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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This report presents detailed analyses and recommendations from a project conducted by the Modeling and Simulation Information Analysis Center (MSIAC) to determine the state of the art in automated tools that can be used to support the verification, validation, and accreditation (VV&A) of simulations and federations. This paper briefly reviews the background of the project, the survey methodology, and survey questions; presents the categories developed for analyzing the tools and detailed analyses of these tools by category; and offers selected conclusions. This report is a follow-on to "Verification, Validation, and Accreditation (VV&A) Automated Support Tools: A State of the Art Report - Part 1 – Overview".

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E. EXECUTIVE SUMMARY

E.1 Purpose of this State of the Art Report

This Modeling and Simulation Information Analysis Center (MSIAC) State of the Art Report, divided into two parts, provides a compendium and an analysis of COTS, GOTS, and developmental automated tools that can be applied to the verification, validation, and accreditation (VV&A) of individual models and simulations (M&S) or of systems of models and simulations. The MSIAC sponsored this project so that members of the Department of Defense (DoD) M&S community can leverage existing knowledge and capabilities, avoid duplication of effort in the conduct of VV&A, and enable efficient search and discovery of leading-edge efforts. The primary audience of this report is the M&S community within the DoD; that is, those people and organizations directly responsible for the development and application of models and simulations to military operations and systems.

This report, "Part 2 – Details" of the state of the art report, briefly reviews the background of the project, the survey methodology, and survey questions; presents the categories developed for analyzing the tools; detailed analyses of these tools by category; and offers selected conclusions. This report also provides a detailed and cross-referenced compendium of VV&A automated support tools along with points of contact for obtaining additional information about these tools. "Part 1 – Overview," issued previously, discusses the needs and challenges facing VV&A; includes an assessment of the breadth of existing tools for VV&A and their applicability; identifies gaps in coverage and/or quality; recommends the types of tools that will be needed in the future; and discusses special topics that illuminate the needs for these tools.

E.2 The Need for Automated Support Tools

Summarizing the conclusions from "Part 1 – Overview," we note that:

- M&S is vital to the development and operation of military and commercial systems.
- Investments in M&S are justified only when M&S is credible.
- VV&A is the path to proving credibility.
- VV&A is perceived to be too difficult; it costs too much, takes too long, and is too hard to apply.
- Automated support tools can alleviate some of the difficulties in applying VV&A.

E.3 Project Approach and Process

Responding to the recognized community need, the MSIAC sponsored this assessment of automated tools that can be used to support VV&A. The MSIAC's overall approach included producing a taxonomy for describing and defining automated support tools for VV&A, developing a tools survey form using the taxonomy as a basis, creating a list of "targets" for receiving the survey, distributing the survey, collecting and analyzing the completed surveys, and crafting conclusions.

The report taxonomy and tools survey form are based on those used for SIMVAL99 but modified with the addition of top-level categories for application (verification, validation, or accreditation), sponsor, applicability to distributed systems, and cost. Survey targets were developed by identifying specific VV&A-focused organizations and other government and commercial organizations that might use VV&A or create automated support tools, and by using several group e-mail lists and e-mail reflectors within the M&S community. The survey of U.S. Government agencies (DoD and civilian), academia, and industry to collect information describing tools was conducted in the last quarter of calendar year 2000. Responses were analyzed and the results were incorporated into this report and "Part 1 – Overview" of the state of the art report.

The MSIAC collected information about more than 140 tools in this project. Developers of 51 of these tools completed the full survey form that is included in the report.

E.4 Summary Assessment of VV&A Automated Support Tools

This state of the art report provides an overall assessment of the quality of various types of automated support tools for VV&A, but does not attempt to evaluate the capabilities of individual tools, determine their suitability for particular applications, or make specific recommendations. The survey forms were completed in their entirety by the developers or distributors of the respective tools. The responsibility for determining actual suitability of these tools for any particular VV&A task rests with their potential users. Since not all automated support tools could be identified and since new tools are constantly being developed, the omission of a tool from this report does not imply that it is unsuitable for applications to VV&A.

Conclusions resulting from the detailed analysis of the VV&A automated support tools include:

- The M&S and software communities have developed many automated tools that can be used to support the verification and accreditation of models and simulations.
- These tools collectively satisfy many of the current functions for supporting VV&A.
- These tools need wider dissemination and they require proper use.
- No single tool satisfies all of the functions for supporting verification.
- No single tool satisfies all of the functions for supporting accreditation.
- The scope of automated tools that support validation is limited.

The development of validation support tools is complicated by an insufficient understanding of exactly what constitutes complete validation of a simulation. Currently, visualization tools and statistical analysis packages can be applied to validation, but purpose-built automated validation tools will not be satisfactory until such an understanding is achieved. There are also insufficient tools available for validation of conceptual models, although some modeling tools might be useful for creating and exploring these models.

Planning and documentation aids are applicable to all types of simulations and tend to be independent of development environment. CASE tools tend to be specialized to particular development environments. These development environment restrictions may be significant for the simulation developer who may need to select a particular tool or modify the development process, but are less important to the planner and policymaker. CASE tools, as a class, are limited in their ability to support closed-form and human/system/hardware-in-the-loop simulations relative to other types of simulations. This is not surprising since CASE tools are not typically intended for such simulations.

1. INTRODUCTION / BACKGROUND

This report presents detailed analysis and conclusions from a project conducted by the Modeling and Simulation Information Analysis Center (MSIAC) to determine the state of the art in automated tools that can be used to support the verification, validation, and accreditation (VV&A) of models and simulations (M&S). The MSIAC is a Department of Defense (DoD) Information Analysis Center (sponsored by the Defense Technical Information Center and the Defense Modeling and Simulation Office) chartered to be a single, integrated support activity for the use, employment, and sustainment of M&S. An overview of this project was presented in "Part 1 – Overview" of this state of the art report [Ref. A]. This "Part 2 – Details" also briefly reviews the background of the project, the need for VV&A automated support tools, the survey methodology, and some top-level conclusions. Finally, this report provides a detailed and cross-referenced compendium of VV&A automated support tools along with points of contact for obtaining additional information about these tools.

1.1 VV&A and the MSIAC

VV&A is a collection of processes that apply incremental reviews, analyses, evaluations, and tests to M&S products for the purpose of establishing M&S credibility and reducing risk to the user. These processes provide many benefits to the M&S community including enhanced user confidence, improved system performance and reliability, and more predictable and accurate M&S behavior. Under current DoD policy, all models and simulations used within the DoD must undergo VV&A.

Responding to a recognized community need, the MSIAC sponsored an assessment of automated tools that can be used to support VV&A. In the last quarter of calendar year 2000, the MSIAC surveyed U.S. Government agencies (DoD and civilian), academia, and industry to collect information describing tools that can be applied to the VV&A of individual M&S or systems of M&S. Responses were analyzed and the results were incorporated into this report and "Part 1 – Overview" of the state of the art report. These reports together provide an assessment of the breadth of existing tools for VV&A and their applicability, an identification of gaps in coverage and/or quality, recommendations for the types of tools that will be needed in the future, and discussions of special topics that illuminate the needs for these tools.

The MSIAC sponsored this project so that members of the DoD M&S community can leverage existing knowledge and capabilities, avoid duplication of effort in the conduct of VV&A, and enable efficient search and discovery of leading-edge efforts. The primary audience of this report is the M&S community within the Department of Defense (DoD); that is, those people and organizations directly responsible for the development and application of models and simulations to military operations and systems.

1.2 The Need for VV&A, Automated Support Tools for VV&A, and This State of the Art Report

Currently, VV&A is perceived as taking too long and costing too much. One method for reducing VV&A cost and schedule is to develop and apply automated support tools. The software development community is already well established along this path [Ref. B]. The DoD M&S Master Plan [Ref. C], in sub-objective 5-2 (3), notes the need to develop "standardized automated tools to support VV&A." Moreover, as noted at the SIMVAL99 Conference [Ref. D] sponsored by the Military Operations Research Society:

- "It appears that the VV&A community is not exploiting existing technology as much as desired.
- M&S management and VV&A practitioners *as a whole* are woefully unaware of existing tools and technologies that could be used to support VV&A.
- The VV&A community has focused primarily to date on defining terminology and developing methodologies and processes, and has not given adequate attention to the potential benefits of tools and technologies.
- ... the lack of a comprehensive survey of tools and technologies available to support the education of the VV&A community or the use of these resources in DoD and elsewhere.
- No central repository exists to document VV&A tool use or to serve as a resource for future applications of VV&A tools and technologies."

The objective of the MSIAC state of the art report is to solve many of the problems noted above.

1.3 Tool Functions

Desirable functions for tools supporting verification include, but are not limited to, the ability to:

- define requirements,
- trace requirements,
- document software,
- plan software tests,
- test software,
- analyze software tests,
- perform configuration management,
- create audit trails, and
- distill and present information to accreditation authorities in the appropriate formats.

Desirable functions for tools supporting validation include, but are not limited to, the ability to compare simulation results to real world values in a meaningful manner that provides confidence in the simulation throughout its range of applicability.

Desirable functions for tools supporting accreditation include, but are not limited to, the ability to:

- identify the information needed,
- determine if this information has been obtained, and
- acquire the information.

1.4 Project Approach and Process

For determining the state of the art in automated support tools for VV&A, the MSIAC's approach included:

- producing a taxonomy for describing and defining automated support tools for VV&A, developing a tools survey form using the taxonomy as a basis,
- creating a list of "targets" for receiving the survey,
- distributing the survey,
- collecting and analyzing the completed surveys, and
- crafting conclusions.

Details of the approach are provided in "Part 1 – Overview" of the report.

The report taxonomy is based on that used for the SIMVAL99 M&S VV&A Tool Survey but modified with the addition of top-level categories for application (verification, validation, or accreditation), sponsor, applicability to distributed systems, and cost. The full taxonomy is provided in "Part 1 – Overview."

Several different methods were used to develop survey targets including:

- identifying specific VV&A-focused organizations and points of contact,
- developing a list of other government and commercial organizations that might use VV&A or create automated support tools and points of contact, and
- broadcasting notifications of the survey via several group e-mail lists and e-mail reflectors within the M&S community, including the Simulation Interoperability Standards Organization (SISO) VV&A reflector.

The MSIAC collected information about more than 140 tools in this project. A total of 29 government tools, 94 commercial tools, and 3 tools with mixed sponsorship were selected for more detailed analysis. Developers of 51 of these tools completed the full survey form that is included in the report (Appendix A-4).

To efficiently analyze the returned survey forms and to assess the VV&A automated support tools, the MSIAC developed a new category in the taxonomy, the *tool type*. These types correspond directly to the eight primary functions that seem to categorize the uses of the tools within the M&S community. These tool types form the basic structure of Chapter 4 of this report which contains a synopsis of each tool and an assessment of the state of the art in that respective tool type category. The eight tool types are as follows:

- resources
- documentation tools
- development environments
- supporting tools
- verification tools
- configuration management tools
- costing tools
- others

The goal of the survey and this project was to develop an overall assessment of the quality of tools for each tool type. This report refrains from critiquing individual tools.

Efforts were concluded by comparing the VV&A automated support tools across these various tool type categories and by producing recommendations for future research and development investments.

1.5 Scope

This state of the art report provides an overall assessment of the quality of various types of automated support tools for VV&A, but does not attempt to evaluate the capabilities of individual tools or to determine their suitability for particular applications. The set of automated support tools for VV&A presented in this report is not (and could never be) complete. However, the MSIAC has tried to produce one of the most comprehensive lists of these tools to date and believe that the tools included are representative of what exists across the M&S community. That is, the various tools described in this report represent the relative quantity and quality of tools across the various tool type categories and that there is an adequate sample size in the set of responses to determine the overall state of the art of automated VV&A support tools today.

The survey forms were completed in their entirety by the developers or distributors of the respective tools, their contents were accepted as is without additional review by the MSIAC or its sponsors for accuracy, and their contents were not edited. The MSIAC does not recommend any individual tools but has determined only that these tools meet the definitions for inclusion in the report, that they are sufficiently mature to be considered, and that they are adequately described to be understood by the user of this report. The responsibility for determining actual suitability of these tools for any particular VV&A task rests with their potential users. For this purpose, the points of contact and use histories are provided in the survey responses. Since not all automated support tools could be identified, and since new tools are constantly being developed, the omission of a tool from this report does not imply that it is unsuitable for applications to VV&A.

Finally, the success of any survey of this kind is always limited by the willingness of organizations to share data as well as their personal availability to take the time to complete the survey.

1.6 Report Structure

Chapter 2 of this report provides a detailed description of the VV&A Automated Support Tools Taxonomy that formed the basis of the survey which was developed. Chapter 2 also discusses the type categories of the tools developed after the survey responses were analyzed.

Chapter 3 provides an overall discussion of the survey responses together with tables and selected cross reference tables.

Chapter 4 provides a summary, by tool type, of the VV&A automated support tools for which completed surveys were received.

Chapter 5 provides conclusions from the detailed analysis of the tools.

Appendix A-1 provides a master table of all of the survey responses that were received, organized by tool name, together with the corresponding tool coding number assigned in this report.

Appendix A-2 provides a master table of all of the survey responses that were received organized by the tool coding numbers assigned in this report.

Appendix A-3 provides a table of points of contact for the surveyed tools.

Appendix A-4 provides the full and complete survey responses for the VV&A automated support tools.

Appendix A-5 provides a copy of the "raw" survey form which was used to solicit information on automated support tools for VV&A.

Appendix A-6 provides a set of VV&A references

Appendix A-7 provides a summary description of the MSIAC.

2. VV&A AUTOMATED SUPPORT TOOLS: TAXONOMY AND TYPES

This chapter reviews the taxonomy used in this project for VV&A automated support tools and presents the additional taxonomy category called tool type. Details of the taxonomy can be found in "Part 1 – Overview" of this report [Ref. A] and details of the tool type can be found in Section 4.

2.1 Taxonomy

The full taxonomy used by the MSIAC for classifying VV&A tools and techniques is:

- Tool Application (verification, validation, accreditation)
- Sponsor (OSD, Joint, Service, DoD Agency, Government/non-DoD, Academic, Commercial)
- Applicability to Distributed Systems (yes, no)
- Cost (low, medium, high)
- Simulation Phases (planning, requirements, conceptual modeling, design, implementation, etc.)
- Simulation Environments (simulation type, development environment, software language)
- Simulation Aspects (architecture, data, system/component interfaces, algorithms, etc.)
- Tool Static / Dynamic / Formal
- Tool Use Considerations (host computer, disk space/RAM, operating system, network, VV&A status of the tool, etc.)
- Training (training length, training availability)
- Additional Tool Information (software language, classification, distribution limitations, sponsor/owner, developer, etc.)
- Previous Users and Uses (name, organization, phone number, email, use of tool)

2.2 Tool Types

Upon initial analysis of the survey responses, the MSIAC decided to introduce the additional category of *tool type* to represent the function of the VV&A automated support tools. These tool types provide useful categories for analysis based on the specific applications of the tools. The types are:

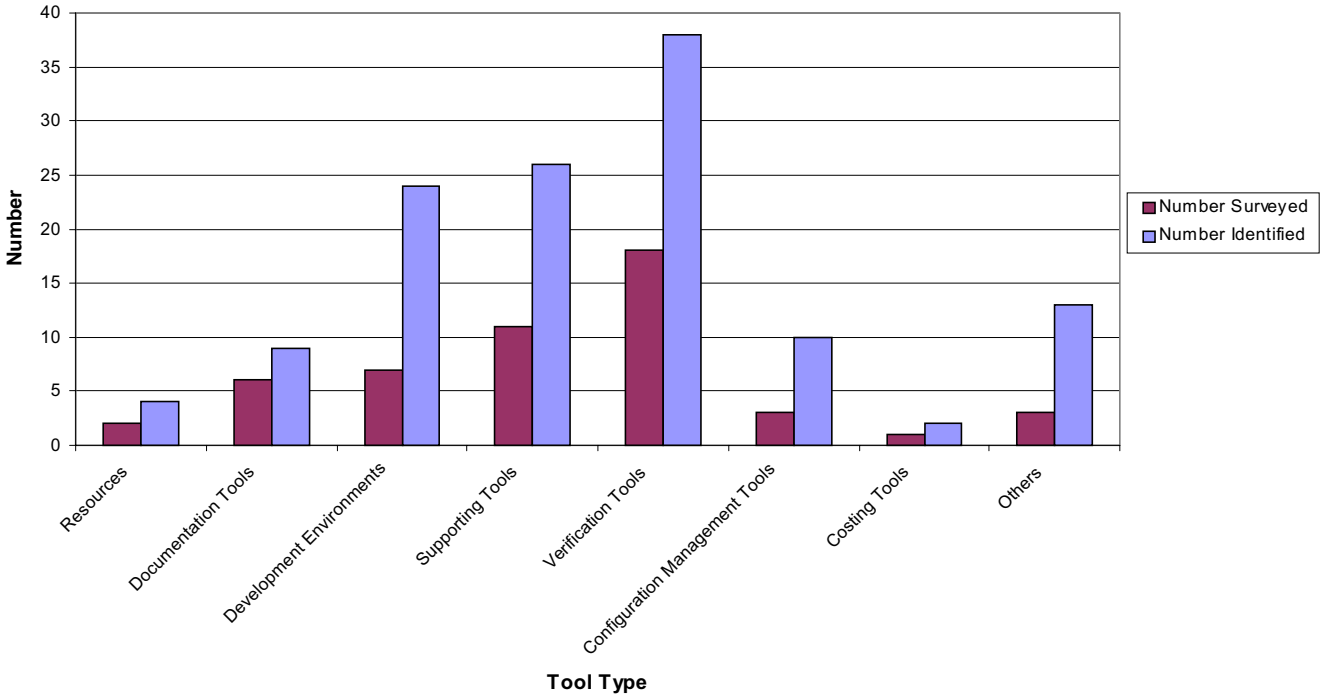
- *Resources* consisting of websites and repositories that contain references, toolsets, policies, and information that can be valuable to the planners and users of VV&A.
- *Documentation tools* including planning and documentation aids, and software documentation tools.
- *Development environments* including software development environments, modeling tools and simulation development environments, and federation development tools.
- *Supporting tools* including visualization tools, and mathematics and statistics packages.

- *Verification tools* including requirements management, specification, and tracing tools; automated testing/measurement/debugging tools; simulation testing tools; and coding standards enforcement tools.
- *Configuration management tools* used to monitor, track, and control changes to software.
- *Software costing tools* used to estimate the development costs of software systems, including verification and validation systems.
- *Other tools* including compilation tools, reliability evaluation tools, database checker and design tools, optimizers for simulation inputs, floating point error analysis tools, software analysis tools, and error collection and analysis tools.

3. SURVEY RESPONSES

The number of survey responses received and the number of tools identified are displayed, by category, in the accompanying figure 1.

Figure 1: Number of Tools Surveyed and Identified By Tool Type



The following tables list the complete set of automated support tools for VV&A that were identified and/or surveyed in this MSIAC project. These tables enable users of this report to quickly access the descriptions of tools that meet their needs. Three cross-reference tables of the survey responses are also provided. These permit the users of this report to find all tools characterized by several important combinations of taxonomy dimensions.

A labeling scheme (tool number) was developed to enable the various survey responses to be referenced by a shorthand notation rather than by their full titles. This label is then used in each of the various cross-reference tables which follow, for ease of use.

3.1 Table of Tools With Complete Survey Responses

The first table lists those tools for which the MSIAC obtained a complete survey response.

