



# Cyber Physical Systems Real Time and Interactive Testing and Governance

Sara Sadvandi<sup>1</sup>(✉), Franck Corbier<sup>2</sup>, and Eric Mevel<sup>3</sup>

<sup>1</sup> Dassault Systèmes, 10 rue Marcel Dassault, 92940 Velizy, France  
Sara.sadvandi@3ds.com

<sup>2</sup> Dassault Systèmes, 35 rue Haroun Tazieff, 54320 Maxeville, France  
Franck.corbier@3ds.com

<sup>3</sup> Dassault Systèmes, 120 rue René Descartes, 29280 Plouzané, France  
Eric.mebel@3ds.com

**Abstract.** Cyber Physical Systems (CPS) interconnects the cyber world of communication and computing with the physical via reliable and secure software's. It asserts a critical challenge not only on development of complex systems but also on integration and validation of system of systems (SoS). This article develops a categorization of multiple levels of testing and defines a high level conceptual organization of test based engineering and validation. It introduces a real time and interactive co-execution platform that provides heterogeneous model integration, models validation and monitoring. It presents a generative approach for test variants management to assure dynamic changes and the flexibility in execution and test during the project life cycle. Further, it provides effective deployment domains.

**Keywords:** Cyber Physical Systems · Model-based testing · MiL  
SiL · HiL · Progressive integration and validation · Test variant management  
Test governance · System under tests · Real time and interactive execution  
Test scenarios