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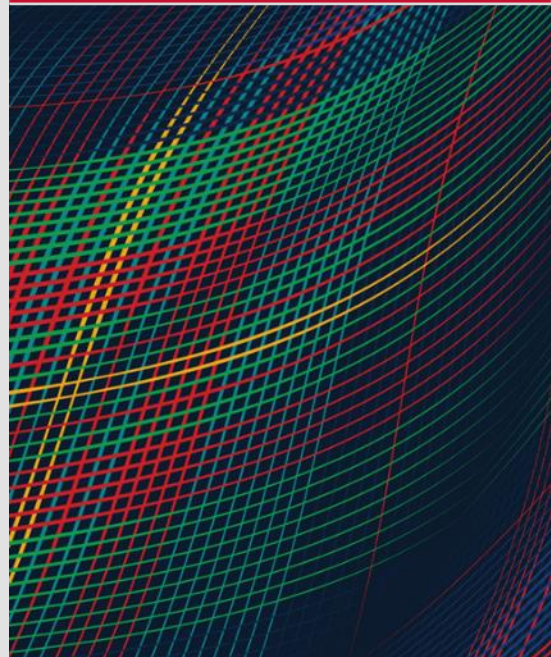

Systems and Software—a most needed synergy

OCTOBER 8, 2024

Paul D. Nielsen
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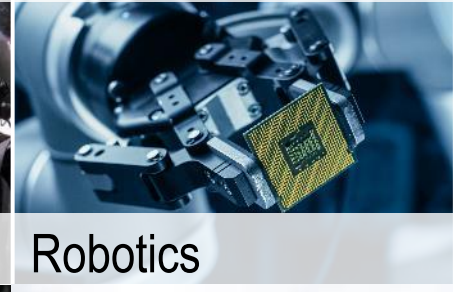
Widespread use of cyber-physical systems points out the need for synergy



Systems and software engineering have similar concerns . . .

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Shared Concerns

- Systems of Systems and Ultra-Large-Scale Systems
- Interfaces
- Interconnectedness
- V&V
- Requirements driven
- Configuration control
- Cost & schedule estimation and control
- Tradeoffs

Systems Engineering

- Architecture (hardware and software)
- System non-functional requirements

Software Engineering

- Software architecture
- Software quality attributes

. . . and different focuses

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Systems Engineering

- MBSE
- Longer dev/upgrade cycles
- Global optimization
- Cyber PHYSICAL Systems
- Plug and Play
- AI/ML issues and opportunities
- Sustainability
- Emergent behavior

Software Engineering

- MBSwE
- DevOps and CI/CD
- Local optimization
- CYBER Physical Systems
- Openness
- AI/ML issues and opportunities
- Cybersecurity
- Technical debt
- Formal methods
- Modularity
- Software-defined X