

Distance Learning and Virtual Laboratory for Information Assurance

Michael VanPutte
Department of Computer Science
Naval Postgraduate School
Monterey, CA 93943
mavanput@nps.navy.mil

Cynthia E. Irvine
Department of Computer Science
Naval Postgraduate School
Monterey, CA 93943
irvine@cs.nps.navy.mil

John Hiles
MOVES Academic Group
Naval Postgraduate School
Monterey, CA 93943
jhiles@mindspring.com

The purpose of this presentation is to discuss preliminary research results in an ongoing project at the Naval Postgraduate School (NPS). The project, tentatively called *SimSecurity*, is to create a distance-learning information assurance (IA) laboratory to support hands-on learning.

The project brings together two diverse groups. The NPS Center for Information Assurance and INFOSEC Studies and Research (CISR), a Center of Excellence in Information Assurance education, brings with it the information assurance subject-matter expertise. Joining CISR on *SimSecurity* is the Modeling, Virtual Environments, and Simulations (MOVES) Academic group that brings its expertise in the development of interactive simulations and agent-based modeling. These diverse groups are combining their talents to create a unique information assurance education tool.

Information assurance is not only a theoretical topic. In addition to rigorous scientific foundations, it involves the application of abstract principles to the real world. A hands-on virtual laboratory provides a dynamic and often surprising context where the abstract principles can be applied. *SimSecurity* will package the information assurance laboratory in the form of an interactive computer simulation in which players may assume various roles involved in IA (manager, security administrator, attacker, etc.). Students will interact with others actors in the environment, operate and configure information systems, and defend those systems. Through the use of autonomous agent-based software techniques, the laboratory will adapt to the decisions and strategies of students, providing them with a customized learning experience. Students will be able to visualize, not only their actions in the environment, but how others see those actions, and the consequences of those actions.

The agent-based architecture underlying this laboratory facilitates extensions as new threats and countermeasures in the real world IA landscape evolve. This extensibility allows researchers and instructors to upgrade the simulation capabilities without invalidating earlier components, supporting rapid, continuous, and relatively inexpensive updates.

The laboratory can be used in three different modes. The first is stand alone and ad hoc to teach users IA concepts and vocabulary. The second is as a self-contained security laboratory that provides an introduction and tutorial to basic IA concepts and their application. This stand-alone mode can be used as an introduction to basic IA concepts or to reinforce previous training and education. The third mode combines the laboratory with a course, students navigate through the IA lab in a systematic program. When used in conjunction with NPS CISR learning modules and courses, students progress through a rigorous sequence of labs and lectures to a NSTISSC-based certification and/or course credit from NPS. The interactive environment is intended to provide an exciting setting that stimulates learning and reinforces abstract principles currently taught in classrooms or books.

This presentation will provide a brief overview of the project goals and progress in the development of the laboratory.