

Overview of Metrics, Models, and Simulation for Cyber-Physical Systems

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Abstract

The Metric, Models, and Simulation for Cyber-Physical Systems focuses on the different frameworks that have been operationalized so that cyber-physical systems can be baselined in security. In addition, the minitrack is interested in innovations in decision support such as cost effective means to decide what metrics should be addressed to get the best value in cybersecurity. There are many challenges to overcome in cyber-physical systems. We ask: How should frameworks be operationalized? What methodologies are available to quantify cybersecurity frameworks while accounting for cyber-physical interactions into account.

1. Introduction

2015 saw a massive increase in cyber crime. Cyber breaches have become ubiquitous. The US government is attempting to adapt through legislation and policy. For instance, businesses in the defense industrial base must be in compliance of NIST 80-71 by 31 December 2017. Insurance companies as well are beginning to build actuaries on cyber risk. Along with NIST, there are many cyber frameworks that exist, each with their own following. Recently, companies have sought mapping from one framework to another but this is imperfect solution because some frameworks are exclusively technical control measures with very little to do with risk governance. Along with

these frameworks, assessment models have been and are under development.

2. Overview of Minitrack

This minitrack brings together academia, industry and government to discuss the models, methods and the issues in implementation. This minitrack is inspired by research conducted on behalf of Carnegie Melon's Software Engineering Institute into cybersecurity risk model for insurance companies.

Our minitrack includes basic and applied research as well as current models being developed to score companies, applied by insurance companies, or novel advances in characterizing adaptive cyber adversary attacks and associated likelihoods and consequences. There are three presentations.

Investigating and Coordinating Safety-critical Feature Interactions in Automotive Systems Using Simulation by Christoph Luckeneder, Michael Rathmair, Hermann Kaindl

Applying MARTE Profile for Optimal Automotive System Specifications and Design by Fabíola Gonçalves, Achim Rettberg, Carlos Pereira, Michel Soares

A Model-Based Engineering Methodology for Requirements and Formal Design of Embedded and Real-Time Systems by Fabíola Gonçalves, Achim Rettberg, Carlos Pereira, Michel Soares