VV&A Automated Support Tools *Surveyed*					
Tool #	**Name of Tool**	**Phase**	**Developer**	**Sponsor**	**Description**
1	Accreditation Assessment Assistant	All	Joint Accreditation Support Activity (JASA)	Joint Technical Coordinating Group on Aircraft Survivability (JTCG/AS)	Computer-based tool to guide VVA process from an accreditation standpoint
5	Analyst-Pro	Verification	Goda Software, Inc.	None/COTS	Requirements management, specification, and tracing tool
7	Artisan Real Time Studio	All	Artisan Software, Inc.	None/COTS	Modeling tool suite with UML plus real time extensions
9	Automated Requirements Measurement Tool	Verification	NASA Goddard Software Assurance Technology Center	NASA	Aid to writing requirements correctly early in life cycle
11	Axum 6.0	All	MathSoft, Inc.	None/COTS	Drawing package
15	C++test, TCA, INUSE, Jtest, insure++, WebKing	Verification	ParaSoft	None/COTS	Set of tools for memory allocation, and testing of C++ and/or/Java
16	Caliber-RBT	Verification	Technology Builders, Inc.	None/COTS	Requirements based testing design tool
17	Caliber-RM	Verification	Technology Builders, Inc.	None/COTS	Requirements management tool
18	C-Cover	Verification	Bullseye Testing Technology	None/COTS	C/C++ code testing coverage analysis tool
136	CodeWizard	Verification	ParaSoft	None/COTS	Tool for standards enforcement
19	CodeWright	Verification	Starbase Corp	None/COTS	Software development environment

22	CostModeler 1.0	All	NASA	NASA, many for COCOMO	Platform for development testing and application of software cost estimating models
23	Data Verification Interactive Editor (DAVIE)	Validation	DMSO Data Engineering	DMSO	Database or data file checker
24	Design Analysis Kit for Optimization (DAKOTA)	Verification Validation	Sandia National Laboratory (Optimization and Uncertainty Estimation Department)	Sandia National Laboratory	Toolkit to combine simulation codes with iterative methods to execute in a variety of conditions
27	Distributed Object Oriented Requirements Software (DOORS) DOORSnet	Verification	QSS Inc. (now Telelogic)	None/COTS	Requirements management and tracing tool
30	DON VVA Turbo Tool	All	IITRI ABTech Group	Navy NAVMSMO	Tool to produce standardized VVA plans and reports
34	EnSight, EnSight Gold, EnLiten, EnVideo	All	Computational Engineering, Inc.	None/COTS	Engineering and scientific visualization; is web and video enabled
36	Evaluation Environment™	All	Orca Computer, Inc.	Navy NSWCDD	Tool for conducting evaluation projects
39	Ferret	Verification	Azor, Inc.	None/COTS	Automated software testing tool
41	Genitor Object Construction Suite	Verification	Starbase Corp	None/COTS	Tools to construct, document, and reuse C++ objects
57	JASA Library of Accreditation Information (JASA)	Accreditation	Joint Accreditation Support Activity	Joint Technical Coordinating Group on Aircraft Survivability (JTCG/AS)	Descriptions of different models including problems and validation history for accreditation use; other VVA process documentation

58	JWARS V&V Database	Verification Validation	BMH Associates	JWARS Program	Database of information required by V&V agent
59	Khoros Pro 2001	Verification	Khoral, Inc.	COTS with some DARPA & AFRL	Integrated image and signal processing development environment
61	Mak Plan View Display	All	Mak Technologies, Inc.	None/COTS	2D Simulation viewer for HLA/DIS including C++ plugin
62	Mak Stealth	All	Mak Technologies, Inc.	None/COTS	3D Simulation viewer for HLA/DIS
64	MathCad	All	MathSoft, Inc.	None/COTS	General mathematics and graphics package
66	Matlab and Simulink(R)	All	The MathWorks, Inc.	None/COTS	General mathematics and display package with tools to model, simulate, and analyze dynamic systems
68	McCabe Test	Verification	McCabe & Associates	None/COTS	Automated testing tool
74	NASA/JPL WebWinds	All	NASA Jet Propulsion Laboratory (JPL)	NASA	Interactive scientific data visualization in JAVA
75	NeumaCM+	Verification Accreditation	Neuma Technology, Inc.	None/COTS	System development management tool, including configuration management, test suite management, problem tracking, and requirements tracing
77	OneSAF Testbed Baseline Plan View Display	All	US Army STRICOM	STRICOM	Simulation viewer (and GUI) for OneSAF
81	Perforce	Verification	Perforce Software, Inc.	None/COTS	Configuration management tool
85	Pro Sim 6.0	Verification	Knowledge Based Systems, Inc.	None/COTS	Process modeling, design, and knowledge capture tools

95	SAS System	All	SAS Institute, Inc.	None/COTS	Statistics, data retrieval, quality control, software performance evaluation, and data visualization package
98	Simdicator™ Toolkit	All	Litton/PRC	None/COTS	Distributed/high fidelity support, analysis, and reporting infrastructure
100	SLATE	Verification Accreditation	SDRC	None/COTS	Requirements tracing and documentation tool
102	SNIFF+	Verification	Wind River Systems, Inc	None/COTS	Software reference and analysis tool
105	SpyWright	Verification	Starbase Corp	None/COTS	Debugging tool, shows connectivity between application and source code for Windows C++ code
108	Statgraphics Plus	All	Manugistics, Inc.	None/COTS	Statistics and graphics package
109	Statistica	All	Statsoft	None/COTS	Statistics package with graphics
110	Surveyor	Verification Accreditation	Starbase Corp	None/COTS	Documentation and organization tool
113	Temporal Rover	Verification	Time Rover, Inc.	None/COTS	Specification-based verification tool for automatic verification of protocols and reactive systems
114	Temporal Verification Framework	Verification Validation	Arizona Center for Integrative M&S	Technical and Scientific Research Council of Turkey, and Arizona Center for Integrative Modeling and Simulation	Verification and validation tool for simulations and HLA federations; uses "temporal logic"

119	V&V Managers Toolkit	All	US Army Developmental Test Command and Training and Doctrine Command (TRADOC)	Army	Automated tool to guide M&S development
121	VectorCast/C VectorCast/ADA	Verification	Vector Software, Inc	None/COTS	Software testing tools for C/C++ and ADA
122	Vega	All	MultiGen-Paradigm, Inc.	None/COTS	Software development environment for simulations
124	Vermont HighTest Plus 3.2.1	Verification	Vermont Creative Software	None/COTS	Regression testing tool for Windows applications
125	Vertical Sky Solution 3.1	Verification Accreditation	Vertical Sky	None/COTS	Configuration management tools for software and web development
128	Visualization Tool Kit	All	Kitware, Inc.	None/COTS	Open source 3D visualization library
129	VVA Cost Estimating Tool (VVACET)	All	Tecmasters	Army	Parametric cost estimating tool for VVA
130	XTie-RT	Verification	Teledyne Brown Engineering	None/COTS	Requirements management and tracing tool

3.2 Table of Tools Identified But Without Survey Responses

The second table lists those tools which were identified as being relevant to VV&A but for which the MSIAC received no survey response.

VV&A Automated Support Tools *Identified*					
Tool #	**Name of Tool**	**Phase**	**Developer**	**Sponsor**	**Description**
2	Accreditation Support Site	Accreditation	S3I	AF Studies and Analyses Agency	Site to support accreditation of models
3	AD/Advantage	Verification	Cincom Systems, Inc.	None/COTS	Software development environment
4	Advanced Continuous Simulation Language (ACSL)	All	AEgis Technologies Group, Inc.	DMSO	Simulation development environment
8	Authoritative Data Source Library PC Version	Accreditation	DMSO	DMSO	Library of data sources including information about approved purposes
10	AVS Express	All	Advanced Visual Systems	None/COTS	General-purpose visualization package
13	BMDP	Validation	Statistical Solutions	None/COTS	Statistics package
14	BridgePoint Modeling Tools	All	Project Technology, Inc	None/COTS	Model development tools
21	COOL	Verification	Computer Associates	None/COTS	Software development environment
25	Design Point Model Compiler	All	Project Technology, Inc	None/COTS	Model compiler with development tools
26	DevPartner Studio	Verification	Compuware NuMega	None/COTS	Debugging, profiling, error checking, requirements management, and testing tool

28	Distributed Simulation Interface Framework (DSIF)	Verification	Georgia Tech Research Institute (GTRI)	DMSO	Software development tool for distributed simulations
29	Doc Express	Accreditation	ATA, Inc.	None/COTS	Automated documentation generation tool suite
31	EDGE Viewer	All	Autometric, Inc.	COTS product may have some Government involvement	Visualization tool
32	EFFTool	Verification	National Institute of Standards and Technology (NIST)	NIST	Error collection and analysis software
33	Endevor Workstation and other Endevor products	Verification Accreditation	Computer Associates	None/COTS	Configuration management tools
35	ERwin	Verification	Computer Associates	None/COTS	Database design tool
134	eValid	Verification	eValid, Inc.	None/COTS	Test enabled browser technology
37	Fault Determination Measurement System	Verification	Cylant Technology, Inc.	None/COTS	Software metrics package
38	Federation Verification Tool (FVT)	Verification	Georgia Tech Research Institute (GTRI)	DMSO	Works through HLA to monitor behavior of federation
40	Forte' Products	Verification	Sun Microsystems	None/COTS	Software development environment
42	Genstat	Validation	NAG, Inc.	None/COTS	Statistics and data visualization package
43	GLIM	Validation	NAG, Inc.	None/COTS	Statistics package
44	Hindsight	Verification Accreditation	IntegriSoft, Inc.	None/COTS	Testing, documentation, metrics, and code analyzer

133	HLA Control	Verification Accreditation	Virtual Technology Corporation	None/COTS	Federation planning, execution, and performance analysis tool
45	HLA Lab Works Suite of Tools	Verification Accreditation	AEgis Technologies Group, Inc.	DMSO	Federation development tool to create HLA compliant federations.
132	HLA Results	Verification Accreditation	Virtual Technology Corporation	None/COTS	Federation data collection, playback, and analysis system
48	IBM Open Visualization Data Explorer	All	IBM	None/COTS	General-purpose data visualization package
49	IDEF	Verification	Knowledge Based Systems, Inc.	Government Standard Page maintained commercially	Requirements development, process, information and data modeling language
50	Imagix 4D	Accreditation	Imagix Corporation	None/COTS	Software documentation tool
52	Interval Arithmetic	Validation	Sun	COTS	Useful for treating roundoff error and observational uncertainty
53	IRIS Explorer	All	NAG, Inc.	None/COTS	Visualization system and application builder
54	ISE Eiffel	Verification	Integrated Software Engineering	None/COTS	Software development environment
55	ITrace SE	Verification	ITrace LLC	None/COTS	Requirements traceability and management and testing tool
56	IV&V Effort Estimator	Verification Validation	AverStar formerly Intermetrics	NASA	Planning/costing tool
63	Maple	All	Waterloo Maple, Inc.	None/COTS	General computational and plotting software
65	Mathematica	All	Wolfram Research, Inc.	None/COTS	Mathematical toolkit with graphics; as much a programming language as a toolkit

69	Metamata Development Environment	Verification	Metamata, Inc.	None/COTS	Development environment for Java including metrics
135	Microsoft Access 2000	All	Microsoft	None/COTS	Database development tool
70	Minitab	All	Minitab, Inc.	None/COTS	Statistical and graphical analysis
71	ModelMart	All	Computer Associates	None/COTS	Model management tool and collaborative development environment
72	ModIOS 3D Stealth Viewer	All	Motorola Corp.	None/COTS	Simulation viewer for HLA/DIS
73	Monte Carlo Arithmetic	Validation	UCLA	Not Known	Error analysis for floating point arithmetic
78	Openmake	Verification	Catalyst Systems Corporation	None/COTS	Tool for standardizing software builds
79	Panorama 2	Verification	International Software Automation, Inc.	None/COTS	Software testing and defect tracing tool
80	PerfMETRICS	Verification	BMH Associates	Multiple programs	Runtime performance data collector for distributed simulations
82	PEST	Verification	National Institute of Standards and Technology	NIST	Program with known bugs to test automated testing tools
83	Platinum CCC/Harvest	Verification Accreditation	Computer Associates International	None/COTS	Configuration management tool
84	PREDICT	All	Los Alamos National Laboratory	Department of Energy	Reliability evaluation tool
86	PVCS	Verification Accreditation	Merant	None/COTS	Configuration management tool
87	PV-WAVE	All	Visual Numerics, Inc.	None/COTS	General mathematics and display package
88	QACenter	Verification	Compuware, Inc.	None/COTS	Software requirements tracing and testing toolset

89	Rational Suite	Verification	Rational Software, Inc.	None/COTS	Software development environment with design, development, test, and analysis features
90	Razor	Verification Accreditation	Visible Systems Corporation	None/COTS	Configuration management tool
91	RDD-100	Verification	Ascent Logic	None/COTS	Requirements tracing tool
92	Reactor	Verification	Critical Mass, Inc.	None/COTS	Software development environment
93	RTM	Verification	Integrated Chipware,Inc.	None/COTS	Requirements traceability and management
94	Sablime	Verification Accreditation	Lucent Technologies	None/COTS	Configuration management tool
96	SENSE8	All	Engineering Animation, Inc.	None/COTS	3D visual simulation development environment
97	Silk Product Family	Verification	Segue, Inc.	None/COTS	Testing, usage monitoring, modeling, and defect tracking tools
101	SLIM	Verification	Quantitative Software Management, Inc.	None/COTS	Software lifecycle management tool for estimating, tracking, and benchmarking
103	Software through Pictures	Verification	Aonix, Inc.	None/COTS	Software development environment
104	S-Plus	All	MathSoft, Inc.	None/COTS	Statistics and data visualization package
106	StarTeam	Verification Accreditation	Starbase Corp	None/COTS	Configuration management tool
107	STATA	All	Stata Corporation	None/COTS	Statistics and data visualization package
137	Symbolic Model Verifier	Verification Validation	Software Engineering Institute	Joint SEI Program Office	Finite state system model checking tool
111	Systat 10	All	SPSS Science	None/COTS	Statistics package with graphics

112	TARZAN	Validation	NASA	NASA	Monte Carlo technique with pruning for simulation testing over a parameter space
115	Test Center	Verification	Centerline Development Systems	None/COTS	C/C++ testing tool
116	TestWorks	Verification	Software Research, Inc.	None/COTS	Testing tool including metrics and coverage checking and debugging assistance
117	Understand Family, Source Publisher, QualGen, DocGen	Verification Accreditation	Scientific Toolworks, Inc.	None/COTS	Documentation and metrics tools
118	Unravel	Verification	National Institute of Standards and Technology (NIST)	NIST	Program to extract all statements relevant to a variable in source code
120	Validator/Req	Verification	Aonix, Inc.	None/COTS	Requirements development tool
126	Visible Advantage	Verification	Visible Systems Corporation	None/COTS	Software engineering and data warehouse development tools
131	VisualAge Smalltalk UML Designer	Validation	IBM	None/COTS	Modeling and requirements capture
127	Visual Source Safe 6.0	Verification Accreditation	Microsoft	None/COTS	Configuration management tool

3.3 Cross-Reference Tables

To facilitate the search and discovery of VV&A automated support tools surveyed in this report, this section provides three cross-reference tables. The tools are characterized in these tables by their specific features: a tool has a single type and a single sponsorship, but can have multiple uses.

The tool *sponsorship* categories are:

- Army
- Navy/Marine Corps
- Air Force
- other Department of Defense (for tools not funded by individual services)
- other government (for state agencies, non-DoD federal agencies, and foreign governments)
- commercial (for tools developed without government funding)
- mixed government/commercial (for tools that received some government funding during their initial stages of development, but have been authorized for public use and/or further developed, and are now available as COTS).

The tool *use* categories are:

- direct support of verification
- indirect support of verification
- direct support of validation
- indirect support of validation
- direct support of accreditation
- indirect support of accreditation.

Direct support refers to tools that directly assist the VV&A process, while indirect support refers to tools that produce results used within the VV&A process. Most tools are indirect support tools, but a tool providing any direct support is also considered a direct support tool.

The tool *type* categories are:

- resources
- documentation tools
- development environments
- supporting tools
- verification tools
- configuration management tools
- costing tools
- other tools.

These tables allow the reader to find tools cross referenced by:

- sponsor versus tool use
- tool use versus tool type
- sponsor versus tool type.

Sponsor Versus Tool Use: Cross Reference Table							
	Sponsor						
Use of Tool	**Army**	**Navy / Marines**	**Air Force**	**Other DoD**	**Other Govern-ment**	**Commercial**	**Mixed***
Direct Support of Verification	119	30, 36		38, 58, 80, 137	24, 32, 84, 114, 118	5, 15, 16, 17, 18, 27, 37, 39, 44, 55, 68, 79, 88, 91, 93, 95, 97, 100, 101, 105, 113, 115, 116, 121, 124, 130, 132, 133, 134	
Indirect Support of Verification	77, 129			1, 4, 28, 45	9, 22, 74, 82, 56	3, 7, 10, 11, 14, 19, 21, 25, 26, 33, 34, 35, 40, 41, 42, 48, 53, 54, 61, 62, 64, 65, 66, 70, 69, 71, 72, 75, 78, 81, 83, 85, 86, 87, 89, 90, 92, 94, 96, 98, 102, 103, 104, 106, 107, 108, 109, 110, 111, 117, 120, 122, 125, 126, 127, 128, 135, 136	31, 49, 59
Direct Support of Validation	119	30, 36		58	112, 114		
Indirect Support of Validation	77, 129			1, 4, 137	22, 23, 24, 56, 73, 74, 84	7, 10, 11, 13, 14, 25, 34, 42, 43, 48, 52, 53, 61, 62, 63, 64, 65, 66, 70, 71, 72, 87, 95, 96, 98, 104, 107, 108, 109, 111, 122, 128, 131, 135	31
Direct Support of Accreditation	119	30, 36	2	1, 57			
Indirect Support of Accreditation	77, 129			4, 8, 45	22, 74, 84	7, 10, 11, 14, 25, 29, 33, 34, 41, 42, 44, 48, 50, 53, 61, 62, 64, 65, 66, 70, 71, 72, 75, 81, 83, 86, 87, 90, 94, 95, 96, 98, 100, 104, 106, 107, 108, 109, 110, 111, 117, 122, 125, 127, 128, 132, 133, 135, 136	31

* Mixed means initial Government sponsorship followed by continued commercial development

Tool Use Versus Tool Type: Cross Reference Table						
	Use of Different Types of Tools					
Type of Tool	Direct Support of Verification	Indirect Support of Verification	Direct Support of Validation	Indirect Support of Validation	Direct Support of Accredi-tation	Indirect Support of Accredi-tation
RESOURCES						
Resources	58		58		2, 57	8
DOCUMENTATION TOOLS						
Planning / Documentation Aids	30, 36, 119	1, 129	30, 36, 119	1, 129	1, 30, 36, 119	129
Software Documentation Tools		110, 117				29, 50, 110, 117
DEVELOPMENT ENVIRONMENTS						
Software Development Environments		3, 19, 21, 26, 40, 41, 54, 59, 69, 89, 92, 103				41
Modeling Tools / Simulation Development Environments		4, 7, 14, 49, 71, 85, 96, 98, 122		4, 7, 14, 71, 96, 98, 122, 131		4, 7, 14, 71, 96, 98, 122
Federation Development Tools		28, 45				45
SUPPORTING TOOLS						
Visualization Tools		10, 11, 31, 34, 48, 53, 61, 62, 72, 74, 77, 128		10, 11, 31, 34, 48, 53, 61, 62, 72, 74, 77, 104, 128		10, 11, 31, 34, 48, 53, 61, 62, 72, 74, 77, 104, 128
Math and Statistics Packages		42, 64, 65, 66, 70, 87, 104, 107, 108, 109, 111		13, 42, 43, 63, 64, 65, 66, 70, 87, 107, 108, 109, 111		65, 66, 64, 42, 70, 87, 107, 108, 109, 111

VERIFICATION TOOLS						
Requirements Management, Specification, and Tracing Tools	5, 17, 27, 55, 91, 93, 100, 130	9, 120				100
Automated Testing / Measurement / Debugging Tools	15, 16, 18, 37, 39, 44, 68, 79, 88, 95, 97, 101, 105, 113, 115, 116, 121, 124, 134, 137	82		95, 137		44, 95
Simulation Testing Tools	38, 80, 114, 133, 132		112, 114			132, 133
Coding Standards Enforcement Tools		136				136
CONFIGURATION MANAGEMENT TOOLS						
Configuration Management Tools		33, 75, 81, 83, 86, 90, 94, 106, 125, 127				33, 75, 81, 83, 86, 90, 94, 106, 125, 127
SOFTWARE COSTING TOOLS						
Software Costing Tools		22, 56		22, 56		22
OTHERS						
Compilation Tools		25, 78		25		25
Reliability Evaluation Tools	84			84		84
Database Checkers / Design Tools		35, 135, 126		23, 135		135
Optimizers for Simulation Inputs	24			24		
Floating Point Error Analysis Tools				52, 73		
Software Analysis Tools	118	102				
Error Collection and Analysis Tools	32					

Sponsor Versus Tool Type: Cross Reference Table							
	Sponsorship of Different Types of Tools						
Type of Tool	Army	Navy / Marines	Air Force	Other DoD	Other Govern-ment	Commercial	Mixed*
RESOURCES							
Resources			2	8, 57, 58			
DOCUMENTATION TOOLS							
Planning / Documentation Aids	119, 129	30, 36		1			
Software Documentation Tools						29, 50, 110, 117	
DEVELOPMENT ENVIRONMENTS							
Software Development Environments						3, 19, 21, 26, 40, 41, 54, 69, 89, 92, 103	59
Modeling Tools / Simulation Development Environments				4		7, 14, 71, 85, 96, 98, 122, 131	49
Federation Development Tools				28, 45			
SUPPORTING TOOLS							
Visualization Tools	77				74	10, 11, 34, 48, 61, 62, 72, 128, 53	31
Math and Statistics Packages						13, 42, 43, 63, 64, 65, 66, 70, 87, 104, 107, 108, 109, 111	
VERIFICATION TOOLS							
Requirements Management, Specification, and Tracing Tools					9	5, 17, 27, 55, 91, 93, 100, 120, 130	
Automated Testing / Measurement / Debugging Tools				137	82	15, 16, 18, 37, 39, 44, 68, 79, 88, 95, 97, 101, 105, 113, 115, 116, 121, 124, 134	
Simulation Testing Tools				38, 80	112, 114	132, 133	

Coding Standards Enforcement Tools						136	
CONFIGURATION MANAGEMENT TOOLS							
Configuration Management Tools						33, 75, 81, 83, 86, 90, 94, 106, 125, 127	
SOFTWARE COSTING TOOLS							
Software Costing Tools					22, 56		
OTHERS							
Compilation Tools						25, 78	
Reliability Evaluation Tools					84		
Database Checkers / Design Tools				23		35, 126, 135	
Optimizers for Simulation Inputs					24		
Floating Point Error Analysis Tools					73	52	
Software Analysis Tools					118	102	
Error Collection and Analysis Tools					32		

* Mixed means initial Government sponsorship followed by continued commercial development

4. ANALYSIS BY TOOL TYPE

4.1 General Results

Of the tools reviewed, there are:
- 41 tools that directly support verification,
- 6 tools that directly support validation, and
- 5 tools that directly support accreditation.

