



Software Engineering for High Assurance Computer Systems

The Software Engineering Section of the Naval Research Laboratory's Center for High Assurance Computer Systems is seeking white papers for innovative research in methods, tools, and techniques for constructing and analyzing high assurance software systems. Applying such methods and tools is necessary in the development of software for systems such as autonomous systems, weapons systems, and security devices that must satisfy critical system properties, such as safety, timing, fault tolerance, and security.

Current and anticipated areas of research focus include:

1. **Model-Based Software Development and Analysis** – We are interested in the development of formal, mathematically based methods supporting model-based software development. Methods and tools for fault-tolerant computing, hardware and software co-design, and construction and analysis of secure software are of special interest. Further topics of interest include compositional techniques; model abstraction, refinement, and transformation; combining models from different modeling domains; verification techniques and tools, including decision procedures and theorem proving; relating assertions in source code to system properties; automatic test case generation; code analysis using static and/or dynamic techniques; code synthesis; source code optimization; combining high assurance techniques with adaptive agents and cognitive models; and achieving trust in autonomous systems.
2. **Methods for Developing and Analyzing Software for Real-Time Systems** – We are interested in research and development of different notations of time, construction and analysis of hybrid (continuous and discrete) timed models, methods for composing timed models, methods for representing the required system and software timing properties and translating these properties into constraints on the execution platform, and methods for analyzing system behavior to ensure that it satisfies the required timing properties.

Send White Papers (WP) to 5546info@ccs.nrl.navy.mil. Allow one month before requesting confirmation of receipt of WP if confirmation is desired. Substantive contact should not take place prior to evaluation of a WP by NRL. If necessary, NRL will initiate substantive contact.