Client Interview Transcript

Dr. Santora requested that we build a GUI interface for the controller of the Flywheel Energy Storage System. The interface is to have a number of features and be both functional and intuitive.

Features

First Priority

The highest priority components of the interface are controls necessary to use the flywheel for research purposes. These controls should allow the user to instruct the flywheel to:

- reach an rpm with a specific (modifiable) acceleration/deceleration rate
- stop in the case of an emergency (including via a spacebar press)
- initiate deceleration and regeneration
- act as a motor and a generator

There are a few other necessary components:

- An error log: the controller will send error codes to the GUI, and the GUI will record them.
- The ability to control some functions of the interface via keyboard shortcut (most importantly, initiating an emergency stop via a spacebar press).
- A page where the user can input limits on operating parameters, which the GUI will then enforce. This page should be password-protected so that only knowledgeable persons can change the input limits.

Second Priority

Of second priority are the controls necessary for using the flywheel practically, as a storage system. The interface should indicate:

- the flywheel's current RPM
- the energy stored in the flywheel
- feedback of whether it is storing or supplying energy and at what rate.

In addition, a second priority is the recording of past flywheel activity. A user would be able to view different graphs of past flywheel activity.

Low Priority

Dr. Santora noted that there are some components of low priority. An interface on a mobile platform would be a cool feature, but it is not necessary at this point. Also, security is a low priority consideration insofar as the interface for research purposes.

Do not include

Components that should not be implemented include a user account system with per-user permissions and a system with superusers that can override the system limits.

Design

Technologies

The GUI should be targeted at the Windows platform, especially Windows 7. It should be written in a standard language (e.g. C++, C, Python). The GUI will simply adjust operating parameters via the flywheel controller API (not acting as control code). We will work with the Flyrollers team to develop the API for the flywheel controller. We will probably interface with the F28377D control card. We will use whatever protocol we need to make the system safe, reliable, and functional (possibly USB or RS-232).

Product Lifespan and Target Users

The interface will be used in research over a number of years. It should also be designed with the vision of it being a part of an actual working product that should function indefinitely. In research, the main users will be mechanical, electrical, computer engineers, and physicists. Eventually some computer scientists may also work on it. The interface should be intuitive and easy to use because some potential users, especially mechanical engineers and physicists, will be less knowledgeable in computer use.

Project Considerations

Dr. Santora hopes that the expectations of the product will not change over time. However, he noted that we should build our product with a modular design that is capable of change. Dr. Santora believes that the biggest obstacle we will face as design team is in communication between us and the other teams working on the flywheel.