The remaining tools indirectly support verification, validation, or accreditation.

Sponsorship of the surveyed tools can be characterized as follows:
- all of the tools that directly support validation are sponsored by the government.
- all of the tools that directly support accreditation are sponsored by the government.
- most of the tools that directly support verification are commercial automated testing packages.

Further:
- 6 tools have been sponsored exclusively by military services.
- 11 tools have been sponsored exclusively by other DoD components.
- 12 tools have been sponsored exclusively by non-DoD government organizations.
- The remaining tools have some degree of commercial sponsorship.

Further analysis indicates that:
- The government-sponsored tools are either directed towards specialized aspects of VV&A and/or specialized aspects of software development, or support the government's specialized VV&A process functions.
- The DoD-sponsored tools are VV&A oriented.
- The tools sponsored by other government agencies are oriented towards specialized aspects of software development, although some work has been done in the area of M&S validation.
- The commercial tools are oriented primarily towards general problems of software verification, software configuration management, requirements traceability, database development, and data representation and analysis, although some commercial tools specialized for M&S are available.

The remainder of this section provides detailed assessments of the tools organized by tool type.

4.2 Resources

Resources consist of websites and repositories that contain references, toolsets, policies, and information that can be valuable to the planners and users of VV&A.

Table of Resources	
Surveyed Items	**Other Identified Items**
JASA Library of Accreditation Information (57) JWARS V&V Database (58)	Accreditation Support Site (2) Authoritative Data Source Library PC Version (8)

Analysis: Surveys were received for 2 resources. Two additional resources were identified. All tools in this category have been developed with government funding. The precise information included depends on the purpose of the site. Some resources are specialized to one model or simulation, and other resources have information pertinent to multiple models. The specialized resources are not based on model-specific concepts and could be replicated for other models. The resources do not yet provide complete coverage of the information needed for VV&A of all models and simulations, but the technology for these resources has been demonstrated.

4.3 Documentation Tools

Documentation tools include (1) planning and documentation aids, and (2) software documentation tools.

Table of Documentation Tools		
Subcategory	**Surveyed Items**	**Other Identified Items**
Planning/Documentation Aids	Accreditation Assessment Assistant (1) DON VVA Turbo Tool (30) Evaluation Environment™ (36) V&V Manager's Toolkit (119) VVA Cost Estimating Tool (129)	
Software Documentation Tools	Surveyor (110)	Doc Express (29) Imagix 4D (50) Understand Family - Doc Gen (117)

Surveys were received for 6 tools falling in the "documentation" category. An additional 3 documentation tools were identified. All of these can be considered to be primarily "documentation" tools, although they may have some other functions.

4.3.1 Planning and Documentation Aids

Planning and documentation aids assist accreditation authorities or VV&A agents in performing their duties. The tools are used for purposes such as estimating the cost of the effort, determining what information is required for accreditation, and preparing reports in a specific format.

Analysis: Surveys were received for 5 planning/documentation aids out of 5 identified. All of these tools have been developed with government support. These tools are perhaps the most significant tools and the tools of most general interest in this report. Different tools handle different parts of the VV&A process. These tools are not completely mature yet, but are rapidly approaching maturity and appear to be very promising. It is anticipated that modifications will occur as these tools are used in M&S programs as part of an integrated process. Once these tools win acceptance, a program to integrate tools that support various aspects of the VV&A process (possibly including commercial tools) would be beneficial.

4.3.2 Software Documentation Tools

Software documentation tools are commercially developed tools that automate the process of preparing documentation, thereby reducing its cost and/or improving its quality. Quality software documentation supports accreditation by providing useful information to the accreditation agent about the function of the software. The software documentation tools surveyed are all available as COTS.

Analysis: A survey was received for 1 software documentation tool out of 4 identified. These tools appear to provide automatic documentation capability for software written in common languages such as C++, FORTRAN, and Ada. As with all CASE tools, the users must select tools relevant to their projects and development environments, since all tools are not suitable for every situation.

4.4 Development Environments

Development environments include (1) software development environments, (2) modeling tools and simulation development environments, and (3) federation development tools. Surveys were received for 6 tools falling in the "development environments" category. A total of 25 development environments were identified. These environments may also provide some other functions.

Table of Development Environments		
Subcategory	**Surveyed Items**	**Other Identified Items**
Software Development Environments	CodeWright (19) Genitor Object Construction Suite (41) Khoros Pro 2001 (59)	AD/Advantage (3) COOL (21) DevPartner Studio (26) Forte' Products (40) ISE Eiffel (54) Metamata Development Environment (69) Rational Suite (89) Reactor (92) Software through Pictures (103)
Modeling Tools / Simulation Development Environments	Artisan Real Time Studio (7) Vega (122) ProSim 6.0 (85) Simdicator™ Toolkit (98)	Advanced Continuous Simulation Language (4) BridgePoint Modeling Tools (14) IDEF (49) ModelMart (71) SENSE8 (96) Visual Age Smalltalk UML Designer (131)
Federation Development Tools		Distributed Simulation Interface Framework (28) HLA LabWorks Suite of Tools (45)

4.4.1 Software Development Environments

Software development environments increase the productivity of a software developer or team of developers. These products support production of standardized bug-free software, distributed applications, and reuse of proven software modules. They can expedite the verification of software by improving the quality of submitted software. These tools are intended for general purpose software development and are not

specialized to modeling and simulation. In general, they would not provide assistance with conceptual model development. All tools discussed are available COTS.

Analysis: Surveys were received for 3 software development environments out of 12 identified. The software development environments appear to be useful in promoting collaborative software development and in promoting reuse of previously verified portions of software. Some government funding has been used for special purpose environments. Some development environments are intended for the production of special purpose software, such as visualization or signal processing software. Most of the development environments appear to be intended for Windows systems and a particular development environment will not necessarily serve all needs.

4.4.2 Modeling Tools

Modeling tools enable a user to construct a model using simple components capable of interaction. These tools enable the developer to coherently express his conceptual model. *Simulation development environments* automate the process of developing an simulation using similar techniques to those used in some modeling tools. Modeling tools and simulation development environments assist verification, validation, and accreditation by providing a clear and easily implemented and followed connection between the conceptual model and its electronic expression. Most tools are available as COTS.

Analysis: Surveys were received for 4 modeling tools/simulation development environments out of 10 identified. These tools appear to be useful for a broad range of applications, but a particular tool is not necessarily capable of meeting every need. As a rule, the more flexible tools will have more complex user interfaces, while the tools that are easiest to use tend to be more restrictive, although with some effort it may be possible to compensate for these restrictions. The modeling tools should be used to develop conceptual models that are easily validated. It is also important, though, that these tools be integrated in a development process that ensures the smooth transition of the conceptual model to the operational simulation and collects the necessary information for VV&A.

4.4.3 Federation Development Tools

Federation development tools assist the developer of a distributed simulation in creating an HLA-compliant federation. These tools expedite the verification process by reducing the number of errors present in a newly developed federation. These tools have been developed with government funding.

Analysis: Surveys were not received for either of the two federation development tools identified. From the limited information provided, it is impossible to discuss these tools' performance in detail. It appears that these tools can be used to create HLA-compliant federations from legacy components.

4.5 Supporting Tools

Supporting tools include (1) visualization tools, and (2) mathematics and statistics packages. Surveys were received for 11 tools falling in the "supporting" category. An additional 15 supporting tools were identified. All of these can be considered to be primarily "supporting tools", although they may also have some other functions.

Table of Supporting Tools		
Subcategory	**Surveyed Items**	**Other Identified Items**
Visualization Tools	OneSAF Testbed Baseline Plan View Display (77) NASA/JPL WebWinds (74) Axum 6.0 (11) Ensight(and related) (34) Mak Plan View Display (61) Mak Stealth (62) Visualization Tool Kit (128)	AVS Express (10) IBM Open Visualization Data Explorer (48) ModIOS 3D Stealth Viewer (72) IRIS Explorer (53) EDGE Viewer (31)
Mathematics/Statistics Packages	MathCad (64) Matlab and Simulink® (66) Statgraphics Plus (108) Statistica (109)	BMDP (13) Genstat (42) GLIM (43) Maple (63) Mathematica (65) Minitab (70) PV-WAVE (87) S-Plus (104) STATA (107) Systat 10 (111)

4.5.1 Visualization Tools

Visualization tools display data in easily understandable formats. In support of verification, visualization tools can be used to check if a system is performing to requirements, and if not, can be used to help determine the type of error. By presenting a large amount of input or output data at once, these tools make it possible to spot discrepancies. In support of validation, visualization tools help an analyst or subject matter expert determine if a system "looks right" and is representing reality correctly. Visualization tools can also be used as part of exercise playback to discover the exact time or the exact event (or series of events) at which a simulation anomaly first occurs (the initial diversion from reality). In support of accreditation, visualization tools can help "make the case" to the accreditation authority that the simulation is, in fact, a reasonable representation of reality within certain bounds. M&S specific visualization

tools differ little from general purpose visualization tools. Most of these tools are COTS, although some that are developed for specific simulations have government sponsorship.

Analysis: Surveys were received for 7 visualization tools out of 12 identified. Visualization tools are readily available and mostly have been developed commercially, although some of the tools have had government sponsorship. The government tools tend to be somewhat more specialized. There should be a visualization tool available to meet almost any M&S need and new display techniques that enhance data presentation and clarity will continue to be developed. Some effort will need to be made to interface a model or simulation to a visualization tool, and these tools will not necessarily display data in real time.

4.5.2 Mathematics and Statistics Packages

Mathematics and statistics packages provide pre-programmed routines for the analysis of large quantities of input or output data. These tools extend the analysis performed using visualization tools and are valuable for the same purposes; many of these packages also include some visualization capability. Mathematics and statistics packages highlight the detailed discrepancies between simulation results and reality. These tools should be used in conjunction with visualization tools, since they can reveal small errors and discrepancies that visualization tools conceal or possibly even introduce. On the other hand, visualization tools occasionally reveal problems or outliers that are not discovered using the most common mathematical tests.

Analysis: Surveys were received for 4 mathematics and statistics packages out of 14 identified. All of these tools are available as COTS items. These packages provide the capability to perform virtually any mathematical analysis of simulation inputs, outputs, and intermediate data desired. This analysis cannot necessarily be performed in real time, and some effort is required to prepare data in a form suitable for these packages. Considerable effort can be required to understand and utilize the full capability of some packages.

4.6 Verification Tools

Verification tools include (1) requirements management, specification, and tracing tools; (2) automated testing, measurement, and debugging tools; (3) simulation testing tools; and (4) coding standards enforcement tools. Surveys were received for 18 of these tools out of 38 identified. All of these can be considered to be primarily "verification tools", although they may have some other functions.

Table of Verification Tools		
Subcategory	**Surveyed Items**	**Other Identified Items**
Requirements Management, Specification, and Tracing Tools	Analyst-Pro (5) Automated Requirements Measurement Tool (9) Caliber-RM (17) DOORSnet (27) SLATE (100) XTie-RT (130)	ITrace SE (55) RDD-100 (91) RTM (93) ValidatorReq (120)
Automated Testing/Measurement/ Debugging Tools	C++test(and related) (15) Caliber-RBT (16) C-Cover (18) Ferret (39) McCabe Test (68) SAS System (95) SpyWright (105) Temporal Rover (113) VectorCast/(C or Ada) (121) Vermont High Test Plus (124)	Symbolic Model Verifier (137) PEST (82) eValid (134) Fault Determination Measurement System (37) Hindsight (44) Panorama 2 (79) QACenter (88) Silk Product Family (97) SLIM (101) TestCenter (115) TestWorks (116)
Simulation Testing Tools	Temporal Verification Framework (114)	Federation Verification Tool (38) HLA Results (132) HLA Control (133) PerfMETRICS (80) TARZAN (112)
Coding Standards Enforcement Tools	CodeWizard (136)	

4.6.1 Requirements Management, Specification, And Tracing Tools

Requirements management, specification, and tracing tools capture, link, trace, analyze and manage a wide range of information to ensure a project's compliance to specified requirements and standards. These tools may be used in the development of a simulation

to ensure that the model or simulation performs as intended. Developing simulations using these tools should expedite verification since the possibilities of failure to meet specification are reduced and the requirements are traceable.

Analysis: Surveys were received for 6 requirements management, specification, and tracing tools out of 10 identified. These tools are primarily COTS, although some specialized tools have been developed with government support. The COTS products appear to provide most, if not all, of the capability necessary for M&S projects. Ideally, these tools should be integrated into the development environment or into the software development process.

4.6.2 Automated Testing, Measurement, And Debugging Tools

Automated testing, measurement, and debugging tools ensure that software works as designed and is easy to maintain, understand and operate. These tools reduce the cost and increase the reliability of the verification process. Automated tools can identify and test all paths in a software system, and can perform testing more rapidly than humans. A tool to validate testing tools is included, as is an automated tool for the verification of conceptual models. All of the tools described are COTS except for two special purpose tools.

Analysis: Surveys were received for 10 automated testing, measurement, and debugging tools out of 21 identified. Many COTS products exist for testing, measurement, and debugging of software. The software metrics developed are oriented towards software engineering practice and will not satisfy all requirements for simulations. These tools should support M&S developers provided that common platforms and languages are used and the appropriate tool is selected. These tools do not address the question of validity, or the question of compliance with requirements.

4.6.3 Simulation Testing Tools

Simulation testing tools collect and analyze performance data from simulations during testing. These tools support verification by providing evidence that a simulation works as intended, and may also provide information that could be used during validation to compare the simulation to reality. Some tools may be configured to produce information that would be reviewed by an accreditation agent. Some of these tools have been developed with government sponsorship, and others are COTS.

Analysis: Surveys were received for 1 simulation testing tool out of 6 identified. There is a need for more tools that can acquire simulation information that is not exchanged through the HLA RTI.

4.6.4 Coding Standards Enforcement Tools

Coding standards enforcement tools reduce errors in software by checking compliance with industry-accepted coding standards. These tools assist verification by reducing the

time and cost of identifying and correcting errors. These tools support accreditation by allowing the developer to state to the accreditation agent that the software has met these standards.

Analysis: A survey was received for the one COTS coding standards enforcement tool identified. These tools enforce good software engineering practice. Some of these tools provide the capability to add additional standards, which may be useful for enforcing organizational standards specific to simulation.

4.7 Configuration Management Tools

Configuration management tools monitor, track, and control changes to software to ensure that errors are not caused by conflicts originating in changes and that the contents and functions of software are well defined. Configuration management is useful for purposes of verification and accreditation of models and simulations because it guarantees that the desired product is the product actually being tested and disseminated.

Configuration Management Tools	
Surveyed Items	**Other Identified Items**
NeumaCM+ (75) Perforce (81) VerticalSky Solution 3.1 (125)	Endevor Workstation(and related) (33) PlatinumCCC/Harvest (83) PVCS (86) Razor (90) Sablime (94) StarTeam (106) Visual Source Safe 6.0 (127)

Analysis: Surveys were received for 3 tools out of 10 identified. All of these can be considered to be primarily "configuration management tools", although they may have some other functions. The tools are all COTS. Adequate configuration management tools should be available to support any program developing M&S software provided that common platforms and languages are used.

4.8 Software Costing Tools

Software costing tools estimate the development costs of software systems, including verification and validation (V&V) systems. They are useful for planning the software V&V that is part of VV&A. Testbeds for software costing tools can also be used to test models for the VV&A costs specific to modeling and simulation.

Software Costing Tools	
Surveyed Items	**Other Identified Items**
CostModeler 1.0 (22)	IV&V Effort Estimator (56)

Analysis: Surveys were received for 1 tool out of 2 identified. The tools discussed are developed with government funding, although COTS software costing tools are also available. The software costing tool used in a development must be selected carefully since some of the tools make assumptions about development practices. In general, software cost modeling is an important area to which more attention should be paid.

4.9 Other Tools

Other tools include (1) compilation tools, (2) reliability evaluation tools, (3) database checker and design tools, (4) optimizers for simulation inputs, (5) floating point error analysis tools, (6) software analysis tools, and (7) error collection and analysis tools. Surveys were received for 3 tools out of 13 identified.

These tools do not fit readily into one of the other major categories. Most of these tools have been developed for special purposes and additional tools will need to be developed for other special purposes. The most important subcategory here may be reliability evaluation tools which require additional effort in development and adaptation for M&S.

Other Tools		
Subcategory	**Surveyed Items**	**Other Identified Items**
Compilation Tools		DesignPoint Model Compiler (25) Openmake (78)
Reliability Evaluation Tools		PREDICT (84)
Database Checker and Design Tools	Data Verification Interactive Editor (DAVIE) (23)	ERwin (35) Microsoft Access 2000 (135) Visible Advantage (126)
Optimizers for Simulation Inputs	Design Analysis Kit for Optimization (DAKOTA) (24)	
Floating Point Error Analysis Tools		Interval Arithmetic (52) Monte Carlo Arithmetic (73)
Software Analysis Tools	SNIFF+ (102)	Unravel (118)
Error Collection and Analysis Tools		EFFTool (32)

4.9.1 Compilation Tools

Compilation tools include two categories of tools, model compilation tools and software compilation tools. Model compilation tools convert models implemented with certain modeling tools into software source code. These tools assist VV&A by providing an automated, standardized method of converting a conceptual model into source code. They can reduce possible sources of error, save time, and increase confidence in the results.

Analysis: Software compilation tools help build executable software from source code. They are useful in creating executable code for large systems involving many different source code files. They ensure that the code is built in a systematic manner and reduce the possibility of errors arising from failure to account for source code updates in the executable version. These tools reduce the time involved in verification and increase its reliability by making it more likely that the human-readable and machine-readable codes correspond. The tool included is COTS.

4.9.2 Reliability Evaluation Tools

Reliability evaluation tools provide a structured, quantitative approach for predicting complex system performance using state of the art expert elicitation, statistical and reliability analysis, and knowledge management techniques. They support VV&A by providing information about system performance in circumstances when complete testing is impractical. This quantitative information is provided to the accreditation agent to assist with the accreditation decision.

Analysis: The tool discussed is government-sponsored.

4.9.3 Database Checker And Design Tools

Database checker and design tools create and verify databases. These databases may contain input data for a simulation, or may contain information about a simulation needed by VV&A agents. Detailed relational databases permitting distributed access have been noted as being essential to the VV&A process. Database checkers may also be used for the verification of input data, especially environmental data.

Analysis: A survey was received for one of these tools out of the 4 identified. The database checker described is government sponsored, and the other database tools are COTS.

4.9.4 Optimizers For Simulation Inputs

Optimizers for simulation inputs operate simulation codes with iterative methods to test performance in a variety of methods. The iterative and statistical capability of this tool could be used in the V&V process to automate the collection of performance data.

