From Dual VEE to Dual Use – Introducing the SoS-VEE™ Model to Improve the Acquisition, Interoperability and Performance of large System-of-Systems (SoS) Programs

Problem Statement: According to the Standish Group, very few large projects perform well to the project management triple constraints of cost, time, and scope. In contrast to small projects, which have more than a 70% chance of success, a large project has virtually no chance of coming in on time, on budget, and within scope. It is critical to break down large projects into a sequence of smaller ones ... and install stable, full-time, cross-functional teams that execute these projects following a disciplined approach[1].

However, this breakdown results in another set of challenges to the acquisition, interoperability and performance of larger programs. According to Northrop Grumman Chief Engineer John Clark (ret) the SoSE management processes (e.g. acquisition) are inadequate and pose the following challenges: there is no god (no overall program manager) of a SoS (Dr Larry Pulman), acquisitions are stovepipes (single systems, not SoS), systems are directed to "integrate" with other systems, often after fielding, suppliers don't cooperate with each other (they believe it's not in their best interest), acquirers don't cooperate with each other for the same reason, SoS costs more up-front to develop (but saves much more later), and interoperability is hampered by lack of SoSE[2].

Offered Solution: The author is making the case that large programs are in fact System of Systems whereby the individual projects represent the element systems of the overarching System of Systems. The INCOSE Systems Engineering Handbook describes seven typical challenges that influence the development of SoS projects, such as independent operation, different life-cycles, ambiguous requirements, complexity, and more. Focus is placed on controlling the interfaces between system elements and external interfaces, also verification and validation plays a critical role in replacing an older component system. The Dual VEE model has been introduced in the past to help better understand System of Systems Engineering (SoSE). Due to its complexity, however, SoSE continues to be one of the least well-understood Systems Engineering disciplines. An SoS-VEE™ model is proposed that is based on the concept of system hierarchy and the SE process as per MIL-STD 499B and EIA/IS-632. The SoS-VEE™ model is highly modular, scalable, and can be applied to both Family and System of Systems (FoS, SoS)

Planned Presentation Content, Approach & Benefits: The webinar will provide an

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[1] CHAOS MANIFESTO 2013, Think Big, Act Small, Page 8, Accessed Nov 09, 2014, http://www.versionone.com/assets/img/files/CHAOSManifesto2013.pdf
[2] INCOSE Webinar, 72 February 18, 2015, "SoSE from the SE Standards, INCOSE SE Handbook, and Dual V-Model Perspective", Slide 9, John O. Clark

overview of the challenges of System of Systems Engineering, derive the SoS-VEE™ model, provide a comparison to the Dual VEE model, illustrates how it can improve the acquisition, interoperability and performance of large System-of-Systems (SoS) programs while addressing the challenges and influences of SoSE. The SoS-VEE™ model will be able to serve as a powerful graphical representation of an otherwise complex engineering process, similar to the existing standard VEE model.

Biography:

Oliver Hoehne is a Senior Professional Associate with Parsons Brinckerhoff (PB) and the U.S. Global Technical Excellence for Systems Engineering, Communications and Control Systems. Mr. Hoehne is a Project Management and Systems Engineering Professional with over 20 years of extensive international and domestic experience in the Software and Systems Engineering, Information Technology, Infrastructure and Transportation industries, ranging from small to large mega-projects.

Oliver has a passion for achieving client satisfaction by producing high-quality results and getting it right the first time, while working within budget and schedule constraints.

He is a PMI certified Project Management Professional (PMP), an INCOSE Certified Systems Engineering Professional (CSEP), and also holds PM certifications from Parsons Brinckerhoff, STV Incorporated, Siemens, and the George Washington University. Oliver has worked in several Project Management and Lead Systems Engineering roles, and is currently serving as a Project Manager for the PB New York City Transit Systems Engineering On-Call Services.

Mr. Hoehne has published several papers and presented them at conferences sponsored by INCOSE, IEEE, APTA, AREMA, and other Software and Systems Engineering symposiums. In 2012 Oliver received the "Best Paper" award in Rome, Italy, for applying Systems Engineering to the $68B California High-Speed Rail Project.