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SYSTEMS ENGINEERING**

**System of Systems Engineering
Collaborators Information Exchange (SoSECIE)**

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**Semantically-enabled Model-based Systems Engineering of
Safety-critical Network of Systems**

Dr. Léonard Petnga, University of Alabama in Huntsville

This briefing describes a novel approach to the development and integration of semantics to the model-based systems engineering and operation of safety-critical network of systems. Engineering models work directly with formal domain and meta-domain (especially time and space) knowledge that are determinate, provable (ambiguity free) and executable. Knowledge is encoded as semantic blocks, which are an integration of ontologies, rules, and communication and computation interfaces. These concepts are exercised in a collision avoidance problem involving autonomous agents at a traffic intersection.

Biography

Dr. Léonard Petnga is an Assistant Professor of Systems Engineering at the University of Alabama, Huntsville. He holds a Masters in Systems Engineering and PhD in Civil Systems from the University of Maryland, College Park. He is a former Cyber-Physical Systems (CPS) Scholar at the US National Institute of Standards and Technology (NIST) and Postdoctoral Fellow at the US Army Research Laboratory (ARL) and the Institute for Systems Research (ISR) at the University of Maryland, College Park. He is a former Cyber-Physical Systems (CPS) Scholar in the Systems Integration Division (SID) at the National Institute of Standards and Technology (NIST). In 2013, he won the Best Paper Award at the 11th Annual Conference on Systems Engineering Research (CSER2013). His research focuses on knowledge structures for Model-based Systems Engineering (MBSE) and integration of complex systems with an emphasis on CPS. His work involves the development of procedures for reasoning and integration of system behavior and structure across domains with applications in transportation (air, ground, water), aeronautic and Internet of Things (IoT).