Analysis: A survey was received for the one tool identified. This tool is government-sponsored tool and licensable.

4.9.5 Floating Point Error Analysis Tools

Floating point error analysis tools treat inaccuracies in complex numerical simulations resulting from rounding errors in floating point arithmetic. These techniques are useful for the validation of certain simulations by showing the magnitude of errors introduced by digital computation.

Analysis: Both COTS and government-sponsored academic tools exist.

4.9.6 Software Analysis Tools

Software analysis tools examine large source codes to identify variables and determine dependencies. They are intended for software systems too large for manual examination. These tools support verification of large software simulations by expediting error tracing. These tools have been developed as both government items and COTS.

Analysis: A survey was received for one out of the two tools identified.

4.9.7 Error Collection And Analysis Tools

Error collection and analysis tools collect and analyze fault and failure data for a project. They support verification by expediting the determination of whether known errors have been rectified.

Analysis: The tool described in the report is GOTS and public domain.

5. CONCLUSIONS AND RECOMMENDATIONS

Conclusions resulting from the detailed analysis of the VV&A automated support tools include:

- The M&S and software communities have developed many automated tools that can be used to support the verification and accreditation of models and simulations.
- These tools collectively satisfy many of the current functions for supporting VV&A.
- These tools need wider dissemination and they require proper use.

Desirable functions for tools supporting verification include, but are not limited to, the ability to:

- define requirements,
- trace requirements,
- document software,
- plan software tests,
- test software,
- analyze software tests,
- perform configuration management,
- create audit trails, and
- distill and present information to accreditation authorities in the appropriate formats.

Currently, no single tool satisfies all of these functions for supporting verification.

Desirable functions for tools supporting validation include, but are not limited to, the ability to compare simulation results to real world values in a meaningful manner that provides confidence in the simulation throughout its range of applicability. *Currently, the scope of automated tools that support validation is limited.* The development of validation support tools is complicated by an insufficient understanding of exactly what constitutes complete validation of a simulation. Currently, visualization tools and statistical analysis packages can be applied to validation, but purpose-built automated validation tools will not be satisfactory until such an understanding is achieved. There are also insufficient tools available for validation of conceptual models, although some modeling tools might be useful for creating and exploring these models.

Desirable functions for tools supporting accreditation include, but are not limited to, the ability to:

- identify the information needed,
- determine if this information has been obtained, and
- acquire the information.

Currently, no single tool satisfies all of the functions for supporting accreditation.

Planning and documentation aids are applicable to all types of simulations and tend to be independent of development environment. CASE tools tend to be specialized to particular development environments. These development environment restrictions may be significant for the simulation developer who may need to select a particular tool or modify the development process, but are less important to the planner and policymaker.

CASE tools, as a class, are limited in their ability to support closed-form and human/system/hardware-in-the-loop simulations relative to other types of simulations. This is not surprising since CASE tools are not typically intended for such simulations.

Finally, as a summary, the top level analysis from "Part 1 – Overview" of this state of the art report yielded several important conclusions including:

- Automated tools exist for supporting VV&A, but more are needed. Some of these can be adopted or adapted from the software industry which leads the M&S community in developing and applying automated tools
- Ongoing M&S trends will increase the difficulties for VV&A and will lead to the requirements for new classes of automated support tools.
- Better use should be made of visualization tools.
- The M&S community should establish a central repository of automated support tools for VV&A.

The recommendations from "Part 1 – Overview" of this report include:

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

APPENDICES

APPENDIX A-1: TABLE OF TOOLS BY NUMBER

Tools By Number				
Tool #	**Name of Tool**		**Tool #**	**Name of Tool**
1	Accreditation Assessment Assistant		27	Distributed Object Oriented Requirements Software (DOORS) DOORSnet
2	Accreditation Support Site		28	Distributed Simulation Interface Framework (DSIF)
3	AD/Advantage		29	Doc Express
4	Advanced Continuous Simulation Language (ACSL)		30	DON VVA Turbo Tool
5	Analyst-Pro		31	EDGE Viewer
7	Artisan Real Time Studio		32	EFFTool
8	Authoritative Data Source Library PC Version		33	Endevor Workstation and other Endevor products
9	Automated Requirements Measurement Tool		34	EnSight, EnSight Gold, EnLiten, EnVideo
10	AVS Express		35	ERwin
11	Axum 6.0		36	Evaluation Environment™
13	BMDP		37	Fault Determination Measurement System
14	BridgePoint Modeling Tools		38	Federation Verification Tool (FVT)
15	C++test, TCA, INUSE, Jtest, insure++, WebKing		39	Ferret
16	Caliber-RBT		40	Forte' Products
17	Caliber-RM		41	Genitor Object Construction Suite
18	C-Cover		42	Genstat
19	CodeWright		43	GLIM
21	COOL		44	Hindsight
22	CostModeler 1.0		45	HLA Lab Works Suite of Tools
23	Data Verification Interactive Editor (DAVIE)		48	IBM Open Visualization Data Explorer
24	Design Analysis Kit for Optimization (DAKOTA)		49	IDEF
25	Design Point Model Compiler		50	Imagix 4D
26	DevPartner Studio		52	Interval Arithmetic

53	IRIS Explorer		89	Rational Suite
54	ISE Eiffel		90	Razor
55	ITrace SE		91	RDD-100
56	IV&V Effort Estimator		92	Reactor
57	JASA Library of Accreditation Information (JASA)		93	RTM
58	JWARS V&V Database		94	Sablime
59	Khoros Pro 2001		95	SAS System
61	Mak Plan View Display		96	SENSE8
62	Mak Stealth		97	Silk Product Family
63	Maple		98	Simdicator™ Toolkit
64	MathCad		100	SLATE
65	Mathematica		101	SLIM
66	Matlab and Simulink(R)		102	SNIFF+
68	McCabe Test		103	Software through Pictures
69	Metamata Development Environment		104	S-Plus
70	Minitab		105	SpyWright
71	ModelMart		106	StarTeam
72	ModIOS 3D Stealth Viewer		107	STATA
73	Monte Carlo Arithmetic		108	Statgraphics Plus
74	NASA/JPL WebWinds		109	Statistica
75	NeumaCM+		110	Surveyor
77	OneSAF Testbed Baseline Plan View Display		111	Systat 10
78	Openmake		112	TARZAN
79	Panorama 2		113	Temporal Rover
80	PerfMETRICS		114	Temporal Verification Framework
81	Perforce		115	Test Center
82	PEST		116	TestWorks
83	Platinum CCC/Harvest		117	Understand Family, Source Publisher, QualGen, DocGen
84	PREDICT		118	Unravel
85	Pro Sim 6.0		119	V&V Managers Toolkit
86	PVCS		120	Validator/Req
87	PV-WAVE		121	VectorCast/C VectorCast/ADA
88	QACenter		122	Vega

124	Vermont HighTest Plus 3.2.1			
125	Vertical Sky Solution 3.1			
126	Visible Advantage			
127	Visual Source Safe 6.0			
128	Visualization Tool Kit			
129	VVA Cost Estimating Tool (VVACET)			
130	XTie-RT			
131	VisualAge Smalltalk UML Designer			
132	HLA Results			
133	HLA Control			
134	eValid			
135	Microsoft Access 2000			
136	CodeWizard			
137	Symbolic Model Verifier			

APPENDIX A-2: TABLE OF NUMBERS BY TOOL

Numbers for Tools				
Name of Tool	**Tool #**		**Name of Tool**	**Tool #**
Accreditation Assessment Assistant	1		DevPartner Studio	26
Accreditation Support Site	2		Distributed Object Oriented Requirements Software (DOORS) DOORSnet	27
AD/Advantage	3		Distributed Simulation Interface Framework (DSIF)	28
Advanced Continuous Simulation Language (ACSL)	4		Doc Express	29
Analyst-Pro	5		DON VVA Turbo Tool	30
Artisan Real Time Studio	7		EDGE Viewer	31
Authoritative Data Source Library PC Version	8		EFFTool	32
Automated Requirements Measurement Tool	9		Endevor Workstation and other Endevor products	33
AVS Express	10		EnSight, EnSight Gold, EnLiten, EnVideo	34
Axum 6.0	11		ERwin	35
BMDP	13		eValid	134
BridgePoint Modeling Tools	14		Evaluation Environment™	36
C++test, TCA, INUSE, Jtest, insure++, WebKing	15		Fault Determination Measurement System	37
Caliber-RBT	16		Federation Verification Tool (FVT)	38
Caliber-RM	17		Ferret	39
C-Cover	18		Forte' Products	40
CodeWizard	136		Genitor Object Construction Suite	41
CodeWright	19		Genstat	42
COOL	21		GLIM	43
CostModeler 1.0	22		Hindsight	44
Data Verification Interactive Editor (DAVIE)	23		HLA Control	133
Design Analysis Kit for Optimization (DAKOTA)	24		HLA Lab Works Suite of Tools	45
Design Point Model Compiler	25		HLA Results	132

IBM Open Visualization Data Explorer	48		PerfMETRICS	80
IDEF	49		Perforce	81
Imagix 4D	50		PEST	82
Interval Arithmetic	52		Platinum CCC/Harvest	83
IRIS Explorer	53		PREDICT	84
ISE Eiffel	54		Pro Sim 6.0	85
ITrace SE	55		PVCS	86
IV&V Effort Estimator	56		PV-WAVE	87
JASA Library of Accreditation Information (JASA)	57		QACenter	88
JWARS V&V Database	58		Rational Suite	89
Khoros Pro 2001	59		Razor	90
Mak Plan View Display	61		RDD-100	91
Mak Stealth	62		Reactor	92
Maple	63		RTM	93
MathCad	64		Sablime	94
Mathematica	65		SAS System	95
Matlab and Simulink(R)	66		SENSE8	96
McCabe Test	68		Silk Product Family	97
Metamata Development Environment	69		Simdicator™ Toolkit	98
Microsoft Access 2000	135		SLATE	100
Minitab	70		SLIM	101
ModelMart	71		SNIFF+	102
ModIOS 3D Stealth Viewer	72		Software through Pictures	103
Monte Carlo Arithmetic	73		S-Plus	104
NASA/JPL WebWinds	74		SpyWright	105
NeumaCM+	75		StarTeam	106
OneSAF Testbed Baseline Plan View Display	77		STATA	107
Openmake	78		Statgraphics Plus	108
Panorama 2	79		Statistica	109

Surveyor	110		
Symbolic Model Verifier	137		
Systat 10	111		
TARZAN	112		
Temporal Rover	113		
Temporal Verification Framework	114		
Test Center	115		
TestWorks	116		
Understand Family, Source Publisher, QualGen, DocGen	117		
Unravel	118		
V&V Managers Toolkit	119		
Validator/Req	120		
VectorCast/C VectorCast/ADA	121		
Vega	122		
Vermont HighTest Plus 3.2.1	124		
Vertical Sky Solution 3.1	125		
Visible Advantage	126		
Visual Source Safe 6.0	127		
VisualAge Smalltalk UML Designer	131		
Visualization Tool Kit	128		
VVA Cost Estimating Tool (VVACET)	129		
XTie-RT	130		

APPENDIX A-3: TABLE OF POINTS OF CONTACT FOR SURVEYED TOOLS

VV&A Automated Support Tools - POCs					
Tool #	**Name of Tool**	**Web Site**	**Point of Contact**	**Phone Number**	**Email**
1	Accreditation Assessment Assistant	http://www.nawcwpns.navy.mil/~jasa/	Dr. Paul Muessig	760-939-3001	meussigPR@navair.navy.mil
5	Analyst-Pro	http://www.analysttool.com	None	703-867-8151	info@analysttool.com
7	Artisan Real Time Studio	http://www.artisansw.com	None	503-245-6200	johnh@artisansw.com
8	Authoritative Data Source Library PC Version	None	Mike Hopkins	703-824-3431	mhopkins@dmso.mil
9	Automated Requirements Measurement Tool	http://satc.gsfc.nasa.gov	Linda Rosenberg	301-286-0087	linda.rosenberg@gsfc.nasa.gov
11	Axum 6.0	http://www.mathsoft.com	None	800-628-4223	sales@mathsoft.com
15	C++test, TCA, INUSE, Jtest, insure++, WebKing	http://www.parasoft.com	None	888-305-0041	info@parasoft.com oakes@parasoft.com
16	Caliber-RBT	http://www.tbi.com/products/caliber.html	None	770-937-7900	marketing@tbi.com
17	Caliber-RM	http://www.tbi.com/products/caliber.html	None	770-937-7900	marketing@tbi.com
18	C-Cover	http://www.bullseye.com	None	425-861-6438	info@bullseye.com
136	CodeWizard	http://www.parasoft.com	None	888-305-0041	info@parasoft.com oakes@parasoft.com
19	CodeWright	http://www.premia.com/products/codewright/	None	800-547-9902	sales@premia.com
22	CostModeler 1.0	None for CostModeler for COCOMO http://sunset.usc.edu/research/COCOMOII/index.html	Marcus Fisher	304-467-8337	kenneth.g.mcgill@ivv.nasa.gov marcus.s.fisher@ivv.nasa.gov

23	Data Verification Interactive Editor (DAVIE)	None yet.	Mike Capitman	703-824-4341	capitman@dmso.mil
24	Design Analysis Kit for Optimization (DAKOTA)	http://endo.sandia.gov/DAKOTA	Mike Eldred	505-844-6479	mseldre@sandia.gov
27	Distributed Object Oriented Requirements Software (DOORS) DOORSnet	http://www.qssinc.com	Pete Carroll	877-275-4777 703-708-1430	info@qssinc.com pete.carroll@telelogic.com
30	DON VVA Turbo Tool	None	Betsy DeLong	703-601-1497	delong.betsy@hq.navy.mil
34	EnSight, EnSight Gold, EnLiten, EnVideo	http://www.ceintl.com	None	919-481-4301	kent@ensight.com
36	Evaluation Environment™	http://www.orcacomputer.com/ee/EESet.html	Dr. Osman Balci	540-961-6722	balci@OrcaComputer.com
39	Ferret	http://www.azor.com	None	650-934-2869	info@azor.com
41	Genitor Object Construction Suite	http://www.premia.com/products	None	800-547-9902	sales@premia.com
57	JASA Library of Accreditation Information	http:/www.nawcwpns.navy.mil/~jasa/	Dr. Paul Muessig	760-939-3001	meussigPR@navair.navy.mil
58	JWARS V&V Database	http://www.bmh.com	Jack Jordan	757-857-5670	jordan@bmh.com
59	Khoros Pro 2001	http://www.khoral.com	None	505-837-6500	info@khoral.com
61	Mak Plan View Display	http://www.mak.com/	Mark Schlackman	617-876-8085	info@mak.com
62	Mak Stealth	http://www.mak.com	Mark Schlackman	617-876-8085	info@mak.com
64	MathCad	http://www.mathsoft.com	None	800-628-4223	sales@mathsoft.com
66	Matlab and Simulink(R)	http://www.mathworks.com	None	508-647-7000	info@mathworks.com

68	McCabe Test	http://www.mccabe.com	Gray Rosse	800-638-6316	penny@mccabe.com
74	NASA/JPL WebWinds	http://www.webwinds.nasa.gov	Lee S. Elson	818-354-4223	webwinds@twinky.jpl.nasa.gov elson@magus.jpl.nasa.gov
75	NeumaCM+	http://www.neuma.com	Joe Farah	613-749-9450	support@neuma.com
77	OneSAF Testbed Baseline Plan View Display	http://www.modsaf.org	Tim Behan	407-384-3694	tim_behan@stricom.army.mil
81	Perforce	http://www.perforce.com	None	510-864-7400	info@perforce.com
85	Pro Sim 6.0	http://www.kbsi.com	Byon Williams	979-269-5274	bwilliams@kbsi.com
95	SAS System	http://www.sas.com	None	919-677-8000	software@sas.com
98	Simdicator™ Toolkit	None	Bruce Stalcup	703-556-1307	bruce_stalcup@prc.com
100	SLATE	http://www.tdtech.com	Mark Sampson	214-570-3000	mark.sampson@sdrc.com
102	SNIFF+	http://www.takefive.com	Paul R. Brock	408-542-1879	inquiries@windriver.com
105	SpyWright	http://www.premia.com/products/spywright/	None	800-547-9902	sales@starbase.com
108	Statgraphics Plus	http://www.statgraphics.com	None	800-592-0050	sgsales@manu.com swyatt@manu.com
109	Statistica	http://www.statsoft.com	None	918-749-1119	info@statsoft.com
110	Surveyor	http://www.premia.com/products	None	800-547-9902	sales@premia.com
113	Temporal Rover	http://www.time-rover.com	Doron Drusinsky	408-252-2808	doron@time-rover.com
114	Temporal Verification Framework	http://www.acims.edu General web page.	Cuneyd Firat, Mehmet F. Hocaoglu, Bernard P. Ziegler	520-621-6184	hocaoglu@ece.arizona.edu
119	V&V Managers Toolkit	None	Jennifer Chew	410-278-1338	chewj@dtc.army.mil
121	VectorCast/C VectorCast/ADA	http://www.vectorcast.com	None	401-295-5855	info@vectors.com

122	Vega	http://www.multigen.com	Christian Cole	972-960-2301	sales@paradigmsim.com christian.cole@ca.com
124	Vermont HighTest Plus 3.2.1	http://www.vtsoft.com	Janice Simmons	800-848-1248	info@vtsoft.com
125	Vertical Sky Solution 3.1	http://www.VerticalSky.com	None	800-265-2797	info@VerticalSky.com
128	Visualization Tool Kit	http://www.kitware.com/index.html	None	518-371-3971	kitware@kitware.com
129	VVA Cost Estimating Tool (VVACET)	http://vvacet.tecmasters.com	Clint Hanson	256-721-6659	chanson@tecmasters.com
130	XTie-RT	http://www.tbe.com/products/xtie	Sherry Aldrich	256-726-2122	xtie@tbe.com

APPENDIX A-4: RESPONSES

This state of the art report provides an overall assessment of the quality of various types of automated support tools for VV&A, but does not attempt to evaluate the capabilities of individual tools or determine their suitability for particular applications. The survey forms were:

- completed in their entirety by the developers or distributors of the respective tools,
- their contents were accepted as is without additional review by the MSIAC or its sponsors for accuracy, and
- their contents were not edited.

The MSIAC does not recommend any individual tools, but has determined only that these tools meet the definitions for inclusion in the report, that they are sufficiently mature to be considered, and that they are adequately described to be understood by the user of this report. Since not all automated support tools could be identified, and since new tools are constantly being developed, the omission of a tool from this report does not imply that it is unsuitable for applications to VV&A.

The responsibility for determining actual suitability of these tools for any particular VV&A task rests with their potential users. Since automated tools evolve over time both in capabilities and supporting requirements, potential users are urged to contact the developers and investigate the tools' prior uses. For this purpose, the points of contact and use histories are provided in the survey responses.

Tool Name:

JASA Accreditation Assessment Assistant (AAA), including:
****

ACCREDITATION PROCESS GUIDE

Accreditation Process Tutorial
Accreditation Information Requirements Guide (AIRGuide) -- including an explanation for use
Accreditation Support Package (ASP) Specification

Brief description of the tool, its primary use(s), and the issues it addresses:

The AAA provides an Accreditation Authority or Accreditation Agent computer-based guidance on how to structure and conduct a comprehensive assessment of simulation credibility that is tailored to the needs of a particular application and that generates the documentation necessary to justify an accreditation decision. The AAA is a structured process that contains hyperlinks between the individual process steps, descriptions for each step, procedures to carry out the step, and forms or guides that help the user generate products that support accreditation assessments. The process guide outlines the planning and procedural steps necessary to reach a justifiable accreditation recommendation. The tutorial provides amplification of the process, including structured examples and real world lessons learned. The AIRGuide helps an Accreditation Agent or M&S user to determine the nature, scope, and depth of information about a simulation that is needed to make an accreditation assessment for a particular use. To use the guide, the Accreditation Agent must quantify the level of risk associated with use of the simulation. Techniques for conducting this risk assessment are available as a hyper-linked adjunct to the guide. Finally, the ASP Specification provides formats for summarizing and documenting the information necessary to justify an accreditation recommendation.

The AAA is not currently computer-based. It is a currently a set of four separate products that provide the user with guidance needed to successfully accredit a simulation for a given application. The short-term goal is to integrate these documents into a computer-based package that guides the user through the necessary accreditation and documentation steps. AAA users will be able to select the level of help they require from the toolkit. An experienced user might select minimal help and proceed to fill in the ASP information directly. A novice user, however, could run through a sequence of computer-based training sessions that would provide online help while gathering the required accreditation information and completing the ASP.

