



The SEAL provides a platform for innovative teaching methods, research and government/industry collaboration. The laboratory provides a physical, on-site presence, as well as virtual presence, for remote access and collaboration. The physical presence of the lab consists of a Large Group Facility (LGRF) and as well as a Small Group Research Facility (SGRF).

This structure allows the laboratory to accommodate large and small scale co-located groups. The virtual presence will provide an infrastructure for on-line, interactive team collaboration. Beyond simply housing the latest tools and technology for systems engineering and education (i.e., a sandbox for researchers and educators), the SEAL provides an environment and tooling for collaboration to let a team of individuals work on the design and analysis of system architectures, designs and implementations.

The SEAL is a unique opportunity to create a laboratory facility for supporting research and prototyping in complex systems development, analysis, and integration. The power of desktop computing has in many ways removed the need for a "traditional" lab as a repository for expensive equipment and instrumentation. Thus, for the SEAL we have to think about how a facility can support research activities that cannot be accomplished on individual desktops. For example:

1. An ability of such an environment is to bring people together from government, academics, and industry for collaborative endeavors.
 - a. Such a laboratory can provide a realistic environment which can enable students/novice systems engineers to realistically experience system level challenges and obtain a feeling of accomplishment upon completion of a successful team project. This can utilize both a "war-room" style ambience for collaboration, as well as using state of the art systems engineering (SE) tools.
 - b. This concept can also be extended to an external offering to commercial enterprises to use the same facilities, under the coaching of Stevens faculty/grad students, to perform concentrated system level design and analysis, such as during proposal writing.
2. Another aspect is the potential for making expensive and/or resource intensive SW available to faculty, students, and government/industry partners for research and experimentation.
 - a. Students and government/corporate customers can be valuable "lab-rats". The use of tools and a central repository for the generated information can offer opportunities for gathering and experiments with data-mining to extract system level patterns.

The lab provides a collaborative environment for system architecting, design and integration to be used as an integral part of course project work to include:

- the use of state of the art requirements management and systems engineering tools;
- a "war-room" style ambience for intensive, collaborative team work;

- on-line collaboration environment for off-site students to work “virtually” on their student projects; and
- on-site as well as on-line project reviews.

Beyond research, the lab has a strong education mission to include:

1. Project work in connection with relevant graduate level classes. Currently the graduate project work in our core classes is conducted on an individual level. Even when done as a team, students often have their “specialties” (e.g., one is the “tool-jockey”). This is not exactly state-of-the art when it comes to SE tools and their application. Most tools today offer some level of groupware capability. This means that several team members can work simultaneously on different aspects of a system design. With a proper tool set up, this can be replicated in the lab. Student teams could then schedule slots to collaborate in the lab. One could also offer tutoring sessions, both to learn the tools, as well as tips and tricks on various methodologies.
2. The lab could serve as a team room for undergraduate teams conducting research for capstone design. In this regard, it could also be interesting to integrate the lab technically to similar facilities in electrical engineering, mechanical engineering, and computer science to achieve a more realistic tie in with the implementation side of the equation.
3. The lab serves as a virtual lab, both by making applications and repositories available over the Internet (e.g. as a remote student, you could work against a common CORE database as the rest of my virtual team). Video-, web conferencing and other collaborative tools also offer opportunities for a totally virtual lab experience. This also enables research on methods and processes for collaborative “e-Systems Engineering”.

Both the LGRF and SGRF contain portable interactive whiteboard/projectors with audio and video capture equipment to support web-casts and on-line conferences for both facilities for distributed learning and research. The lab also houses the latest versions of standard systems software to include:

- CORE
- DOORS
- Rational Rose Suite
- METIS
- Telelogic System Architect
- Telelogic Tau
- Matlab
- SPSS
- AnyLogic
- Stella/iThink/VESIM
- Others