

Modelling Systems of Systems Without Drowning: Using ISO 24641-Compliant ARCADIA Methodology

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Abstract.

In today's world, few systems remain cleanly within their scoped boundaries; most interact with other systems as a communication network, GPS, or an external power supply. Current methods of modeling Systems of Systems (SoS) struggle with limitations of language and diagram-based representations on top of the challenges of scale and scope. ARCADIA provides an alternative approach with a robust way to capture known and to-be-defined interfaces/integrations while using representations that facilitate cross-discipline collaboration, systems models that can be differentially decomposed based on the domain, and bidirectional sharing subsets of models with suppliers, partners, and even customers.

The ARCADIA methodology offers a way to avoid the "language barrier" because it emerged from work by a top-ten aerospace company who was looking for a systematic approach to support a diversity of product and system types, facilitate cross-domain collaboration, and be effective for projects that start at different points in the system/product lifecycle. Since its release as open-source, over 400 organizations have or are using it, and that community helped inspire the creation of an ISO standard, 24641 (in-work).

We will discuss the challenges of SoS modeling, explore doing recursive modeling (addressed in INCOSE SEBOK), and show several practical examples of its application. Demonstration via ARCADIA-supporting tool as well as interactive activity and discussion will provide insights into issues of composing new systems from pre-existing constituents and of extending an existing product with new system interactions and capabilities.

Note: ARCADIA is an open-source methodology managed under the Eclipse Foundation (www.eclipse.org/capella/arcadia.html).

Biography

Anthony Komar (Siemens Digital Industries Software)

Anthony Komar has a master's in systems Engineering and has been practicing and/or supporting systems engineering practitioners for over 35 years. Tony began his career as a System Engineer on development of engine and flight controls in the early 1980s. He led his team supporting FADEC I for CF6 engine control through FAA software certification. His research and development of flight control system based on COTS platforms led Tony to work as a consultant helping auto and other companies establish architectures focused on increasingly complex and powerful software-based control systems. Tony joined Siemens 17 years ago and has helped customers establish requirement management and systems engineering solutions in variety of industries including those subject to significant certification requirements.