Application (please check all that apply):

☐Verification
☐Validation
☒Accreditation

Sponsor:

☒OSD (JTCG/AS via DOT&E)

Is the tool applicable to distributed systems?

☒YesThe types of information necessary to establish simulation credibility should be easily adaptable to distributed systems, but the toolkit has not yet been used to accredit distributed simulations.

What is the cost of the tool? Free to government users

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒ M&S Assessment / Evaluation
- ☒ V&V Planning (including resource estimation)
- ☒ V&V Documentation / Reporting
- ☒ Accreditation / Certification

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: N/A. The toolkit approach can be used to establish simulation credibility for all types of simulation.

Development Environment: N/A. The toolkit can be used to establish simulation credibility in any development environment.

Software language(s) which the tool accommodates:

Any language can be accommodated because the Guide is not directly concerned with the simulation code.

Simulation **aspects** for which the tool is applicable (please check all that apply):
Not Applicable. The Guide is not concerned with the individual aspects of the simulation, but with the simulation as a whole. It concentrates on how the simulation will be used so that the Accreditation Agent can identify the type and amount of information necessary to accredit the simulation for a particular application.

Tool Use Considerations:

None of the next six elements apply to the current toolkit because it is not yet computer-based. The goal is to make the integrated, computer-based toolkit Windows compatible and small enough to fit on a single CD ROM.

What training is required for personnel to use the tool?

Length Approximately 1 – 2 days to review the written guide for use. Eventually, the computer based toolkit will contain its own tutorial.

Where Available From the Joint Accreditation Support Activity:
www.nawcwpns.navy.mil/~jasa/

Additional Tool Information:

Language(s) Used N/A
Classification level Unclassified
Distribution limitations Unlimited
Sponsor / Owner Joint Accreditation Support Activity, NAWCWD, China Lake
Developer (organization, point of contact, address, phone number, email)
Joint Accreditation Support Activity (JASA), Dr. Paul Muessig, Director, JASA,
Distribution Point of Contact (name, title, organization, address, phone number, email)

Dr. Paul R. Muessig, Director JASA
Naval Air Warfare Center, Weapons Division
1 Administration Circle
China Lake, California 93555-6100
(760) 939-3001
muessigpr@navair.navy.mil

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
John Wrobleski	CSC	805-987-9641 ext 140	jwrobles@csc.com	AIM-9X LRIP
Dennis Laack	CSC	805-987-9641 ext 130	dlaack@csc.com	F/A-18 Surv. Anal.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)
Other comments?

Tool Name: Analyst Pro

Brief description of the tool, its primary use(s), and the issues it addresses:

The tool is useful for requirements specification, analysis, management and tracing requirements throughout software development life cycle.

Application (please check all that apply):

☒Verification
Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool
$450/- for stand-alone version. Multi user version costs $7500/- for more than 125 concurrent users. For more details, visit company's web site at http://www.analysttool.com

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒M&S Requirements
- ☒M&S Testing and Integration:
  - ☐Unit
  - ☐Function
  - ☐Sub-system
  - ☐System
- ☒M&S Use/Application and Maintenance
- ☒V&V Documentation / Reporting
- ☒V&V Management
- ☒Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
No response.
Development Environment:
- ☒Structured
- ☒Object-Oriented
- ☒Waterfall
- ☒Evolutionary / Spiral
- ☒Rapid Prototyping

Software language(s) which the tool accommodates:

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒System / Component Interfaces
☒Test Planning / Execution
☒Results Evaluation

Tool Use Considerations:

Host Computer(s) PCs
Disk Space / RAM Required
50MB DS, 32 MB RAM,
Operating System(s)
Win 95/98/2000/NT
Network(s)
Lan, Wan
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length
1 day
Where Available
From the company (Goda Software,Inc)

Additional Tool Information:
Language(s) Used
Classification level
Distribution limitations
Sponsor / Owner
Goda Software,Inc.

Developer (organization, point of contact, address, phone number, email)
Goda Software,Inc.
1221 S Eads Street, Suite 607
Arlington, VA 22202
USA
(703)867-8151

Distribution Point of Contact (name, title, organization, address, phone number, email)

Same as above. Or Online purchase from
http://www.analysttool.com

Previous Users and Uses:

Name Organization Phone number Email Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)
Other comments?

Tool Name: Artisan Real-time Studio

Brief description of the tool, its primary use(s), and the issues it addresses:

Real-time is an easy-to-use, industrial-strength modeling tool suite that provides rich UML modeling plus real-time extensions and automatic documentation generation. In addition to providing the modeling features Real-time Studio also makes it far easier to validate system behavior with models so that, when built, the system will behave as expected. This introduction transforms system modeling from something exotic to a practical activity with a short return on investment. RTS is the only enterprise level tool that offers whole product engineering.

Application (please check all that apply):

☒Verification
☒Validation

Sponsor:

☒Service
- ☒Army
- ☒Navy
- ☒Air Force
- ☒Marine Corps
- ☒DoD Agency
- ☒Government / Non-DoD
- ☒Academic
- ☒Commercial

Is the tool applicable to distributed systems?

- ☒Yes

What is the cost of the tool?

Approx $ 7,000.00 per seat

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒M&S Conceptual Modeling
- ☒M&S Design
- ☒M&S Implementation
- ☒M&S Testing and Integration:
  - ☒Unit
  - ☒Function
  - ☒Sub-system
  - ☒System
- ☒M&S Configuration Management
- ☒M&S Use/Application and Maintenance
- ☒M&S Assessment / Evaluation
- ☒M&S Interoperability / Compatibility
- ☒M&S Modification
- ☒V&V Planning (including resource estimation)

☒V&V Documentation / Reporting
☒V&V Management

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

☒Real-Time

Development Environment:

☒Object-Oriented
☒Evolutionary / Spiral
☒Rapid Prototyping
☒Other (specify)

Software language(s) which the tool accommodates:

C, C++, Java, Ada

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Behaviors
☒Prototypes

Tool Use Considerations:

Host Computer(s)
NT, solaris(server only), 98, 2000
Disk Space / RAM Required
Model dependent, 128 RAM
Operating System(s)
Windows
Network(s)
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?
Length 2 day minimum, 4 day optimum
Where Available Direct from Artisan or other contractors we contract.

Additional Tool Information:

Language(s) Used

Classification level
Distribution limitations
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)

Artisan Software Tools, Inc., 10220 Greenburg Road, OR 97223 (503) 245-6200
johnh@artisansw.com

Distribution Point of Contact (name, title, organization, address, phone number, email)
Artisan Software Tools, Inc., 10220 Greenburg Road, OR 97223 (503) 245-6200
johnh@artisansw.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
	Northrup Gruman			
	NASA			
	Boeing			
	Lockheed Martin			
	General Dynamics			
	NSA			

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

RTS is a CASE tool with System engineering capabilities and full support of the UML 1.3. It is a repository based tool with an active semantic dictionary as the engine.RTS has simulation capabilities for the state models but its openness allows it to interface to any other tool that is required.

Other comments?

Tool Name: Automated Requirements Measurement Tool (ARM)

Brief description of the tool, its primary use(s), and the issues it addresses:

The purpose of the tool is to provide a textual analysis of the quality of the requirements, are they written in such a way as to be testable, unambiguous, are there terms indicating incomplete requirements. The objective is to help projects ensure the requirements are written correctly and produce a numerical evaluation of potential problem areas.

Application (please check all that apply):

xx☐Verification

Sponsor:

xx☐Government / Non-DoD

Is the tool applicable to distributed systems?

xx☐Yes

What is the cost of the tool?
The tool is free on the SATC website
http://satc.gsfc.nasa.gov

Simulation **phases** for which the tool is applicable (please check all that apply):

xx☐M&S Requirements

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: all

Development Environment: all

Software language(s) which the tool accommodates: all

*Simulation **aspects** for which the tool is applicable (please check all that apply): all*

Tool Use Considerations:

Host Computer(s) pc
Disk Space / RAM Required
Operating System(s) windows 95 or later
Network(s)
Special Configurations none
Required Application Software none
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length 10 minutes for running of tool – note a comprehensive study of metrics is not included
Where Available help file with tool

Additional Tool Information:

Language(s) Used
Classification level nine
Distribution limitations none
Sponsor / Owner NASA
Developer (organization, point of contact, address, phone number, email)

Dr. Linda H. Rosenberg
Software Assurance Technology Center
Office of Systems Safety and Mission Assurance, Code 300
Goddard Space Flight Center, NASA
Greenbelt, MD 20771
301-286-0087
Linda.Rosenberg@gsfc.nasa.gov

Distribution Point of Contact (name, title, organization, address, phone number, email)
Same as above

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Upon request, over 200 users per month download tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: Axum 6

Brief description of the tool, its primary use(s), and the issues it addresses:

Axum is a powerful data analysis package that goes well beyond simple statistics and graphics. Axum includes all of the standard charting functions, has plenty of 2-D and 3-D chart types, and offers better control than most packages when it comes to manipulating chart elements. A Project Outline window shows your project in a hierarchical view so you can select individual objects that may not be immediately visible. Axum offers graph templates, which let you set up a graph once and then reuse it as often as necessary.

Application (please check all that apply):

- ☒ Verification
- ☒ Validation

Sponsor:

- ☒ Service
  - ☒ Army
  - ☒ Navy
  - ☒ Air Force
  - ☒ Marine Corps
- ☒ DoD Agency
- ☒ Government / Non-DoD
- ☒ Academic
- ☒ Commercial

Is the tool applicable to distributed systems? No response

What is the cost of the tool?

$349.95

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒ M&S Conceptual Modeling
- ☒ M&S Design
- ☒ M&S Assessment / Evaluation
- ☒ M&S Interoperability / Compatibility
- ☒ V&V Documentation / Reporting

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response

Development Environment: No response

Software language(s) which the tool accommodates:

S-Plus

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Algorithms
☒Behaviors
☒Prototypes
☒Test Planning / Execution
☒Results Evaluation

Tool Use Considerations:

Host Computer(s)
Disk Space / RAM Required
90 MB disk space; 145 MB for full installation
32 MB RAM
Operating System(s)
Windows 95, 98, NT4.0 or higher
Network(s)
Yes
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool? **No response.**
Length
Where Available

Additional Tool Information:

Language(s) Used
S-Plus
Classification level
Distribution limitations
Sponsor / Owner
MathSoft, Inc EEPD
Developer (organization, point of contact, address, phone number, email)
Terry Rochford
101 Main St
Cambridge, MA 02142
617-577-1017

Distribution Point of Contact (name, title, organization, address, phone number, email)
Susan Z. Robins
101 Main St
Cambridge, MA 02142
617-577-1017

Previous Users and Uses:

Name Organization Phone number Email Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?
Product has a GSA schedule.

Tool Name: Insure++, CodeWizard, TCA, INUSE, WebKing, and C++ Test

Brief description of the tool, its primary use(s), and the issues it addresses:

Insure++: The most thorough automatic runtime error detection tool for C/C++ supporting most UNIX platforms including Linux, and Windows.

TCA: Total Coverage Analysis, coverage model that tells users by file, function or directory, what Insure++ has instrumented.

INUSE: Graphic amlloc monitor that helps optimize memory allocation for C/C++ development.

CodeWizard: Automatic source code analyzer for C/C++. It automates coding standardsautomatically (with over 140 built-in coding standards for C and C/C++, users can customize their own standards as well.)

Jtest: Automatic unit testing tool for Java and static testing module. Jtest automatically performas white box, black box, and regression testing on Java code. It also has a static analysis feature that enables developers to automate coding standard verification and analysis.

WebKing: Web/development/testing tool thatenalbes developers/QA to test dynmaic web sites by performing functionality testing as well as load stress testing.

Application (please check all that apply):

- ☒ Verification
- ☒ Validation
- ☒ Accreditation

Sponsor:

- ☒ Commercial

Is the tool applicable to distributed systems?

- ☒ Yes

What is the cost of the tool? **Please contact developer.**

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒ M&S Requirements
- ☒ M&S Implementation
- ☒ M&S Testing and Integration:
  - ☒ Unit
  - ☒ Function
- ☒ M&S Use/Application and Maintenance
- ☒ Accreditation / Certification
- ☒ Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
- ☒Closed Form
- ☒Continuous
- ☒Distributed Processing
- ☒Distributed Simulation

Development Environment:
- ☒Structured
- ☒Object-Oriented
- ☒Formal System
- ☒Waterfall
- ☒Evolutionary / Spiral
- ☒Rapid Prototyping

Software language(s) which the tool accommodates:

C, C++, JAVA, HTML, AND XML

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☒System / Component Interfaces
- ☒Human Interfaces (e.g., GUIs)
- ☒Algorithms
- ☒Behaviors
- ☒Prototypes
- ☒Management
- ☒Test Planning / Execution
- ☒Results Evaluation

Tool Use Considerations:

Host Computer(s)
Disk Space / RAM Required **300 MB, 64 MB**
Operating System(s) **Unix, Linux, HP, AIX, DEC, SGI, and Solaris, Windows 95, 98, NT, and 2000**
Network(s)
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length
Where Available

Very little training is required, typically, someone can get up and going within a relatively short time frame after reviewing the "Getting Started Guide"

Additional Tool Information:

Language(s) Used
Classification level
Distribution limitations **None**
Sponsor / Owner **ParaSoft**

Developer (organization, point of contact, address, phone number, email)

Josh Oakes
ParaSoft
2013 S. Myrtle Ave.
Monrovia, CA 91016
(888)305-0041x114
oakes@parasoft.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

Josh Oakes
ParaSoft
2013 S. Myrtle Ave.
Monrovia, CA 91016
(888)305-0041x114
oakes@parasoft.com

Previous Users and Uses:

Name Organization Phone number Email Use of Tool

Numerous. Contact ParaSoft for information.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: Caliber-RBT

Brief description of the tool, its primary use(s), and the issues it addresses:

Caliber-RBT is a requirements-based, functional test case design tool that drives clarification of application requirements and designs the minimum number of test cases for maximum functional coverage. By thoroughly evaluating application requirements for errors and logical inconsistencies, Caliber-RBT enables project teams to refine and validate the requirements earlier in the development lifecycle. The earlier in the lifecycle requirement errors are found and corrected, the less costly and time-consuming they are to fix. Caliber-RBT uses the requirements as a basis to design the minimum number of test cases needed for full functional coverage. Caliber-RBT then allows project teams to review both the requirements and the test cases in a variety of formats, including a logic diagram and structured English functional specification to ensure that the requirements are correct, complete, fully understood and testable.

Application (please check all that apply):

☒Verification

Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool?

Caliber-RBT pricing is dependant upon the number of seats purchased. The table below details pricing options for North America. International pricing varies slightly.

Options	Pricing
1 Seat	$3,495
2-5 Seats	5% discount
6-10 Seats	10% discount
11-20 Seats	15% discount
21-35 Seats	20% discount
36-50 Seats	25% discount
51-100 Seats	30% discount
Over 100 seats	33% discount
Maintenance	18% of the $3,495 list price

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Requirements
☒M&S Testing and Integration:
- ☒Unit
- ☒Function

☒Sub-system
☒System
☒M&S Modification

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
☒Closed Form
☒Continuous
☒Discrete Event
☒Real-Time
☒Human / System / Hardware-in-Loop
☒Distributed Processing
☒Distributed Simulation

Development Environment:
☒Structured
☒Object-Oriented
☒Formal System
☒Waterfall
☒Evolutionary / Spiral
☒Rapid Prototyping

Software language(s) which the tool accommodates:

Caliber-RBT designs test cases for any application, written in any language, running on any platform.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Data:
☒Collection
☒System / Component Interfaces
☒Human Interfaces (e.g., GUIs)
☒Algorithms
☒Behaviors
☒Prototypes
☒Test Planning / Execution
☒Results Evaluation

Tool Use Considerations:

Host Computer(s) Pentium
Disk Space / RAM Required
64 Mb RAM
10 Mb hard disk space for program

Free disk space for work files (amount of free space required will vary by organizational needs)
Operating System(s)
Microsoft Windows 95/98/NT/2000
Network(s)
LAN/WAN
Special Configurations
None
Required Application Software
None currently. Version 5.6 will include a Visio 2000 front-end.
VV&A Status of the Tool
The current version of Caliber-RBT, v5.5, is generally available.

What training is required for personnel to use the tool?

Caliber-RBT is strongly rooted in process and methodology. Therefore, many of the classes offered are focused on process, rather than on the tool itself. End users must understand the requirements-based testing process in order to use Caliber-RBT effectively. Several classes are available, from those for the general user to the skilled test case designer. Classes are available either on-site or at one of TBI's public training facilities in Atlanta, GA or Dallas, TX.

The classes available are:

Class	Length	Description
Finding Ambiguities in Requirements	1 day	A process-oriented class that provides a powerful, yet practical method for ensuring that specifications are clear, concise and unambiguous.
Writing Testable Requirements	3 days	A techniques and process-oriented class that focuses on problem avoidance by teaching how to write requirements correctly the first time. Provides a set of practical guidelines for writing testable requirements to ensure that sufficient test cases can be created from the requirements.
Requirements-Based Testing	3 days	A process-oriented class that provides students with a set of practical, yet rigorous techniques for testing the requirements to ensure that they are complete, consistent, accurate and unambiguous. The third day includes an introduction to using Caliber-RBT, which automates much of the requirements-based testing process.
Code-Based Testing	1 day	A process-oriented class that provides a technique for identifying the logic and data flows in a program, allowing more comprehensive testing..

Additional Tool Information:

Language(s) Used
C++
Classification level
N/A
Distribution limitations
N/A
Sponsor / Owner
N/A
Developer (organization, point of contact, address, phone number, email)

Technology Builders, Inc.
400 Interstate North Parkway
Suite 1500
Atlanta, GA 30339
770-937-7900

Contact: Richard Bender
518-743-8755
rbender@tbi.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

Jennifer Lauck
Shipping
Technology Builders, Inc.
400 Interstate North Parkway
Suite 1500
Atlanta, GA 30339
770-661-3594
jlauck@tbi.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

TBI Corporate Policy strictly prohibits us from providing specific information about our customers. If you would like to inquire about references, please contact TBI at 800-879-9645 or email info@tbi.com.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Caliber-RBT is the industry's leading functional test case design system, and is integrated with Caliber-RM, TBI's requirements management system. Caliber-RBT can be used to generate test case definitions for any type of application, written in any language, running on any platform. When used throughout the software development lifecycle, Caliber-RBT aids in identifying ambiguities and omissions present in a system's design. It is the only tool available that utilizes a mathematically rigorous technique to generate the minimum set of test case definitions necessary to detect any 'fault' in the functional operation of the system under test based on the requirements.

Currently, Caliber-RBT is integrated with the following tools:

- Caliber-RM, TBI's requirements management system
- TestDirector®, a test planning and management tool from Mercury Interactive
- WinRunner®, a functional automated testing tool from Mercury Interactive
- Export to other leading capture/playback tools also is available

The Caliber-RBT integrations with TestDirector and WinRunner allow test case definitions designed by Caliber-RBT to be exported to ensure that the tests built are the same as those designed. Caliber-RBT uses cause and effect statements derived from the actual application requirements in Caliber-RM to design the minimum number of test cases required for full functional test coverage. These test case definitions then can be exported to TestDirector and WinRunner to allow the test team to build the tests designed. Each step, along with the action to be performed and the expected result, is fully documented in TestDirector and WinRunner.

The Caliber-RBT integrations with other capture/playback tools allows the test case definitions designed by Caliber-RBT to be exported to a format that can be used by those tools.

Other comments?

Tool Name: Caliber-RM® and Caliber-RM Professional™

Brief description of the tool, its primary use(s), and the issues it addresses:

TBI's Caliber-RM is a collaborative, Web-based requirements management system that enables organizations to develop higher quality e-business and enterprise applications. By allowing all project stakeholders—including business analysts, product marketing, developers, testers and end users—to collaborate on project requirements, Caliber-RM helps organizations ensure that their applications will meet end-user needs. Caliber-RM facilitates communication among project teams, providing centralized requirement data to distributed team members and allowing documented discussions about requirements and projects. Through lifecycle traceability between requirements and related development and testing tools, Caliber-RM enables project teams to understand the impact of potential requirement changes on the project scope, schedule and budget before the changes are accepted. And when requirement changes are made, Caliber-RM keeps team members up to date by automatically notifying responsible individuals of the changes. Caliber-RM also enables team members to quickly identify potential requirement problems by highlighting ambiguous and commonly-used terms defined in a shared glossary. In addition, Caliber-RM enables project teams to manage scope creep through requirement versioning and project baselines. With Caliber-RM, organizations can better control their requirements definition and management process to increase quality and meet expectations.

