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Incremental Commitment Spiral Model as Applied to Systems of Systems (SoS)

Dr. Jo Ann Lane, University of Southern California

Dr. Richard Turner, Stevens Institute

Abstract

Defense organizations are finding that their systems and software development policies, standards, and maturity models apply well to a declining number of the systems they develop. The remaining systems have proliferated into various combinations of reuse-based, prototype-based, agile, architected agile, plan-driven, product-line, systems of systems, legacy-based, and COTS/cloud/open-source-based systems. Applying their traditional model to this variety of systems is frustrating and often unproductive.

The ICSM is a process model generator that extends the scope of the original spiral model for software development (the basis of most agile methods) to cover the definition, development, and evolution of cyber-physical-human systems. It enables organizations to determine which process model, or combination of models, best fits the needs of each system, and to evolve those models over time as the development and operational environment changes.

In this presentation, the authors provide an overview of the ICSM, describing its history, principles, components, and scope. They then demonstrate its application in acquiring, developing, and managing systems of systems.

Biography

Dr. Jo Ann Lane is a research assistant professor at the University of Southern California Center for Systems and Software Engineering, conducting research in the areas of SoSE, systems engineering, and innovation. She was a co-author of the 2008 Department of Defense Systems Engineering Guide for Systems of Systems. She received her PhD in systems engineering from the University of Southern California and her Master's in computer science from San Diego State University. Dr. Lane is a co-author of *The Incremental Commitment Spiral Model: Principles and Practices for Successful Systems and Software*.

Dr. Richard Turner has over thirty years of experience in systems, software and acquisition engineering in both private and public sectors. Currently a Distinguished Service Professor and Principle Investigator within the Systems Engineering Research Center at the **Stevens Institute of Technology**, Dr. Turner is active in the agile, lean and kanban communities and was a core team author of the IEEE Computer Society/PMI *Software Extension for the Guide to the PMBOK*. He is a Golden Core awardee of the IEEE Computer Society, a fellow of the Lean Systems Society, a Senior Member of the IEEE, and co-author of four books: *The Incremental Commitment Spiral Model: Principles and Practices for Successful Systems and Software*, *Balancing Agility and Discipline: A Guide for the Perplexed*, *CMMI Survival Guide: Just Enough Process Improvement*, and *CMMI Distilled*.