Model-Based Architectural Patterns for Teaching Systems Engineering

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Abstract. Systems Engineering may be one of the fastest evolving engineering disciplines today. With each new technology introduction, the practice of systems engineering is challenged to adapt in order to apply systems engineering to the new technology. Two such practices that have been appearing in university curricula are Model-Based Systems Engineering (MBSE) and Architectural Patterns. The combination of MBSE and patterns has proven to be a powerful construct. This paper looks at the use of a space-based patterns library (language) in a graduate level system engineering curricula to teach MBSE. The “INCOSE systems Engineering Vision 2035” de-fines, by 2035, the systems engineering practices will be based on a set of theoretical foundations and other general principles that are taught constantly as part of systems engineering curriculum. This literature provides the roots and needs of academic coursework for teaching model-based systems engineering. In this paper, we aimed to provide details of the usage of pattern library concept developed for the NASA and its usage by the systems engineering graduate students that eased the development of new space-based systems architectures. Again, our objective is to incorporate INCOSE Vision 2035 in the academia using Model-Based Architectural Patterns for Teaching Systems Engineering.

Biography

Bhushan Lohar (Assistant Professor- Systems Engineering at the University of South Alabama)
Dr. Bhushan Lohar is an Assistant Professor in Systems Engineering at the University of South Alabama (USA). He is a faculty advisor of the INCOSE student chapters at the USA and President of the INCOSE Blues Chapter. He has over 10 years of experience combining the automobile and aerospace industry, working on systems engineering, research & development, project management, and quality management. His research interests include Model-Based Systems Engineering, Model-Based Patterns, Space Systems Engineering, SysML modeling and simulation, and Model-Based Machine learning and Artificial Intelligence.

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Dr. Robert Cloutier is a Research Professor and at the University of South Alabama (USA). His research interests include the application of SE to healthcare delivery, ConOps, system architecting, MBSE and complex patterns for systems engineering. Before joining the USA, Dr. Cloutier was an Associate Professor and Director of Systems & Software Programs at Stevens Institute of Technology in Hoboken NJ. Before Stevens, he spent over 20 years at Lockheed Martin and The Boeing Company, served eight years in the U.S. Navy & Navy Reserve. He received his BS from the US Naval Academy, MBA from Eastern University, and Ph.D. from Stevens Institute of Technology.