Caliber-RM Professional adds decision support that allows advanced query and analysis of project requirements, enabling project teams to make better business decisions. By allowing team members to review, correlate and compare requirement metrics data from multiple projects in their Caliber-RM repository, Caliber-RM Professional enables them to make informed decisions that could influence project success. With Caliber-RM Professional, project managers can easily review pertinent requirement metrics, such as how many high-risk, high-priority requirements are owned by each team member, and the estimated development effort of each. The data then can be used to make business decisions, such as how to reduce the risk of schedule delays due to overly complex requirements assigned to overloaded or inexperienced team members. Armed with multiple views of the project data throughout the development cycle, project managers can be confident that they are making the best possible choices for the success of the project and the organization.

Application (please check all that apply):

☒Verification
☒Validation

Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool?

Caliber-RM pricing is dependant upon concurrent or seat-based licenses. The table below details pricing options for North America. Quantity discounts are available, and international pricing varies slightly.

Options	Products	Pricing
Seat-Based Pricing	**Caliber-RM Server** **Caliber-RM Client (Web or Desktop)** **Caliber-RM WebView Client (Read-Only)** ***Note:*** *Seats may be either desktop or Web, and are interchangeable. The only restriction is on the total number of seats licensed.*	$9,995 each $1,495 each $295 each
Concurrent Pricing	**Caliber-RM Server** *1.1.1.1.1 Caliber-RM Concurrent User (Web or Desktop)* Web Viewer (Read-Only) Concurrent User ***Note:*** *Seats may be either desktop or Web, and are interchangeable. The only restriction is on the total concurrent users licensed.*	$9,995 each $4,995 each $795 each

Caliber-RM Professional pricing is seat-based only. Concurrent licenses cannot be upgraded to Caliber-RM Professional seats. The table below details pricing options for Caliber-RM Professional.

Options	Products	Pricing
New Purchase	**Caliber-RM Professional DataMart (required)** **Caliber-RM Professional** Includes Caliber-RM and Caliber-RM Professional Explorer **Caliber-RM Professional Explorer**	$4,995 each $2,995 each $1,995 each
Upgrade	**Caliber-RM Professional DataMart (required)** **Caliber-RM Professional Explorer** Upgrades seat-based Caliber-RM license only	$4,995 each $1,495 each

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Requirements
☐M&S Testing and Integration:
☒Function

☒M&S Use/Application and Maintenance
☒M&S Assessment / Evaluation
☒M&S Interoperability / Compatibility
☒M&S Modification
☒V&V Planning (including resource estimation)
☒V&V Documentation / Reporting
☒V&V Management
☒Accreditation / Certification
☒Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response

Development Environment:
☒Structured
☒Object-Oriented
☒Waterfall
☒Evolutionary / Spiral
☒Rapid Prototyping

Software language(s)which the tool accommodates:

Caliber-RM is a requirements management system, so it is not language-dependant. Caliber-RM and Caliber-RM Professional support the development of any application in any language.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Management
☒Test Planning / Execution

Tool Use Considerations:

Host Computer(s)

Server: 300 MHz Pentium II or higher
Windows Client: 200 MHz Pentium II or higher
Web Client: any machine with a Java-enabled browser, must be able to run the Sun Java 1.3 plug-in

Disk Space / RAM Required

Server: 128 Mb RAM, 125 Mb hard disk space
Windows Client: 64 Mb RAM, 50 Mb hard disk space
Web Client: N/A – runs through browser

Caliber-RM Professional Client: 150 Mb hard disk space

Operating System(s)

Server: Windows NT 4.0 or higher, SP3, or Windows 2000
Windows Client: Windows NT/95/98/2000
Web Client: any OS that can run the Sun Java 1.3 plug-in
Caliber-RM Professional Client: Windows 98/2000 or Windows NT 4.0 SP6a

Network(s)

Caliber-RM uses TCP/IP, and can be run over a LAN, WAN or any Internet connection

Special Configurations

None

Required Application Software

Server is required for all installations. Clients can be either Windows or Web. Windows clients must be installed on individual machines. Web clients do not require installation on the client side.

VV&A Status of the Tool

The current version of Caliber-RM, v3.1, is generally available. Caliber-RM Professional v3.2 (version numbers are consistent with Caliber-RM) is scheduled to be released at the end of February, 2001.

What training is required for personnel to use the tool?

Caliber-RM and Caliber-RM Professional are very easy to learn and use. Several classes are available, from those for the general user to administrator classes. Classes are available either on-site or at one of TBI's public training facilities in Atlanta, GA or Dallas, TX.

The classes available are:

Class	Length	Description
Introduction to Caliber-RM	1 day	Provides an overview of the features and functions of Caliber-RM. Students learn how to add, change and delete requirements and their attributes.
Managing Requirements Using Caliber-RM	2 days	Provides intensive hands-on training on the requirements management lifecycle and the techniques used to elicit, analyze, represent, validate and manage changing requirements in Caliber-RM. (This course is optional.)
Administering Caliber-RM	1 day	Provides hands-on training of Caliber-RM Administrator functions. This course is required only for Caliber-RM administrators.
Caliber-RM Advanced	1 day	Provides hands-on training of the advanced capabilities of Caliber-RM, including Import and Export, Caliber Document Factory, and reporting and analysis strategies using Export to Access. This course is designed for individuals who need advanced reporting functionality.
Caliber-RM Professional	2 days	Provides hands-on training of the advanced query and analysis capabilities of Caliber-RM Professional.

Additional Tool Information:

Language(s) Used
Visual C++, Java

Classification level
N/A
Distribution limitations
Windows clients: N/A
Web clients: Sun Java 1.3 plug-in
Sponsor / Owner
N/A
Developer (organization, point of contact, address, phone number, email)

Technology Builders, Inc.
400 Interstate North Parkway
Suite 1500
Atlanta, GA 30339
770-937-7900

Contact: Darrell Kalichak
770-937-7849
Darrell@tbi.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

Jennifer Lauck
Shipping
Technology Builders, Inc.
400 Interstate North Parkway
Suite 1500
Atlanta, GA 30339
770-661-3594
jlauck@tbi.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

TBI Corporate Policy strictly prohibits us from providing specific information about our customers. If you would like to inquire about references, please contact TBI at 800-879-9645 or e-mail info@tbi.com.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Generally, it is TBI's intent to provide Caliber-RM integrations to leading third-party products that process information based upon requirements throughout the software development lifecycle, allowing for more accurate impact analysis and a better overall understanding of the project. These integrations focus on test management, object modeling, analysis and design, software configuration management, and project management and estimation. TBI has no plans to develop these types of tools. Instead, TBI intends to provide bi-directional, dynamic interfaces with the market leading tools. TBI's primary objective is to provide added benefit to these products as well as the complete development lifecycle through integration with the TBI-Caliber suite and other related products.

1.1.2 TEST CASE DESIGN TOOLS

Requirements-based testing is the process of 1) testing the requirements to ensure that they are correct, complete, unambiguous and logically consistent and 2) designing and building tests for applications based on the requirements of that application, to allow higher functional and code coverage. Caliber-RM integrates with Caliber-RBT, TBI's functional test case design tool, for more robust test case design early in the test planning process. This integration allows links to be established between requirements in Caliber-RM and their associated cause-effect graph files in Caliber-RBT, which are graphical representations of the requirements. Caliber-RBT uses the requirement information to generate test case definitions. When changes are made, these links help the project team identify which requirements and cause-effect graphs are affected. A more robust integration was delivered with the release of Caliber-RM version 3.1 and Caliber-RBT version 5.5.

The Caliber-RM v3.1/Caliber-RBT v5.5 integration features the following enhancements:

- Create links from Caliber-RBT test cases to requirements in Caliber-RM
- View list of all requirements in Caliber-RM with links to test cases in Caliber-RBT
- View details of linked requirements in Caliber-RM directly from within Caliber-RBT
- View Caliber-RBT Cause-Effect Graphs from within Caliber-RM, depicting the functional relationships and conditions present in the requirements
- View Caliber-RBT Test Cases directly from within Caliber-RM
- View Caliber-RBT Test Case Coverage Analysis from within Caliber-RM to examine which test cases cover which functional variations
- View Caliber-RBT Functional Specifications from within Caliber-RM, which provide an "as-built" specification for the application under test
- Launch Caliber-RM from within Caliber-RBT

The use of Caliber-RBT ensures maximum functional coverage with the minimum number of tests, and allows them to be automatically created using a sophisticated mathematical formula, instead of relying on user instincts and experience to guarantee that no requirements have been overlooked, a common error. The industry average code coverage at test completion is under 50%, while Caliber-RBT results in 70% to 90% code coverage during the initial test pass early on in a given project.

TEST MANAGEMENT TOOLS

Test management is a key process in the software development lifecycle. TBI has integrated test management with other software engineering tools through our SQM Framework.

The first phase, delivered in the fall of 1998, provided a bi-directional, dynamic interface with Mercury Interactive's® test management system, TestDirector®. By linking requirements management to test planning and management, project teams are able to link requirements to tests and trace them all the way through enhancement request tracking for a complete test automation solution, helping ensure that applications meet end-user needs.

The second phase, delivered in the summer of 1999, allowed requirements to serve as the basis for tests automatically created in Mercury's TestDirector. The traceability between the newly created tests and the requirements is created automatically and maintained in Caliber-RM's repository.

This integration was enhanced again in Caliber-RM version 3.0 (September 2000) with multi-project support. This allowed a Caliber-RM project to be linked to multiple projects in Mercury TestDirector. This new version also allowed for reporting from the Document Factory, and test status was displayed on the traceability matrix. Also, significant performance improvements were made allowing for much shorter connection times, and more efficient reporting through the document factory.

The LiveLink™ integration of Caliber-RM with TestDirector gives customers direct access to current TestDirector information from within Caliber-RM and allows them to link test planning and execution information to requirements. Caliber-RM's traceability gives project managers the ability to analyze which requirements are covered by test plans, and more importantly, which requirements are not covered, ensuring that all requirements are being tested. In addition, the direct integration with TestDirector gives customers the flexibility to trace to three different levels of information within TestDirector: tests, test steps and test sets. Caliber-RM supplies the requirement data, and TestDirector allows customers to plan tests and track defects based on that data. The result is a more thorough testing process and precise defect classification.

MODELING, DESIGN, AND ANALYSIS TOOLS

Caliber-RM version 2.0, released in June 1999 provided integration with Princeton Softech's® SELECT Enterprise®. This integration enables organizations to have complete traceability of requirements, use cases, objects, models and processes—from requirements gathering all the way through test

and defect management. Together the tools provide a solution for identifying requirements and tracing those requirements through analysis, design, development, and testing. For more information on Princeton Softech (formerly SELECT Software Tools), visit (http://www.selectst.com).

This integration was enhanced in September 2000 with Release 3.0 of Caliber-RM whereby SELECT objects were added to the Document Factory, the Traceability Matrix, and the new Traceability Diagram. The integration now supports versions 6.0 and 6.1 of SELECT Enterprise.

Version 3.0 also debuted two new integrations to leading object modeling tools: Embarcadero Technologies' GDPro (http://www.embarcadero.com) and Rational Rose (http://www.rational.com). Caliber-RM's integrates with GDPro by means of an export from Caliber-RM to GDPro. GDPro then handles all synchronization (resolving added, modified, and deleted requirements.)

Caliber-RM integrates with Rational Rose using the new version 3.0 "Drag and Drop Requirements" feature. Requirements in Caliber-RM may be dragged and dropped directly onto objects in Rational Rose (use case, actor, etc.) to set up an association between the requirement and the Rose object. The requirement may then be viewed by the Rose user using the new Requirement Viewer that ships with Caliber-RM version 3.0. The Requirement Viewer is a new Caliber-RM utility that provides detailed information about a requirement and the option to launch Caliber-RM. Rose users are always looking at the most current requirement data available, without having to export data from Caliber-RM into Rose. Also, Rose users may be notified of requirement changes via email notification from Caliber-RM.

In addition to this integration, an even stronger integration with Rational Rose is currently being developed which will include traceability. This integration will allow clients using the Rational Rose modeling tools to link requirements in Caliber-RM to use cases and other objects in Rational Rose, and vice versa. These objects would then appear in the Traceability Matrix, Traceability Diagram, and Document Factory portions of Caliber-RM.

SOFTWARE CONFIGURATION MANAGEMENT TOOLS

TBI recognizes the importance of software configuration management (SCM) in producing quality software. TBI's SQM Framework and our vision of an integrated software quality management solution would not be complete without an integrated SCM solution. TBI provides integration support for several of the most popular products on the market today, such as StarBase StarTeam (http://www.starbase.com/), PVCS Version Manager® and PVCS Dimensions®, both from Merant (http://www.merant.com), Microsoft Visual SourceSafe® (http://www.microsoft.com), Continuus® (http://www.continuus.com), and Rational ClearCase® in Caliber-RM version 3.0, which was released in September 2000. This integration features a LiveLink™ dB Synchronization and most SCM functionality can be accessed directly from within Caliber-RM. This means that changes made in the SCM tool automatically display in Caliber-RM without any importing or exporting of information. SCM integration can be enabled or disabled on a per project basis.

The integration will allow users to link requirements via traceability to entities (source code, bitmaps, etc.) that securely reside in and are versioned by SCC-compliant tools. Through the SCC interface, customers will be free to choose or continue to use their favorite SCM tool and receive the full benefits of integration with requirements management, problem/change request tracking, test management and others. The integration allows users to link requirements via traceability to entities (source code, bitmaps, etc.) that securely reside in and are versioned by SCC-compliant tools. Through the SCC interface, customers will be free to choose or continue to use their favorite SCM tool and receive the full benefits of integration with requirements management, problem/change request tracking, test management and others.

TBI's integration focuses on the use of the defined SCC (Source Code Control) interface which all of the leading SCM tools support. At this time, development is underway to allow TBI to create a single SCC compliant interface that will support the necessary level of integration.

PROJECT MANAGEMENT TOOLS

Project management is a natural fit into TBI's product vision. Requirements can be used as the basis to develop more detailed project plans. Caliber-RM contains information, such as responsible team members, which could automatically populate tasks in a project plan. Other useful information such as requirement priority and estimated cost is created in Caliber-RM as user-defined attributes and is then linked directly to appropriate locations in the project plan.

TBI is currently in the initial phase of forming partnerships with several of the market-leading project management providers. An integration with Caliber-RM and Project Management is anticipated by mid 2001. A formal announcement will be made as soon as details become available.

Currently, the Document Factory™ generates an export file to create a Microsoft® Project 98® or Microsoft® Project 2000® project plan from selected requirements.

The requirement name is brought over to a new or existing MS Project file as the task name; the requirement owner becomes the task resource; and the user-defined attribute 'Number of Days' becomes the MS Project duration, etc. The hierarchy of requirements is preserved. This provides project management with a WBS (Work Breakdown Structure) from requirements to serve as a project plan starting point.

1.1.3 ESTIMATION TOOLS

The information being managed by the components of the SQM Framework is valuable data for input to estimation tools. TBI realizes the value of accurate and complete estimates and therefore intends to enhance the capabilities of the TBI-Caliber products and the SQM Framework to allow for more complete and dynamic estimates.

TBI does not intend to develop an estimation tool, but intends to support integrations with a few of the more powerful estimation tools available. Currently, an integration has been developed for Estimate Professional®, a powerful planning and estimation tool from Software Productivity Center® (http://www.spc.ca). This integration allows effort (stored in days or hours) to be captured in Caliber-RM, and be used as the basis for an estimate in Estimate Professional. Also, "what-if" statements then may be asked of the estimation data, whereby certain expensive requirements may be removed from or significantly altered in the estimation. The input that can be provided by Caliber-RM and other products will only increase the accuracy and value of the estimation tools and provide added benefits to TBI customers.

Tool Name: C-Cover

Brief description of the tool, its primary use(s), and the issues it addresses:
Code coverage analyzer for C/C++.

Application (please check all that apply):

X ☐ Verification
X ☐ Validation

Sponsor:

X ☐ Commercial

Is the tool applicable to distributed systems?

X ☐ Yes

What is the cost of the tool?
One user for one platform with one year of updates $800. For more prices see www.bullseye.com/purchase.html.

Simulation **phases** for which the tool is applicable (please check all that apply):

X ☐ M&S Testing and Integration:
- X ☐ Unit
- X ☐ Function
- X ☐ Sub-system
- X ☐ System

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response

Development Environment: No response

Software language(s) which the tool accommodates:
C++ and C

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

X ☐ Test Planning / Execution

Tool Use Considerations:

Host Computer(s)
Disk Space / RAM Required
Operating System(s)
Windows and Unix

Network(s)
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

None

Additional Tool Information:

Language(s) Used
Classification level
Distribution limitations
Sponsor / Owner
Bullseye Testing Technology
Developer (organization, point of contact, address, phone number, email)
www.bullseye.com, info@bullseye.com
Distribution Point of Contact (name, title, organization, address, phone number, email)

Previous Users and Uses:

Name Organization Phone number Email Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name:

CodeWright
The Programmers Editing System

Brief description of the tool, its primary use(s), and the issues it addresses:

Programmer's who use CodeWright are among the best of the best in their profession. One reason is that they are immediately productive as they move from one project to another, one language to another and even one company to another.
Now, more than ever, CodeWright 6.5 enables you to shine because
eBusiness projects are typically built using multiple languages and web time requires you to be more productive than ever.
CodeSense for Java, enhanced CodeSense for C++ and special support for ASP, XML, HTML, C#, Perl and Python are just part of the exciting new 6.5 release. We call it the evolution of CodeWright, you'll call it just another hyper-productive day at the office!
Application (please check all that apply):

- ✓ Verification
- ✓ Validation
- ✓ Accreditation

Sponsor:

- ✓ OSD
- ✓ Joint
- ✓ Service
- ✓ Army
- ✓ Navy
- ✓ Air Force
- ✓ Marine Corps
- ✓ DoD Agency
- ✓ Government / Non-DoD
- ✓ Academic
- ✓ Commercial

Is the tool applicable to distributed systems?

- ✓ Yes

What is the cost of the tool?

The price for CodeWright is **$299.00*** (US Currency) plus shipping charges. A Getting Started and User Guide is included with each single order. The User Guide is also included on the CD.

*CA and MI residents please apply applicable sales tax.

Maintenance 89.00 per year

Note: Maintenance is only available to US and Canadian customers.

Take part in our maintenance program and receive the following benefits:

- Receive any major upgrades that are released within a year of maintenance purchase free of charge (UPS Ground).
- Receive major upgrades before they are made available to the general public.
- First to be notified of patches and enhancements.
- Free technical support

Simulation **phases** for which the tool is applicable (please check all that apply):

- ✓ M&S Design
- ✓ M&S Implementation
- ✓ M&S Testing and Integration:
  Unit
  Function
  Sub-system
  System
- ✓ M&S Use/Application and Maintenance
- ✓ Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: **No response.**

Development Environment:

- ✓ Structured
- ✓ Object-Oriented
- ✓ Formal System
- ✓ Waterfall
- ✓ Evolutionary / Spiral
- ✓ Rapid Prototyping
- ✓ Other (specify)

Software language(s) which the tool accommodates: **No response.**

*Simulation **aspects** for which the tool is applicable (please check all that apply): **No response.***

Tool Use Considerations:

System Requirements

Refer to the following system requirements for running CodeWright:

- System: For CodeWright 6.5 a 486-class machine is required as a minimum, with at least 16MB of RAM.
- Performance will vary depending on the video adapter, driver and video mode you have selected.
- Memory: CodeWright requires 1MB of memory to operate.
- Windows: You must be running Windows 9x, 2000, ME, or Windows NT 4.0 or greater to run the 32-bit version of CodeWright.
- Storage: A CD-ROM drive and a hard drive are required. CodeWright will store temporary files on the hard drive, or other location specified for temporary files.
- The amount of storage space required varies according to the size and number of files that are being edited.

CodeWright Specifications

CodeWright has the following capabilities:

File Size

The Default file size is 500 Mb. Using the -BlockSize= command line flag described in the User's Guide chapter on Large Files, a single 2Gb file can be edited (or two 1Gb files). The default block size (0x2000) allows a single 500-Mb file to be opened and edited in CodeWright. Even larger blocks would allow even larger files, but 2Gb will still be the overall limit.

