Wednesday, November 16 - 15:30 - 17:30

Modeling and Simulation for System Reliability Analysis: The RAMSAS Method

Prof. Alfredo GARRO University of Calabria, Italy;

Visiting Professor (from January to October 2016) at NASA Johnson Space Center (JSC)

Abstract: Reliability analysis of modern large-scale systems is a challenging task which could benefit from the joint exploitation of recent model-based approaches and simulation techniques to flexibly evaluate the system reliability performances and compare different design choices. In this context, the tutorial presents RAMSAS, a model based method that supports the reliability analysis of systems through simulation by combining the benefits of popular OMG modeling languages (SysML/UML) with widely adopted simulation and analysis environments (Simulink/Modelica). RAMSAS can be easily plugged into various phases of a typical system development process ranging from the design to the testing phases so as to complement other well-known and widely adopted techniques for system reliability analysis (e. g. FMECA, FTA, RBD) by providing additional analysis capabilities. The present version of RAMSAS is the result of intensive experimentation in several application domains (aerospace, automotive, railway) which allows improving the effectiveness of the method, especially in the modeling of both the intended and dysfunctional system behavior. During the tutorial a case study concerning the reliability analysis of an Attitude Determination and Control System (ADCS) of a satellite will be presented. The seminar will conclude with a discussion about the specific aspects of the reliability analysis of System of Systems (SoS) and how RAMSAS can be further extended to effectively support it.

Biography: Alfredo Garro is Associate Professor of Computer and Systems Engineering at the Department of Informatics, Modeling, Electronics and Systems Engineering (DIMES) of the University of Calabria (Italy). He was Visiting Professor (from January to October 2016) at NASA Johnson Space Center (JSC), working with the Software, Robotics, and Simulation Division (ER). From 1999 to 2001, he was a researcher at CSELT, the Telecom Italia Group R&D Lab. From 2001 to 2003, he worked with the Institute of High Performance Computing and Networking of the Italian National Research Council (CNR). On February 2005 he received the PhD Degree in Systems and Computer Engineering from the University of Calabria. From January 2005 to December 2011, he was an Assistant Professor of Computer and Systems Engineering at the DIMES Department (formerly DEIS) of the University of Calabria. His main research interests include: Modeling and Simulation, Systems and Software Engineering, Reliability Engineering. His list of publications contains about 100 papers published in international journals, books and proceedings of international and national conferences. In 2014, he founded the Departmental Research Laboratory "System Modeling And Simulation Hub Lab (SMASH Lab)". He is vice chair of the Space Reference Federation Object Model (SRFOM) Product Development Group (PDG) of SISO. He is the Technical Director of the "Italian Chapter" of INCOSE (International Council on Systems Engineering). He is a member of the Executive Committee and National Coordinator for Italy in the MODRIO European Project. He is the Technical Leader for UNICAL in the Open Source Modelica Consortium (OSMC). He is a Member of the CINI National Lab on Cyber Security and of the Technological District on Cyber Security (DCS). He is the Faculty Advisor and Member of the Executive Committee of the Simulation Exploration Experience (SEE) project, led by NASA. He is involved in the activities of the IEEE Computer Society, IEEE Reliability Society and IEEE Aerospace and Electronic Systems Society.