**Call for Papers**

*IEEE Open Journal of Systems Engineering*

***Special Issue on Digital Twins and System Engineering Process***

Digital Twins represent a paradigm shift in systems engineering, creating a dynamic bridge between physical assets and their virtual counterparts through integrated, data-driven representations with synchronized, bidirectional interactions. When coupled with Model-Based Systems Engineering (MBSE), they revolutionize product development by enabling virtual testing, design validation, and comprehensive system lifecycle analysis across diverse industries from aerospace to healthcare. Despite their transformative potential—enhancing system resilience, accelerating development cycles, and modeling complex interactions—Digital Twins face significant research challenges including model fidelity, computational efficiency, data integration from heterogeneous sources, interoperability, cybersecurity, and standardization. Digital Twins are evolving beyond traditional systems engineering approaches that rely primarily on statistical parameter estimation to incorporate advanced artificial intelligence capabilities for model induction and abductive reasoning. This expansion enables more sophisticated system representations and predictive analytics while also opening new pathways for human-system collaboration. By integrating these AI advancements with human-centered design principles, Digital Twins can facilitate collaborative decision-making between engineers and intelligent systems throughout the product lifecycle, ultimately enhancing verification, validation, and adaptive response to emergent system behaviors. This special issue explores the intersection of Digital Twin technology and systems engineering processes. We invite cutting-edge research that addresses these challenges while advancing both theoretical foundations and practical applications. Contributions should focus on methodologies, tools, and case studies demonstrating how Digital Twins enhance the systems engineering lifecycle. By fostering dialogue between researchers and practitioners, we aim to shape the future direction of this rapidly evolving field.

**Key Topic Areas:**

- Integration of Digital Twins with Model-Based Systems Engineering (MBSE)
- Digital Twin reference architectures and frameworks for systems engineering
- Verification, validation, and uncertainty quantification for Digital Twin models
- Digital Twins for complex systems-of-systems and adaptive systems
- Multi-domain and multi-physics aspects of Digital Twins
- Digital Twins for system resilience, sustainability, and circular economy
- Case studies demonstrating Digital Twin in systems engineering
- Data integration and synchronization between physical systems and their Digital Twins
- Human-centered design and human-Digital Twin interaction models
- Novel application domains and methodological extensions of the Digital Twin paradigm

For information on paper submission, prospective authors should visit http://ieee-aess.org/OJSE. Manuscripts should be submitted using the manuscript submission web site for IEEE Open Journal of Systems Engineering at https://ieee.atyponrex.com/journal/ojse for peer review. Publication costs are $975 (USD) for a 10-page manuscript.

**Important Dates**

- Manuscript submission deadline: 15 July 2025
- First review completed: 15 August 2025

**Guest Editor**

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