Line Length

Line size can be as large as 2Gb when the -Blocksize parameter, mentioned above, is used.

Lines per Buffer Limit

Using the -Blocksize parameter, the number of lines per buffer can be as many as comprise a 2Gb file.

Buffers Limit

The maximum number of buffers is limited only by storage (memory and disk).

Windows Limit

Microsoft Windows limits the number of windows.

Number of Files

The number of files being edited is limited to 65,535, subject to the limit on total file size given previously.

Clipboard/Scrap Buffer Size

There is no limit to the size of the Windows Clipboard. Also, CodeWright allows multiple Clipboards to be used. Alternatively, multiple Scrap buffers can be used,
operating under the buffer limits described above.

Search String Length

Search strings are limited to 64K.

VV&A Status of the Tool

What training is required for personnel to use the tool?

Length **Customized from 3-5 days**
Where Available **On-site or Public available**

Additional Tool Information:

Language(s) Used
C/C++ assembler
Classification level
Distribution limitations
Standard Single user license. OEM options are available.
Sponsor / Owner
Starsbase

Developer (organization, point of contact, address, phone number, email)

Distribution Point of Contact (name, title, organization, address, phone number, email)

Phone: (503) 641-6000
(800) 547-9902
Fax: (503) 641-6001

Email
Sales – sales@premia.com
Support – support@premia.com

Office Hours
We are available to answer your calls between the hours of
7am and 5pm PST,
Monday - Friday
(except holidays).

Mail
Premia Corporation
9615 SW Allen Blvd.
Beaverton, OR 97005
USA

Previous Users and Uses:

Name Organization Phone number Email Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: COSTMODELER 1.0

Brief description of the tool, its primary use(s), and the issues it addresses:
A generalized platform for the development, testing, and application of software cost estimation models.

Application (please check all that apply):

☒Verification - if an independent team used it to compare estimates
☒Validation - if an independent team used it to compare estimates

Sponsor:

☒Government / Non-DoD

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool? Developed by NASA so there is no cost to NASA civil servant

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Planning (including resource estimation)
☒M&S Assessment / Evaluation
☒V&V Planning (including resource estimation)

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No Response
Development Environment:
☒Structured
☒Object-Oriented
☒Formal System
☒Waterfall
☒Evolutionary / Spiral
☒Rapid Prototyping

Software language(s) which the tool accommodates: any, as long as you have conversion routines

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Management

Tool Use Considerations:

Host Computer(s) - PC / DOS
Disk Space / RAM Required
Operating System(s) - 16-bit application
Network(s)
Special Configurations - reboot into DOS mode
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

No response

Additional Tool Information:

Language(s) Used
Classification level
Distribution limitations
Sponsor / Owner : developed by NASA Johnson Space Center
Developer (organization, point of contact, address, phone number, email)
Distribution Point of Contact (name, title, organization, address, phone number, email)

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: Data Verification Interactive Editor (DAVIE)

Brief description of the tool, its primary use(s), and the issues it addresses:

DAVIE is a Government-off-the-shelf (GOTS) data quality tool used to conduct data verification edits on existing ASCII data files or relational data base tables.

Application (please check all that apply):

☒Verification

Sponsor:

☒OSD

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool?

DAVIE is free to government agencies.

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Design
☒M&S Implementation
☒M&S Testing and Integration:
- ☒Unit
- ☒Function
- ☒Sub-system
- ☒System

☒M&S Use/Application and Maintenance
☒M&S Assessment / Evaluation
☒M&S Modification
☒V&V Documentation / Reporting
☒Accreditation / Certification
☒Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: All

Development Environment: Any system that uses data.

Software language(s) which the tool accommodates:

DAVIE can be used by Government sites having a SQL-based Relational Database Management System (RDBMS) such as Oracle, IBM Database 2, Ingres, Sybase, Informix, and many Open Data Base Connectivity (ODBC) compliant database

systems. The versatility of ODBC allows common access to many different data storage techniques (such as ASCII files, X-base databases, and relational database management systems).

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Data:
☒Reduction
☒Test Planning / Execution
☒Results Evaluation

Tool Use Considerations:

Host Computer(s) **PC**
Disk Space / RAM Required
Operating System(s)

WIN 95/98 OR WIN NT. YOU NEED A COPY OF PERSONAL ORACLE 7 FOR PC OR SYBASE SQL ANYWHERE 5.0.

Network(s)

N/A
Special Configurations

N/A
Required Application Software

DAVIE operates under Windows95 or Windows NT 4.0. DAVIE uses the object oriented PowerBuilder environment to verify data in an internal database or data stored in RDBMSs on a network. It operates on data in ASCII fixed-length files, data in other ASCII file formats (such as comma-separated variable and other formats), and data stored in formats such as dBase, Foxpro, and Paradox.
VV&A Status of the Tool

OPERATIONAL

What training is required for personnel to use the tool?

SELF TAUGHT WITH USERS MANUAL AND EXTENSIVE ON -LINE HELP

Additional Tool Information:

Language(s) Used

Windows
Classification level
Unclassified
Distribution limitations
Distribution limited to government or government-sponsored agencies.
Sponsor / Owner
OSD, DMSO
Developer (organization, point of contact, address, phone number, email)

Computing Technologies, Inc. (CoTs)

Distribution Point of Contact (name, title, organization, address, phone number, email)

Mr Mike Capitman, DMSO, 1901 N. Beauregard St, S-500, Alexandria, VA 22311, 703-824-4341, capitman@dmso.mil.

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

- **DMSO CMMS Library**
- **TRADOC Analysis Center, White Sands**
- **All Service Combat Identification Evaluation Team**
- **Georgia Techl Research Institute**

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: DAKOTA (Design Analysis Kit for OpTimizAtion)

Brief description of the tool, its primary use(s), and the issues it addresses:
The DAKOTA toolkit utilizes object-oriented design with C++ to achieve a flexible, extensible interface between analysis codes and system-level iteration methods. This interface is intended to be very general, encompassing broad classes of numerical methods which have in common the need for repeated execution of simulation codes. The scope of iteration methods available in the DAKOTA system currently includes a variety of optimization (gradient, nongradient, and approximate), uncertainty quantification (analytic, sampling, and stochastic finite element), parameter estimation (nonlinear least squares), and sensitivity/primary effects analysis (design of experiments and parameter study) methods. Currently, over 20 simulation codes have been interfaced from the disciplines of nonlinear solid mechanics, structural dynamics, fluid mechanics, heat transfer, shock physics, reacting flows, and many others. This allows the use of these simulations as virtual prototypes to address fundamental engineering questions, such as "what is the best design?", "how safe is it?", or "how much confidence do I have in my answer?". The system also provides a platform for research and rapid prototyping of advanced methodologies which focus on increasing the robustness and efficiency of these systems analyses for computationally complex engineering problems. Specific research emphases include massively parallel computing, surrogate-based optimization, optimization under uncertainty, mixed integer nonlinear programming, and simultaneous analysis and design.

Application (please check all that apply):

X Verification
X Validation

Sponsor:

X Government / Non-DoD

Is the tool applicable to distributed systems?

X Yes (from multiprocessor desktops on the low end, to networks of workstations, to massively parallel computers with thousands of processors on the high end)

What is the cost of the tool? Currently varies from free to nominal cost (refer to http://endo.sandia.gov/DAKOTA/licensing/license.html for current licensing procedure). GNU licensing is currently under investigation.

Simulation **phases** for which the tool is applicable (please check all that apply):

X M&S Design
X M&S Assessment / Evaluation
X M&S Modification

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
X Closed Form
X Continuous
X Discrete Event
X Distributed Processing

X Distributed Simulation

Development Environment:
X Object-Oriented

Software language(s) which the tool accommodates: C/C++, F77/F90, Perl and shell scripts

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

X Algorithms
X Prototypes

Tool Use Considerations:

Host Computer(s) – Unix platforms, LINUX, custom massively parallel machines
Disk Space / RAM Required – 20 MB
Operating System(s) – Sun Solaris, SGI Irix, IBM AIX, HP UX, Compaq TruUnix and LINUX, PC Red Hat LINUX, massively parallel: ASCI Red/Blue/White and Cplant.
Network(s) – Unix/LINUX networks, communication with the Message Passing Interface (MPI)
Special Configurations
Required Application Software – refer to http://endo.sandia.gov/DAKOTA/licensing/license.html
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length – varies (typically days)

Where Available – through Sandia National Laboratories Licensing Center (see http://endo.sandia.gov/DAKOTA/licensing/license.html for contact information).

Additional Tool Information:

Language(s) Used: C++ with some C and F77
Classification level: unclassified
Distribution limitations: export control EAR99
Sponsor / Owner: Sandia National Laboratories
Developer (organization, point of contact, address, phone number, email)

Michael S. Eldred
Sandia National Laboratories
P.O. Box 5800, Mail Stop 0847
Albuquerque, NM 87185-0847
(505)844-6479, FAX:(505)844-9297
mseldre@sandia.gov
http://endo.sandia.gov/~mseldre/

Distribution Point of Contact (name, title, organization, address, phone number, email)

Same as above

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

proprietary

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?
Extensive project information available on line from http://endo.sandia.gov/DAKOTA

MSIAC M&S VV&A Tool Survey Form

Tool Name:

DOORS

DOORSNET

Quality Systems & Software (QSS) has recently been acquired by Telelogic.

Brief description of the tool, its primary use(s), and the issues it addresses:

DOORS(R) is the world's leading requirements management tool; a standard used by more than 50,000 users at over 1,000 companies around the world. A multi-platform, enterprise-wide requirements management tool designed to capture, link, trace, analyze, and manage a wide range of information to ensure a project's compliance to specified requirements and standards. DOORS has the power and scalability to manage large, complex projects with many concurrent users collaborating over a network. For more information, please go to: http://www2.telelogic.com/doors/products/doors/ .

DOORSnet™ is a web-based tool that gives your project team access to live DOORS(R) data anytime, anywhere. Using a standard web browser and the Internet, your corporate intranet, or a local area network, selected team members can view, search, sort, and edit requirements information and submit change proposals against key data and documents. Particularly useful in cutting down on time-consuming weekly reports and conference calls, DOORSnet keeps mobile or remote users in the loop - increasing collaboration and speeding feedback from anywhere around the globe. For more information, please go to: http://www2.telelogic.com/doors/products/doorsnet/ .

Application (please check all that apply):

- ☒Verification
- ☒Validation
- ☒Accreditation

Sponsor:

- ☒OSD
- ☒Joint
- ☒Service
  - ☒Army
  - ☒Navy
  - ☒Air Force
  - ☒Marine Corps
- ☒DoD Agency
- ☒Government / Non-DoD
- ☒Academic

☒Commercial

Is the tool applicable to distributed systems?

☒Yes
☐No

What is the cost of the tool?

List price:

DOORS	$5000 per license (concurrent)
DOORSnet	$5000 per package of 5 licenses (concurrent)

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Planning (including resource estimation)
☒M&S Requirements
☒M&S Conceptual Modeling
☒M&S Design
☒M&S Implementation
☒M&S Testing and Integration:
- ☒Unit
- ☒Function
- ☒Sub-system
- ☒System

☒M&S Configuration Management
☒M&S Use/Application and Maintenance
☒M&S Assessment / Evaluation
☒M&S Interoperability / Compatibility
☒M&S Modification
☒V&V Planning (including resource estimation)
☒V&V Documentation / Reporting
☒V&V Management
☒Accreditation / Certification
☒Standards Compliance
☐Other (specify)

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
- ☒Closed Form
- ☒Continuous
- ☒Discrete Event
- ☒Real-Time
- ☒Human / System / Hardware-in-Loop
- ☒Distributed Processing

☒Distributed Simulation
☐Other (specify)

Development Environment:
☒Structured
☒Object-Oriented
☒Formal System
☒Waterfall
☒Evolutionary / Spiral
☒Rapid Prototyping
☐Other (specify)

Software language(s) which the tool accommodates:

DOORS Extension Language (DXL)

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Architecture
☒Data:
☒Collection
☒Reduction
☒System / Component Interfaces
☒Human Interfaces (e.g., GUIs)
☒Algorithms
☒Behaviors
☒Prototypes
☒Management
☒Test Planning / Execution
☒Results Evaluation
☐Other (specify)

Tool Use Considerations:

Host Computer(s)
Windows PC
Unix

Disk Space / RAM Required

1.1.4 Windows Server (must be running TCP/IP)

- Windows NT, Windows 2000: **128MB** more than is recommended for the Windows system being used.
- Windows 95, Windows 98 not recommended.
- **40MB** disk space recommended for installation and use.

1.1.5 Windows Client

- Windows 95, Windows 98, Windows NT, Windows 2000: **64MB** using a **200MHz** Pentium processor or higher.
- **30MB** disk space recommended for installation and use.

1.1.6 UNIX Server

Follow the manufacturer's recommendation for RAM.
40Mb disk space recommended for installation and use.

1.1.7 UNIX Client

Follow the manufacturer's recommendation for RAM.
40Mb disk space recommended for installation and use.

Operating System(s)

Microsoft Windows 95
Microsoft Windows 98
Microsoft Windows NT 4 (Service Pack 6a)
Microsoft Windows 2000

Sun Solaris 2.6 or 7 (server)
HP/UX 10.2 and 11 (32 and 64 bit versions); (server)
Compaq (was Digital) Tru64 UNIX version 4.0d (server)

Network(s)

TCP/IP

Special Configurations

None

Required Application Software

None

VV&A Status of the Tool

What training is required for personnel to use the tool?

No training is required (DOORS even comes with a computer-based training tutorial), however Telelogic offers a variety of courses to enable the most success with DOORS.

Telelogic provides training and education programs focusing on systems engineering, requirements management, Telelogic DOORS(R) Enterprise Requirements Suite (DOORS/ERS) and other products. All of our courses are given by Telelogic consultants with experience in systems or software engineering as well as technical training.

Our courses combine theory and experience, drawing on the best working practices established by leading industrial businesses and organizations worldwide. Each course is adapted to suit the requirements of the participants, whether strategists, managers or implementors, with plenty of hands-on practical work, interaction and exercises.

These courses are frequently combined with follow-up consulting to transfer the knowledge gained into good working practice.

DOORS courses

DOORS Enterprise Requirements Suite Training Course (1 day)
Using DOORS Enterprise Requirements Suite.

Using DOORS with UML (2 days)
An integrated approach to object-oriented development with DOORS.

Applying DOORS (2 days)
DOORS functionality and its application.

Applying DOORS Primer (1 day)
The basics without the baffle.
* only available in the USA

DOORS Evaluation Training (1 day course and 15 day trial)
* only available in the USA

Customizing DOORS with DXL (2 days)
DOORS extension language for application engineers.

DXL Primer (1 day)
One day DXL Training for the Non-Programmer.

Transition to DOORS 5 (1 day)
* only available in the USA

DOORS 5 Administration Transition (1 day)
* only available in Europe

DOORS 5 User Transition (1 day)
* only available in Europe

Methodology courses

Requirements Methodology (2 days)
US courses
European courses
The role and use of requirements within the systems development process.

Meeting the Business Objectives (1 day)
Essential for managers deploying technology and systems projects.

Writing Better Requirements (1 day)
US courses

European courses
Learn how to organize, prioritize and track essential project details.

Other courses

Practical Application Training (PAT) (1 day)
A one-day extension to our on-site training courses. Apply your newly acquired skills to your project today!
* only available in the USA

DOORS System Administration (1 day)
Maintain your DOORS installation across your corporate network.

Train the Trainer (1 day)
Prepare your internal training staff to deliver our training courses.

Introduction to Structured Decision Making (1 day)
DecisionLink methodology course
* only available in the USA

Introduction to Technology and Product Planning (1 day)
VisionMap methodology course
* only available in the USA

Workshops

Structured Decision Making and Risk Management
Structured decision making integrated with your project information.
* only available in the USA

Technology and Product Planning (1 day)
Apply strategic planning and product forecasting to your real-world information.
* only available in the USA

Information Architecture
Define an information model for your project in DOORS.

Length

<see table above>

Where Available

Public courses are available worldwide; there is a Training Facility in Reston, VA.

On-site courses may be arranged.

Additional Tool Information:

Language(s) Used
English
Classification level
N/A
Distribution limitations
none
Sponsor / Owner
N/A
Developer (organization, point of contact, address, phone number, email)

Telelogic
Paul Raymond, DOORS Product Manager
11911 Freedom Drive, Suite 280
Reston, VA 20190
(703) 708-1423
Paul.Raymond@Telelogic.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

Telelogic
Pete Carroll, District Manager
11911 Freedom Drive, Suite 280
Reston, VA 20190
(703) 708-1430
Pete.Carroll@Telelogic.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

This information will be gladly furnished. We would like to further understand your project and application to provide similar customer references.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

DOORS interfaces

EASY INTEGRATION WITH BEST-IN-CLASS TOOLS

Telelogic DOORS(R) has been built with an open architecture that allows integration with other domain-specific tools to share information and improve productivity. This approach provides organizations with a robust requirements management solution that extends into every stage of the product lifecycle.
The following interfaces to DOORS are available:

Product
Interface Vendor
Category

Active Risk Manager
from Strategic Thought
Strategic Thought
Risk Management

COOL:Jex
from Telelogic
Telelogic
Software Modeling

COOL:Teamwork
from Computer Associates
Computer Associates
Software Modeling

ClearCase
from Rational Software
Telelogic
Configuration Management

DocExpress
from ATA, Inc.
ATA, Inc.
Documentation

Foresight
from Foresight Systems, Inc.
Foresight Systems, Inc.
Systems Modeling & Simulation

Framemaker
from Adobe
Telelogic
Authoring

GDPro
from Advanced Software
Advanced Software
Software Modeling

Interleaf
from Interleaf

Telelogic
Authoring

MATLAB, Simulink, Stateflow
from Mathworks, Inc.
Mathworks, Inc.
Systems Modeling & Simulation

MetricCenter
from Distributive Software
Distributive Software
Metrics & Measurement

ObjectGEODE
from Telelogic
Telelogic
Real Time Software Modeling

PVCS Version Manager
from Merant
Telelogic
Configuration Management

Paradigm Plus
from Computer Associates
Platinum Technology
Software Modeling

Project
from Microsoft
Telelogic
Project Management

QADirector
from Compuware Corporation
Compuware Corporation
Software Testing

Rational Rose
from Rational Software
Telelogic
Software Modeling

Real-Time Studio
from Artisan Software
Artisan Software

Real Time Software Modeling

Rhapsody
from I-Logix Inc.
I-Logix Inc.
Real Time Software Modeling

Rose Real Time
from Rational Software
Metex and QSS
Real Time Software Modeling

Software Through Pictures
from Aonix
Aonix
Software Modeling

StarTeam
from Starbase Corporation
Starbase Corporation
Configuration Management

Statemate MAGNUM
from I-Logix Inc.
I-Logix Inc.
Systems Modeling & Simulation

T-Plan Professional
from T-Plan Limited
T-Plan Limited
Software Testing

TestDirector
from Mercury Interactive
Telelogic
Software Testing

TestExpert
from VEReCOMM
VEReCOMM
Software Testing

Together
from TogetherSoft
TogetherSoft
Software Modeling

Word
from Microsoft
Telelogic
Authoring

Other comments?

For additional information, please go to: http://www2.telelogic.com/doors/ .

Tool Name: Department of the Navy (DON) Verification, Validation, and Accreditation (VVA) Turbo Tool

Brief description of the tool, its primary use(s), and the issues it addresses: The DON VVA Turbo Tool produces standardized VVA plans and reports that are consistent with DON VVA policy and guidance.

Application (please check all that apply):

- ☒ Verification
- ☒ Validation
- ☒ Accreditation

Sponsor:

- ☐ Service
  - ☒ Navy

Is the tool applicable to distributed systems?

- ☒ Yes

What is the cost of the tool? Free

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒ V&V Planning (including resource estimation)
- ☒ V&V Documentation / Reporting
- ☒ Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☒ Closed Form
- ☒ Continuous
- ☒ Discrete Event
- ☒ Real-Time
- ☒ Human / System / Hardware-in-Loop
- ☒ Distributed Processing
- ☒ Distributed Simulation

Development Environment:

- ☒ Structured
- ☒ Object-Oriented
- ☒ Formal System
- ☒ Waterfall
- ☒ Evolutionary / Spiral
- ☒ Rapid Prototyping

Software language(s) which the tool accommodates: All.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☒ Architecture
- ☒ Data:
  - ☒ Collection
  - ☒ Reduction
- ☒ System / Component Interfaces
- ☒ Human Interfaces (e.g., GUIs)
- ☒ Algorithms
- ☒ Behaviors
- ☒ Prototypes
- ☒ Management
- ☒ Test Planning / Execution
- ☒ Results Evaluation

Tool Use Considerations:

Host Computer(s) PCs
Disk Space / RAM Required TBD
Operating System(s) Windows 2000 and NT
Network(s)
Special Configurations
Required Application Software MS Access
VV&A Status of the Tool: Tool is still in development, will go out for beta testing in March. Will be submitted to DON M&S Standards Steering Committee for further review.

