# System of Systems EngineeringCollaborators Information Exchange (SoSECIE)

***December 3, 2019***

***11:00 a.m. to Noon Eastern Time***

**Digital Twin Strategies for SoS
- 4 Challenges and 4 Architecture Setups for Digital Twins of SoS**

***Dr. Michael Borth, ESI (TNO), The Netherlands***

#### Abstract

Cyber-physical systems-of-systems operate on and with machine-generated data that form the foundation of many of their information-centric functions and processes. Especially within infrastructure systems of systems and the applications of the internet of things, data became an asset for additional tasks regarding their efficient and effective operations, e.g., predictive maintenance which lowers the total costs of ownership.

Many of these tasks are well supported by digital twins but building such digital replicas of systems and processes within a system of system is complicated by that context, e.g., due to the managerial independence of the contributing systems that often restricts available information and data sharing. We discuss these challenges together with strategies and architectures that address them and illustrate this digital twin perspective on cyber physical systems and the internet of things with examples from the smart grid and smart building domain.

#### Biography

Dr. Michael Borth leads the Smart Systems research at ESI, the Joint Innovation Centre for high-tech systems design and engineering of the Dutch TNO. As Senior Research Fellow, he works in cooperation with industry and academia at ESI since 2007, looking back at projects with, e.g., Thales, Philips, and ASML on the national and international level.

Previously, he worked for Daimler Research and Technology. There, his work and interests centered on advanced E/E – architectures, diagnosis systems, and learning from machine generated data, where Daimler was among the first to realize industrial applications. He received his PhD from the University of Ulm in this capacity for his work on Bayesian networks and the knowledge discovery in and about technical systems in 2004.

Bringing these topics together, his current focus is on information-centric architectures and embedded intelligence for cyber-physical systems-of-systems. Realizing digital twins and diagnosis and predictive maintenance applications as stepping stones towards smart systems, he pursues system-level reflection mechanisms to bring on safe and informed adaptive systems.

More details can be found on his LinkedIn Profile: https://www.linkedin.com/in/michaelborth/.