8:30   Welcome

8:45   Introductory Remarks: Priorities with Regard to System Assurance (Security, Safety, Reliability) within a Digital Engineering/ Acquisition Environment (Ms. Kristen Baldwin, DASD-Systems Engineering)

9:15   Featured Talk: Model-Based Development: What's New? What's Needed? (Professor Nancy Leveson, MIT)

10:00   Coffee Break

Government Perspective – Challenges and Opportunities with Enhancing System Assurance in a Digital Engineering Environment:

10:15   Challenges with Realizing Robust System Security in Complex Systems (Ms. Melinda Reed, Deputy Director, ODASD – Systems Engineering)

10:45   Challenges and Research Priorities with Digital Engineering as an Enabler for Trade Space Exploration/Systems Analysis (Ms. Philomena Zimmermann, Deputy Director, ODASD – Systems Engineering

Industry Perspective – Challenges and Opportunities:

11:15   Hardening Legacy Systems and Cyber Resilient System Architectures (Irby Thompson, StarLabs)

11:45   Functional Modeling for Model Based System Assurance (Gustavo Quiros and Archimedes Canedo, Siemens, Princeton NJ)

12:15   Lunch Break

1:00   Featured Talk: Model-Based Testing of Complex Concurrent Systems: Lessons Learned and Future Perspectives (Ed Brinksma, TU/Twente; Jan Tretmans, ESI/Univ. of Nijmegen)

1:45   Featured Talk: Between Testing and Verification: Dynamic Software Model Checking (Patrice Godefroid, MS Research)

2:30   Afternoon Break

2:45   Parallel Breakout Sessions

5:00   Reception and Dinner Featured Talk: Integrating Modeling and Simulation into Safety Program (Mark Denicuolo, FAA)

Thursday, December 7, 2017

8:30   Welcome/Announcement

8:45   Featured Talk: Advancing Model Based Mission Assurance for Complex Systems (John W Evans, NASA)

9:30   Featured Talk: Leverage from Models: Inherent Limitations and Open Questions (Professor Fred Schneider, Cornell University)

10:15   Coffee Break

10:30   IoT and Trust (Dr. Jeff Voas, NIST)

11:00   MBSA for Cyber Failure Detection and Recovery (Cody Fleming, UVA)

11:30   MBSA for Cross-scale Resilience (Val Sitterle, GT)

12:00   UML Testing Profile: A Language for Model Based Test Automation (by Marc-Florian Wendland, Fraunhofer)

12:30   Lunch Break

1:30   Breakout groups on MBSA research needs

4:00   Breakout group summary presentations

4:30   Workshop summary and paths forward

5:00   Closing

SYSTEMS ENGINEERING RESEARCH CENTER

A U.S. DEPARTMENT OF DEFENSE UNIVERSITY AFFILIATED RESEARCH CENTER

WORKSHOP

MODEL BASED SYSTEM ASSURANCE

ENABLED BY

DIGITAL ENGINEERING

DATE:
DECEMBER 6-7, 2017
WORKSHOP ATTENDANCE IS BY INVITATION ONLY.

LOCATION:
20 F ST CONFERENCE CENTER
20 F STREET, NW WASHINGTON, DC

ABSTRACT

Digital Engineering is seeing increased applications in the conception, design, integration, verification and validation (V&V) of mission critical systems. However, applying model-based verification and validation methods, e.g. Model-Based Testing (MBT), to the testing of large-scale complex systems remains extremely difficult and expensive. This is exacerbated by increasing system complexity and uncertainty associated with cyber-physical systems employed as system-of-systems, and increasingly sophisticated threats. Therefore, it remains a challenging problem, across many domains, to effectively and efficiently identify and remove latent critical faults and improve overall system assurance within given system constraints and priorities. In particular, a mission critical cyber-physical system must consider of all classes of system failures, whether inherent or malicious, in rapidly changing external system-of systems contexts. Future methods, processes, and tools must go beyond traditional quality assurance scope to include emergent dimensionality of the design space through the evolving quantification of concepts such as flexibility and resilience.

This workshop is focused on identifying and prioritizing appropriate research questions related to next generation system assurance, i.e. Model-Based System Assurance (MBSA), that have two significant attributes – relevancy from a practitioners' perspective, and uniqueness and rigor from a research and academic perspective. We use the word "assurance" in association with safety, security, reliability and resilience as system design attributes. These attributes are achieved intentionally through a systematic and rigorous modeling, searching, and analysis of how the system could fail to meet its mission objectives, followed by the development and implementation of engineered features that provide design margins to compensate for threat uncertainty, aided by our ability to test these features as assurance hypotheses.

This 2-day research workshop will address the state of the art and practical challenges in Model Based System Assurance, and investigate related research opportunities. Building from previous SERC research in Cyber-aware Systems, Engineered Resilient Systems, and Systemic Assurance, the workshop will focus on methods, processes and tools that reuse and innovate modeling techniques in MDE, support the automation of test design, as well as balance cyber mission assurance versus risk in today's cyber threat environment.

RESEARCH WORKSHOP LEADERS:

Professor Tom McDermott
  – Georgia Tech

Professor Ye Yang
  – Stevens Institute of Technology

SERC Executive Director:

Dr. Dinesh Verma
  – Stevens Institute of Technology

SERC Chief Scientist:

Dr. Barry Boehm
  – University of Southern California

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