ESD.83 Assignment 7: Practicing Systems Concepts

One document, ~1500 word paper; 10% of total grade

Assigned: Session 3; Due: Session 10.

Attached you will find two chapters from a book, which try to capture many ideas of value in characterizing, analyzing, or designing a complex sociotechnical system (CSS). Chapter 3 is entitled "(Re)Thinking about Systems," and Chapter 4 is called, "Life-Cycle Properties of Engineering Systems: The Ilities."

No claim is made for comprehensiveness of these documents, nor do we claim originality in all elements; many of these concepts will be familiar to you and have been documented in texts, professional papers and so forth. By CSS, we mean (for our purposes here), large-impact, difficult-to-understand systems that have important technology issues (technical complexity) *and* important societal implications (social complexity). It is not necessary to spend much time wrestling with the definition of complexity, but if you are interested, see these two references on the ESD Working Paper site, http://esd.mit.edu/WPS/default.htm:

- Lloyd, Seth, ESD Internal Symposium: Complex systems: a review (.pdf ESD-WP-2003-01.16)

- Sussman, Joseph, Ideas on Complexity in Systems – Twenty Views (.html ESD-WP-2000-02, .pdf ESD-WP-2000-02)

This assignment asks you to do three things:

First, we ask you to choose any CSS that you have good familiarity with – you all have some "domain" in which you developed at least a modicum of expertise. **Describe** the system you have selected so the instructors and those with modest expertise in that domain may understand you. Limit your response to this part to 300 words.

Second, we ask you to read "(Re)Thinking about Systems" and "Life-Cycle Properties of Engineering Systems: The Ilities" in their entirety. Then **discuss your CSS** using these chapters as a guide. We are flexible on your approach. Some students may choose one of the perspectives or concepts in these chapters and discuss that single point in depth as it relates to their CSS. Others will chose to identify and discuss in less detail a number of the points as they relate to their CSS (we suggest you limit yourselves to four or five points). Either is fine. In any case, limit your response to this part to 1000 words.

Third, there is no claim that these chapters are the final word on thinking about systems. We ask that you, based on your own systems experience within and without of your domain, **suggest modifications or additions** that you believe would help make these chapters more useful. Limit your response to this part to about 200 words.

Although each section length may vary slightly from our limits, the overall document you submit should definitely be less than 1500 words. You can think of this assignment as **"practice."** You should get in the habit of "automatically" thinking in terms of systems perspectives when you consider a CSS. Doing an assignment like this is practicing how to think about systems.

ESD.83 Doctoral Seminar in Engineering Systems
Fall 2011