

Report on IEEE SMCS and INCOSE Special Session/Panel in Bari IT during SMC2019

Over 25 IEEE Systems Man and Cybernetics Society (SMCS) members joined INCOSE and World Academy of Art and Science representatives on October 8th at the annual SMCS symposium in Bari, IT. A special session of technical papers and follow-on panel addressed the Future of Systems Engineering (FuSE).

Five technical paper presentations described current approaches to systems engineering and posed questions for future directions. Robert Minnicelli presented three papers on behalf of his co-authors: “Analyzing Systems Architectures using Inter-Level and Intra-Level Dependency Matrix (I2DM),” “Trust and Reputation in Multi-Agent Resilient Systems,” and “Architecting Success in Model Based Systems Engineering Pilot Projects.” Ali Raz discussed his paper on “Multi-Disciplinary Perspectives for Engineering Resilience in Systems.” Dennis J. Folds and Thomas A. McDermott presented “The Digital (Mission) Twin: an Integrating Concept for Future Adaptive Cyber-Physical-Human Systems.”

Following the paper special session, SMCS President Eddie Tunstel welcomed panel and audience members.

SMCS VP, Systems Science and Engineering Adrian Stoica drew attention to new trends in automation and system sciences, and systems engineering gaps and needs from SMC SSE perspective.

INCOSE Future of Systems Engineering (FuSE) Lead William Miller called for an evolution of systems tempo, scale, complexity, volatility; needs for new methods, staffing; and future vision for systems engineering. INCOSE President Garry Roedler noted “We seem to be writing context into mission analysis, but have we defined it in a way that is useful?”

SMCS Industrial Liaison Committee Chair and panel moderator Christopher Nemeth invited attention to real world needs that continue to increase in complexity and rate of change; industrial systems and methods to develop them are essentially static / deterministic, electronic/cyber systems are dynamic, capable of engaging non-deterministic challenges; non-deterministic, complex challenges are typical of evolving post-industrial society. Systems that enable humans to effectively engage dynamic, rapidly evolving problem sets must themselves be configured to rapidly adapt, constantly minimizing the difference between need and solution. SMCS combines the disciplines that are essential to future-focused research and development of dynamic systems.

CEO of the World Academy of Art & Science (WAAS) Garry Jacobs called for a concept of integration in cognitive and social sciences, a process of accomplishment in symbiotic social systems, analytic and synthetic forms of thinking in social systems, and objective and subjective dimensions of value-based, decision-making.

Much of the discussion that followed examined the need to for crucial elements to be part of future systems engineering approaches, including context awareness, the human element, and trust in systems.

The sessions are part of an ongoing program of collaboration between INCOSE and SMCS.