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Practical Verification and Validation (V&V) of System of Systems (SoS) Federations for the Future Combat System (FCS)

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Topics

1. Point of View
2. Theory vs. Reality
3. Definitions & Points
4. V&V Concepts
5. Tasks of Federation V&V
6. Scope
7. Layers of V&V
8. Standard & Metrics of V&V
9. Summary of the V&V Strategy



Point of View

- Look at objective (mitigating risk) instead of activities.
- Assumption: A proper V&V program will assure a suitable federation for a test event.
- Interpretation of old concepts.
- Auditing of V&V.



V&V: Theory vs Reality

- Theory
 - Well defined development process
 - V&V started before development
 - V&V team integrated into development process
 - V&V ensures right product built correctly
- Reality
 - Development process ill-defined
 - V&V is afterthought
 - V&V team small and on outside
 - V&V is an administrative exercise



Definitions & Points

- V&V
- Simulation vs. Software Application
- Federation (Capability & Event)



V&V Concepts

- Collecting Evidence
- V&V follows federation development
- V&V is continuous



Tasks of Event Federation V&V

- First
 - Identify sponsor, integrator, and user
 - Find objective of event & intended use of federation
 - Find what V&V is already happening
- Then
 - Confirm Requirements are appropriate
 - Confirm Design traces to requirements
 - Confirm Implementation uses best practices
 - Confirm federation works and is reliable



Scope

- Analogy: Buying a Car
- Start at top level
- Data Source Requirements
- Simulation over Software Applications
- Think out Assumptions to logical conclusions



Layered V&V

- Layers
 - Data
 - Simulations / Software Applications
 - Capability Federations
 - Event Federation
- Relationship
 - One of helpfulness (assist, advise, assess)
 - Not demand tasks not in contract



Standard & Metrics of V&V

- Standard
 - Sufficient Evidence of Proper V&V
- Metrics
 - Federation & developing organization identified
 - Federation Conceptual Model described
 - Federation assumptions & limitations are specified
 - Integration folks and V&V agents identified
 - SoS V&V methods are listed & described
 - The V&V results are summarized



Summary of V&V Strategy

- Tasks
 - Find event federation decision makers
 - Find event objective and intended use of the federation
 - Find who is doing V&V; build relationship
 - Confirm: Requirements harmonized, Design traceable, Implementation efficient, and Federation reliable
- Point of View
 - Keep eye on objective of V&V
 - Look at top level of event federation.
 - Concentrate on simulations as opposed to software applications
 - Collect evidence of V&V – not documents.
 - Build picture of V&V status (continuous process).
 - Ensure activities lead to reduction in risk (V&V objective).

