



Overview of VV&A Tools, Templates, and Other Resources

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The Need for VV&A

- Establishes credibility
- Reduces risk
- Enhances user confidence
 - improved system performance and reliability
 - more predictable and accurate behavior
- Complies with DoD Policy



The Need for VV&A Tools, Templates, & Other Resources

- Community perception that VV&A takes too long and costs too much
 - no “tried and true approach”
 - no way to know “how much is enough.”
- Need to develop “standardized automated tools to support VV&A” (DoD M&S Master Plan)
- The community is not exploiting existing technology as much as desired *and* has not given adequate attention to the benefits of tools and technologies (SIMVAL99)
- The community needs a comprehensive survey of tools and technologies *and* a central repository to document tool use or to serve as a resource (SIMVAL99)



Advantages of VV&A Tools, Templates, & Other Resources

- Allow us to do a better job
- Allow us to do more in less time
- Allow us to do our jobs at less expense
- Reduce risk in performing VV&A
- Allow better cost estimating and planning
- Allow better scheduling estimating and planning
- Eliminate “reinventing the wheel”
- Make our jobs easier.



Objective of this Session

**M&S Community
Needs**



VV&A Tools, Templates, & Other Resources

- **Assess the breadth of existing tools, templates, and other resources for VV&A and their applicability**
- **Identify gaps in coverage and/or quality**
- **Provide recommendations for the types of tools that will be needed in the future**



MSIAC State of the Art Reports

- **Verification, Validation, and Accreditation (VV&A) Automated Support Tools - A State of the Art Report Part 1 – Overview**

www.msiac.dmsso.mil/products/VVASOARPartI.pdf

- **Verification, Validation, and Accreditation (VV&A) Automated Support Tools - A State of the Art Report Part 2 – Details**

www.msiac.dmsso.mil/products/VVASOARPartII.pdf

**Verification, Validation, and Accreditation
(VV&A) Automated Support Tools**

**A State of the Art Report
Part 1 – Overview**

**Modeling and Simulation Information Analysis
Center (MSIAC)**

December 15, 2000

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**Verification, Validation, and
Accreditation (VV&A) Automated
Support Tools**

**A State of the Art Report
Part 2 – Details**

**Modeling and Simulation Information Analysis
Center (MSIAC)**

July 13, 2001

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Approach

- **Leverage MSIAC State of the Art Reports and other studies**
- **Define taxonomies for describing VV&A tools, templates, and other resources**
- **Develop, distribute, collect, and analyze survey forms based on the taxonomies**
- **Assess the state of the art of VV&A tools, templates, and other resources**



Definitions

- ***Tools:*** software/hardware programs, routines, algorithms, etc., that can be used and reused to automate and support parts of the VV&A process
- ***Templates:*** written/automated standardized formats (“cookbooks”) that can be used to organize, record, and present material relevant to the VV&A process
- ***Resources:*** other sources that contain (or are knowledgeable concerning) references, toolsets, policies, and information documenting approaches to, and experience in, performing the VV&A process



What We Need To Know About Tools, Templates, & Resources

- Name
- Basic application (V., V., and/or A.)
- Simulation phases, environments, or aspects they cover
- Owner (sponsor)
- Developer
- Maintainer
- Users
- Use history
- Training provider
- Cost
- Provider
- Proprietary status
- Use considerations: host computer, disk space/RAM, operating system, source code language, etc.



Tool Types

- **Resources (a type in MSIAC reports)**
- **Documentation tools**
- **Development environments**
- **Supporting tools**
- **Verification tools**
- **Configuration management tools**
- **Costing tools**
- **Others**



Template Types

- **Verification plan templates**
- **Verification report templates**
- **Validation plan templates**
- **Validation report templates**
- **Credibility templates**
- **Data quality templates**
- **Accreditation plan templates**
- **Accreditation package templates**
- **Accreditation report templates**
- **Accreditation decision letter templates**



Other Resource Types

- **Repositories**
- **Websites**
- **Reflectors**
- **Organizations**
- **Conferences**
- **Conference proceedings**
- **Papers/reports**
- **Bibliographies**
- **Subject matter experts**



Issues: Stressing Trends - 1

- **Distributed M&S systems**
 - development of automated VV&A tools that can act across simulation components
 - understanding the behavior of all the components in a distributed exercise individually is not sufficient for understanding the behavior of the system as a whole.
- **High fidelity distributed simulations**
 - development of specialized “simulation instrumentation” tools to assure credibility in analysis, training, acquisition, and experimentation



Issues: Stressing Trends - 2

- **Advanced modeling techniques such as neural networks and genetic programs**
 - **development of automated VV&A tools that can be effective when applied to “black boxes” that normally inhibit understanding of their inner workings**
 - **also applies to:**
 - **COTS products**
 - **inherited objects with encapsulated mechanisms (in object-oriented systems)**
 - **components with differing security classifications**



Issues: Additional Needs

- **M&S VV&A tools (vice software V&V tools)**
- **Visualization tools supporting VV&A**
- **VV&A tools supporting feedback from system development**
- **VV&A tools for direct quantitative assurance**



Issues: Standards

- ***Should there be standards for VV&A tools, templates, and other resources?***
 - what are the advantages and disadvantages?
 - who would set the standards?
 - who would enforce the standards?
 - who would pay to operate the standards group?



Issues: Planning

- ***Should there be a central planning function for VV&A tools, templates, and other resources (including processes for identifying gaps in tools, etc.)?***
 - **who would evaluate the gaps?**
 - **who would decide how these gaps would be filled and by whom?**
 - **who would pay to operate the planning function?**



Issues: Repository

- ***Should there be a repository for VV&A tools, templates, and other resources?***
 - who hosts it?
 - who populates it?
 - who pays to populate it?
 - who maintains it?
 - who has access to it?
 - who develops the taxonomy for it?
 - what exactly does it contain (metadata and/or actual tools, templates, etc.)?
 - what is its relationship to the MSRR and/or other repositories?



Summary Conclusions

- **Tools, template, and other resources are needed for supporting VV&A**
- **There are already many tools that can be adopted or adapted to support VV&A**
- **The software industry leads the M&S community in developing and applying automated tools**
- **Ongoing M&S trends will increase the difficulties for VV&A**



Summary Recommendations

- **Develop more tools, templates, and other resources for VV&A**
- **Adopt or adapt tools from the software industry**
- **Make better use of visualization tools**
- **Develop new types of automated support tools for VV&A**
- **Establish a central repository of automated support tools for VV&A**



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