distilled down to the most practical quality and quantity.

Documents may be uploaded to the Google Site directly, typically under a “Files” section. However, documents directly uploaded to the website will be viewable by all, and you may want to restrict access to certain documents. See Section II above for recommendations for managing your documents.

The following types of documents should be included in the documents section:

a. Design brainstorming

Keep a summary record of the ideas you generate during your initial and subsequent design brainstorming sessions. Don’t just throw away old ideas and concepts; you may go back to one or more of them later. Many or all of these ideas may involve hand-drawn drawings. Annotate them sufficiently to remind you of what they mean.

b. Drawings, schematics, and datasheets

- Electrical
 - *Wiring Diagrams.* Wiring can become a significant problem if you don’t keep track of it. Keep your wiring neat. Make a drawing and label it so others can follow it.
 - *Schematic Circuit Diagrams.* You will probably design many small circuits. Keep a schematic for each one and record the part numbers, values, etc. Add any equations you use to derive the values. During troubleshooting, we may ask to see this (hand-drawn is okay).
 - *PCB Layout.* Record a general layout of your boards. It doesn’t have to include the wires. However, you should annotate the important features (like pin designations, where inputs and outputs are).
 - *Datasheets.* Include any portions of datasheets pertinent to your work (some data sheets can be 20+ pages). Specifically, keep the pinouts and block diagrams for components (usually around the first page). You should also pull out applicable pictures from a data sheet for easier access. Hyperlinks to online stores are not sufficient— imagine if the part was discontinued and the hyperlink went dead.
- Mechanical
 - *Mechanical Drawings.* Make mechanical drawings of subsystems (if applicable) and label the major parts.
 - *Mechanical Schematics.* Include notes on how to construct the individual pieces as well. This will be necessary if you use the shop.
- Software flowcharts

c. Component testing & experiment results

Some components may involve an experiment; record how you tested and the results.

d. Software

Include information on how to access and use your software.

- README file with an introduction, configuration instructions, installation instructions and operating instructions

- Every document should include a full header stating: the class name, team name, team member names, high-level description of the code's function, and date of the first software revision.
- Code should be well-commented

e. Presentations

Include pdf copies of each of the following presentation documents in this section.

- Conceptual Design Review document (due early December before the Project Course begins)
- Individual Lab Reports (ILRs) (due throughout the year)
- Progress Review slides
- Preliminary Design Review slide presentation (due around the middle of March)
- Critical Design Review slide presentation (due in early May)
- Critical Design Review Report (due in early May)
- System Development Review slide presentation (due in October)
- Final Report document (due in early December)

V. Website Grading

There will be **three** (3) graded project website checks in each semester – worth 6, 6, and 8 points – for a total of 20 points per semester. The course staff will evaluate the structure, content, and quality of each team's website. Grading will be based on the content guidance provided in Section IV of this document. The schedule below lists which items must be complete by each website check. You should have completed everything in one colored section (and all of the ones before it) for each website check. The course staff may make additional website checks which are ungraded and are merely intended to give teams guidance/feedback, in preparation for a later graded evaluation.

Although content will only be graded at the six website checks, you should be constantly maintaining the site throughout the year. **It is expected that the content for all sections (not just those listed in the schedule below) will be up to date as of each check.** This is especially important during the fall semester. It is easy to integrate new content into your website as you create it, but it will overwhelm you if you try to do it all at the last minute. Start early!

To ensure constant updates, you may find it helpful to integrate your team's internal collaboration mechanisms (e.g. Meeting notes, Google Photos, Trello) into your website.

Content that will be graded at each website check:

- Pictures and videos of current system status
- Updates to issues and risks logs

Website Deductions

Spring semester

The final spring semester check distributes points as follows to the 8 website sections:

1. System summary (0.5)
2. System design (0.5)
3. System implementation (subsystem and full system) (1.5)
4. System performance (1)
5. Project management (1.5)
6. Media (1)
7. Team page (0.5)
8. Documents (1.5)

Fall semester

By the beginning of the fall semester, all major content areas should already be present. Now the grading is focused on continued content development and keeping the website consistent with the current goal, design, and scope of the project. As such, areas that are already developed, such as the summary and team page, are devalued, and systems implementation, since it involves continual development, is increased in value.

The final fall semester check distributes points as follows to the 8 website sections:

1. System summary (0.3)
2. System design (0.5)
3. System implementation (subsystem and full system) (2)
4. System performance (1)
5. Project management (1.5)
6. Media (1)

7. Team page (0.2)
8. Documents (1.5)

Date	Points	Content Items to be added	Content Section Reference
Fall semester	0	<ul style="list-style-type: none">Basic website structure establishedProblem descriptionTeam page	
			1.a.
			7.
Jan (based on CoDR info)	6	<ul style="list-style-type: none">Use caseSystem designConceptual Design Review	1.b.
			2.
			8.e.
Early Feb		<ul style="list-style-type: none">Spring semester round-robin list of Progress Review presenters	5.a.
Late Feb (Check 1)		<ul style="list-style-type: none">Initial system implementation detailsProject management tools established (incl. Spring Test Plan)Picture gallery establishedILR01, ILR02	3.
			5.a.-5.e
			6.b.
			8.e.
Mar (PDR)	6	<ul style="list-style-type: none">Preliminary Design Review	8.e
Early April (Check 2)		<ul style="list-style-type: none">Additional system implementation detailsPCB informationILR03-ILR05	3.
			8.b.
			8.e.
Early May (Check 3)	8	<ul style="list-style-type: none">Full spring semester system implementation detailsSpring semester: Performance resultsSpring system video and picturesDesign brainstormingDrawings, schematics, datasheetsComponent testing & experiment resultsSoftwareCritical Design Review slide presentationCDR report	3.
			4.
			6.
			8.a.
			8.b.
			8.c.
			8.d.
			8.e.
Early Oct. (Check 4)	6	<ul style="list-style-type: none">Fall semester round-robin list of Progress Review presentersFall work schedule or WBS updatesFall Test PlanILR06, ILR07	5.a.
			5.a.
			5.b.
			8.e.
Early Nov. (Check 5)	6	<ul style="list-style-type: none">System Development ReviewStandards & Regulations presentationILR08-ILR10	8.e.
Mid-Dec. (Check 6)	8	<ul style="list-style-type: none">Full fall semester implementation detailsFall semester: Performance resultsFall system video and picturesPublic presentation posterFinal report	3.
			4.
			6.a., 6.b.
			6.c.
			8.e.