What training is required for personnel to use the tool? None at the moment..

Additional Tool Information:

Language(s) Used MS Access macros
Classification level Unclassified
Distribution limitations Not available for distribution at this time
Sponsor / Owner DON N6M
Developer (organization, point of contact, address, phone number, email)
IITRI/AB Tech Group
Pamela L. Mayne
4705 Eighth Street, Suite A
Carpinteria, CA 93013
(805) 566-9765
pmayne@impulse.net

Distribution Point of Contact (name, title, organization, address, phone number, email)
Betsy DeLong
DON VVA Program Manager
2511 Jefferson Davis Highway
Arlington, VA 22202

(703) 601-1497
delong.betsy@hq.navy.mil

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
None at this time				

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: EnSight, EnSight Gold, EnLiten, EnVodeo

Brief description of the tool, its primary use(s), and the issues it addresses:

General-purpose visualization software for engineers and scientists

Application (please check all that apply):

☒Validation

Sponsor: _____

Customers

☒Service
- ☒Army
- ☒Navy
- ☒Air Force
- ☒Marine Corps

☒DoD Agency
☒Government / Non-DoD
☒Academic
☒Commercial

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool? **Starts at $4000/year**

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Design

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

☒Other (specify) **Analysis**

Development Environment: No response.

Software language(s) which the tool accommodates: **C,C++**

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Other (specify) **Design**

Tool Use Considerations:

Host Computer(s) **all UNIX, LINUX, Windows**
Disk Space / RAM Required **128 MByte**
Operating System(s) **UNIX, LINUX, Windows**
Network(s) **Yes**
Special Configurations **Need good OpenGL graphics support.**
Required Application Software **None**
VV&A Status of the Tool **?**

What training is required for personnel to use the tool?

Length **2 days**
Where Available **CEI office, near Raleigh, NC, or on-site.**

Additional Tool Information:

Language(s) Used **C, C++**
Classification level **None**
Distribution limitations **None**
Sponsor / Owner **CEI, Inc.**
Developer (organization, point of contact, address, phone number, email)
See below.
Distribution Point of Contact (name, title, organization, address, phone number, email)

CEI Inc.
600 Airport Blvd., Suite 500
Morrisville, NC 27560
T 919-481-4301 F 919-481-4396
Contact: Kent Misegades President Email:kent@ensight.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
Most DoD Research Labs: ARL, AFRL, CEWES, NAVAIR, NAWCAD				
NASA				

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: **Evaluation Environment™**

Brief description of the tool, its primary use(s), and the issues it addresses:

The Evaluation Environment (EE) software product is an integrated development and execution environment for conducting evaluation projects. EE enables the creation of a hierarchy of indicators, criticality weighting of indicators and subject matter experts (SMEs), aggregation of scores, object-oriented rule-based knowledge specification, graphical representation of weights and scores, and HTML report generation. EE also enables an SME to score on the indicators and to provide feedback. Please see http://www.orcacomputer.com/ee/EESet.html for more information.

Application (please check all that apply):

☒Verification
☒Validation
☒Accreditation

Sponsor:

☐Service
☒Navy → Naval Surface Warfare Center Dahlgren Division (NSWCDD)

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool?

The EE software tool is provided **free** of charge for the National Missile Defense program use. Pricing for other uses is situation dependent.

Simulation **phases** for which the tool is applicable (please check all that apply):

☒**M&S Assessment / Evaluation**
☒**V&V Management**
☒**Accreditation / Certification**
☒**Standards Compliance**
☒Other (specify): **The EE tool can be used for the assessment / evaluation of any process used and any work product produced during the M&S development life cycle including the assessment of all of the M&S phases listed above.**

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☒ Closed Form
- ☒ Continuous
- ☒ Discrete Event
- ☒ Real-Time
- ☒ Human / System / Hardware-in-Loop
- ☒ Distributed Processing
- ☒ Distributed Simulation

Development Environment:

- ☒ Structured
- ☒ Object-Oriented

Software language(s) which the tool accommodates: None (It has its own object-oriented language for rule-based knowledge specification.)

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☒ Architecture
- ☒ Data:
  - ☐ Collection
  - ☐ Reduction
- ☒ System / Component Interfaces
- ☒ Human Interfaces (e.g., GUIs)
- ☒ Algorithms
- ☒ Behaviors
- ☒ Management
- ☒ Test Planning / Execution
- ☒ Results Evaluation
- ☒ Other (specify): **The EE tool can be used for the assessment / evaluation of any of the M&S aspects including the ones listed above.**

Tool Use Considerations:

Host Computer(s): **Intel-based PCs**
Disk Space / RAM Required: **Minimum 64MB**
Operating System(s): Windows 95, 98, ME, 2000, NT 4.0
Network(s)
Special Configurations:
Required Application Software
Requires the installation of OPENSTEP Enterprise API
VV&A Status of the Tool: **Passed all required tests**

What training is required for personnel to use the tool?
Length: **3 days**
Where Available: **Training courses are given on customer site upon request.**

Additional Tool Information:

Language(s) Used:
Objective C is the language used for developing the EE tool.
Classification level: **Unclassified**
Distribution limitations: **Unlimited**
Sponsor / Owner: **NSWCDD / Orca Computer, Inc.**
Developer (organization, point of contact, address, phone number, email)

Dr. Osman Balci, President
Orca Computer, Inc.
Virginia Tech Corporate Research Center
1800 Kraft Drive, Suite 111
Blacksburg, VA 24060-6370

Tel: (540) 961-ORCA (6722)
Fax: (540) 961-4162
E-mail: Balci@OrcaComputer.com

Distribution Point of Contact (name, title, organization, address, phone number, email)
Same as above

Previous Users and Uses:

Name:	William F. Ormsby
Organization:	NSWCDD
Phone number:	(540) 653-4657
Email:	OrmsbyWF@nswc.navy.mil
Use of Tool:	National Missile Defense M&S VV&A

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Please see http://www.orcacomputer.com/ee/EESet.html

Other comments? Please see http://www.orcacomputer.com/ee/EESet.html

Tool Name: Ferret

Brief description of the tool, its primary use(s), and the issues it addresses:
No response

Application (please check all that apply):

x☐Validation

Sponsor:
x☐Commercial

Is the tool applicable to distributed systems?

x☐Yes

What is the cost of the tool?
$30,000

Simulation **phases** for which the tool is applicable (please check all that apply):

☐M&S Testing and Integration:
x☐Sub-system
x☐System

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
x☐Continuous
x☐Discrete Event
x☐Real-Time
x☐Distributed Processing

Development Environment:
x☐Formal System
x☐Waterfall
x☐Evolutionary / Spiral
x☐Rapid Prototyping

Software language(s) which the tool accommodates:

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

x☐Results Evaluation
x☐Other (specify)
Test Automation

Tool Use Considerations:

Host Computer(s) PC
Disk Space / RAM Required 4G/32M
Operating System(s) any
Network(s) any
Special Configurations 2 PC cards in PC
Required Application Software Ferret
VV&A Status of the Tool Mature

What training is required for personnel to use the tool?

Length 3 days
Where Available On Site

Additional Tool Information:

Language(s) Used TCL
Classification level
Distribution limitations
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)
Distribution Point of Contact (name, title, organization, address, phone number, email)
No response.

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
Sun Microsystems				
FDA				
Mitre				

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: OCS

Brief description of the tool, its primary use(s), and the issues it addresses:

The Genitor Object Construction Suite (OCS) is a collection of tools that help construct, document, and reuse C/C++ objects. Genitor is designed for programmers-the people "in the trenches" who write code, make it work, and keep it working. While Genitor provides many features to support workgroup programming and information sharing, the product is equally beneficial to individuals.

Unlike classical CASE tools that focus on modeling and design, Genitor OCS applies OO thinking to the process of implementing and maintaining code. The main idea behind Genitor is that it is more effective to work with objects than it is to work with files. As a developer, you think and talk about code elements (such as base classes, member data, or functions) as things in their own right, not as textual representations within various files.

Genitor OCS helps developers construct code as quickly as they can think and speak about it. It elevates the programmer above the file level and lets him/her work with objects instead. Genitor also provides an infrastructure for object reuse so that team members can quickly locate, analyze, and understand work that has been completed by others.

Application (please check all that apply):

☒Verification

Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☐Yes

What is the cost of the tool?

$845.00 for single user.

Simulation **phases** for which the tool is applicable (please check all that apply):

☐M&S Conceptual Modeling
☐M&S Design
☐M&S Use/Application and Maintenance
☐M&S Modification
☐V&V Documentation / Reporting
☐V&V Management

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response
Development Environment:
☐ Object-Oriented

Software language(s) which the tool accommodates:
C/C++

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☐ Architecture
☐ System / Component Interfaces
☐ Human Interfaces (e.g., GUIs)
☐ Algorithms
☐ Management

Tool Use Considerations:

Host Computer(s)
486-based PC or higher with 16 MB RAM (20 MB or higher recommended)
Disk Space / RAM Required
20MB of hard disk space16 MB RAM (20 MB or higher recommended)
Operating System(s)
Microsoft Windows NT 4.0, '95, '98, 2000
Network(s) Any that work with above OS's
Special Configurations System and Workstation setups
Required Application Software External C/C++ Compilers and make utilities
VV&A Status of the Tool unknown

What training is required for personnel to use the tool?

Length 3 days
Where Available Online help. Onsite training if demand is great enough.

Additional Tool Information:

Language(s) Used	C/C++
Classification level	
Distribution limitations	Starbase Corp.

Developer (organization, point of contact, address, phone number, email)

Starbase Corp
Sales@starbase.com
9615 SW Allen Blvd Ste 107
Beaverton, OR 97219

Distribution Point of Contact (name, title, organization, address, phone number, email)

Phone: (503) 641-6000
(800) 547-9902

Email
Sales - sales@premia.com

Fax: (503) 641-6001

Support – support@premia.com

Office Hours
We are available to answer your calls between the hours of
7am and 5pm PST,
Monday – Friday
(except holidays).

Mail
Premia Corporation
9615 SW Allen Blvd.
Beaverton, OR 97005
USA

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of TOOL

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)
Other comments?

Tool Name: JASA Library of accreditation information including:

ACCREDITATION SUPPORT PACKAGES FOR SEVERAL SIMULATIONS

VV&A process documentation

Brief description of the tool, its primary use(s), and the issues it addresses:

The **accreditation support packages** contain a collection of information about each simulation that is either essential or useful in making an accreditation assessment. The information is grouped into three parts; a description of which follows:

ASP 1 is meant to provide information that characterizes the simulation. It contains:

- A baseline description of the model and its configuration management provisions;
- A summary of assumptions and limitations inherent in the model along with any known errors or anomalies found as a result of prior V&V efforts;
- A review of the model's development, verification and validation (V&V) and usage histories, as well as a summary of prior accreditations;
- A review of the status of model documentation and its conformity to accepted software documentation standards;
- A summary of overall software quality.

ASP 2 is meant to provide about the details of model design and functional sensitivity to changes in typical input parameters. It contains:

- A Functional Element Breakdown and Description of the model in terms of its functional hierarchy;
- A Conceptual Model Specification, which describes the top level and function level design requirements and specifications, as well as algorithms used to model the physical phenomena within the simulation, and which identifies a set of assumptions and conditions for which the simulation correctly produces intended results;
- A Sensitivity Analysis, which exercises the model and its functions over the full range (or the maximum, minimum and highest probability values) of major model variables to assure correct, corresponding changes in model output.

ASP 3 is meant to provide the model user with a high confidence statement of model credibility backed by detailed verification and validation assessments. It contains:

- Verification results
- Validation results

The library has full or partial ASPs for the following simulations:

AIRADE	ALARM	BLUEMAX
BRAWLER	COVART	EADSIM
ESAMS	JIMM	JSEM
RADGUNS	SUPPRESSOR	SWEG

THUNDER TRAP

The **VV&A process documentation** consists of reports and lessons learned from a five year program that investigated VV&A methods and applied them to legacy simulations. This documentation describes techniques and processes for conducting V&V of legacy M&S. It also contains guidance for applying that information to reach an accreditation recommendation.

Application (please check all that apply):

☒Verification
☒Validation
☒Accreditation

Sponsor:

☒OSD (JTCG/AS via DOT&E)

Is the tool applicable to distributed systems?

☒YesPartially, the basic principles of conducting V&V would be applicable to each element of the distributed simulation.

What is the cost of the tool? Free to government users; Available on the JASA website.

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Assessment / Evaluation
☒V&V Planning (including resource estimation)
☒V&V Documentation / Reporting
☒Accreditation / Certification

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: The process descriptions convey information that would apply to most types of simulations.

☒Closed Form
☒Continuous
☒Discrete Event
☒Real-Time
☒Distributed Simulation

Development Environment: N/A. The information is primarily directed to simulation users, not developers.

Software language(s) which the tool accommodates:

Any language can be accommodated because the methodology is not directly concerned with the simulation code.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

Not Applicable. The information in the library is not focused on individual aspects of the simulation, but on the simulation as a whole. However, the techniques for applying certain verification or validation methods involve application at the object or functional element level.

Tool Use Considerations:

Host Computer(s) Web-based and compatible with all types of computers.
Disk Space / RAM Required No specific requirement. It depends on how much one wants to download.
Operating System(s) Any
Network(s) Any
Special Configurations N/A
Required Application Software Any
VV&A Status of the Tool N/A

What training is required for personnel to use the tool?

Length Totally dependent on how one desires to use the information. If one wants to understand and apply the V&V techniques, probably 2-3 days of study will be necessary to gain a basic understanding.

Where Material is self-explanatory. Supplemental information or answers will be provided on request to JASA through their website at www.nawcwpns.navy.mil/~jasa/

Additional Tool Information:

Language(s) Used	N/A
Classification level	Unclassified
Distribution limitations	Unlimited
Sponsor / Owner	Joint Accreditation Support Activity, NAWCWD, China Lake

Developer (organization, point of contact, address, phone number, email)

Joint Accreditation Support Activity (JASA), Dr. Paul Muessig, Director, JASA,

Distribution Point of Contact (name, title, organization, address, phone number, email)

Dr. Paul R. Muessig, Director JASA
Naval Air Warfare Center, Weapons Division
1 Administration Circle
China Lake, California 93555-6100

(760) 939-3001
muessigpr@navair.navy.mil

Previous Users and Uses:

Various. Web site monitoring statistics indicate a wide variety of users who have downloaded ASPs or other documentation. The specific use to which the information was put, however, is not known.

Other comments?

Tool Name: Joint Warfare System (JWARS) Verification and Validation (V&V) Database

Brief description of the tool, its primary use(s), and the issues it addresses:

- Customized tool to support entire JWARS V&V process
    - Provides traceability of derived requirements to Operational Requirements Document (ORD)
    - Contains complete set of Universal Joint Task List (UJTL) tasks and measures
    - Produces detailed V&V reports
    - Provides mechanism to trace design products to requirements and implementation
    - Contains detailed textual and graphical description of algorithms
    - Designed to capture all developer and V&V Agent products to support follow-on accreditation activities
- Developed in Microsoft Access 2000
    - Provides synchronization of replicated databases over the Internet at disparate locations
    - Supports multi-user secure access to encrypted database

Application (please check all that apply): No response

Sponsor: No response

Is the tool applicable to distributed systems? No response

What is the cost of the tool? No cost, developed under government contract.

Simulation **phases** for which the tool is applicable (please check all that apply): No Response

Simulation **environments** for which the tool is applicable (please check all that apply): No Response

Simulation Type: No Response

Development Environment: No response

Software language(s) which the tool accommodates:

*Simulation **aspects** for which the tool is applicable (please check all that apply): No response*

Tool Use Considerations:

Host Computer(s): PC
Disk Space / RAM Required: 75 MB / at least 64 MB of RAM recommended
Operating System(s): Windows 98/NT
Network(s): Product support user collaboration using Access Replication over local area and wide area networks (Internet/SIPRNET)
Special Configurations
Required Application Software: None, since it can be distributed in the royalty free run-time version.
VV&A Status of the Tool

What training is required for personnel to use the tool? No formal training or documentation available. Minimal training required since it provides familiar Microsoft Office menu-driven and push button type interface.

Additional Tool Information:

Language(s) Used: Developed using Microsoft Access 2000
Classification level: Unclassified
Distribution limitations: Must be coordinated through the JWARS Office
Sponsor / Owner: OSD PA&E
Developer (organization, point of contact, address, phone number, email)

Jack Jordan
BMH Associates, Inc.
5365 Robin Hood Road, Suite 100
Norfolk, VA 23513-2416
(757) 857-5670, x213
Jordan@bmh.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

CDR Steven Barnes
1555 Wilson Blvd.
Suite 619
Arlington, VA 22209
(703) 696-9490 /1
Steven.Barnes@OSD.PENTAGON.MIL

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments? Product has served as basis for other similar programs, such as, Aviation Combined Arms Tactical Trainer (AVCATT), Joint Semi-Automated Forces (JSAF), and the Naval Warfighting Concepts to Future Weapon Systems Design (WARCON) V&V efforts.

Tool Name: Khoros Pro 2001

Brief description of the tool, its primary use(s), and the issues it addresses:
Integrated development environment for image processing. Quickly develop solutions to complex computing problems. With multi-platform support, you can manage large-scale, complex software systems and integrate a diverse software base into a uniform framework. Khoros Pro delivers flexible functionality in a variety of application areas:

Software Development Environment
- Create and manage software and GUI objects intuitively,
- Customize applications using a modular toolboxes
- Use tools to scale development efforts of any size, from small to large, local to distributed
- Promote collaboration with an organized approach to the software development process
- Consolidate disparate software tools in an intuitive programming environment

Software System Integration
- Integrate custom and Commercial-Off-the-Shelf (COTS) software into one system
- Make systems that run on different platforms compatible
- Save development costs! Get programs written in different languages to work together
- Why start from scratch? Incorporate legacy code into current projects
- Use integration tools together with Khoral's software development and visual programming environments
- Profit from the plug-and-play environment for most software

Visual Programming
- Perform cradle-to-grave development as well as rapid prototyping
- Take advantage of sophisticated programming functionality
- Scale programs with flexible code generation
- Capture complex workspaces as executables with the workspace compiler
- Increase speed at run-time with distributed processing
- Migrate code easily to embedded systems
- Use Visual Programming with Khoral's system integration and software development tools

Application (please check all that apply):

☒ Verification
☒ Validation

Sponsor:

☐ Service
  ☒ Air Force
  ☒ DoD Agency

Is the tool applicable to distributed systems?

☒ Yes

What is the cost of the tool?
Price range is from $2,500 to $8,000 depending upon platform and user (we have academic, government, and commercial pricing).

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒M&S Conceptual Modeling
- ☒M&S Design
- ☒M&S Implementation
- ☒M&S Testing and Integration:
  - ☒Unit
  - ☒Function
  - ☒Sub-system
  - ☒System
- ☒M&S Configuration Management
- ☒M&S Use/Application and Maintenance
- ☒M&S Assessment / Evaluation

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☒Human / System / Hardware-in-Loop
- ☒Distributed Processing
- ☒Distributed Simulation

Development Environment:

- ☒Structured
- ☒Object-Oriented
- ☒Evolutionary / Spiral
- ☒Rapid Prototyping

Software language(s) which the tool accommodates:
C, C++, Fortran, Java, Perl

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☒Architecture
- ☒System / Component Interfaces
- ☒Human Interfaces (e.g., GUIs)
- ☒Algorithms
- ☒Prototypes

Tool Use Considerations:

Host Computer(s)
Sun, HP, Compaq Alpha, SGI, PC - Linux
Disk Space / RAM Required
160 MB disk / 32 MB RAM
Operating System(s)
Solaris 2.5+, HPUX 10.20, OSF/1 4.0D+, IRIX 6.2, 6.5, Linux 4.2, 5.2, 6.0 (Red Hat)

Network(s)
TCP/IP
Special Configurations
None
Required Application Software
X11R5
VV&A Status of the Tool

What training is required for personnel to use the tool?
Length
3 day training course
Where Available
Albuquerque or on-site

Additional Tool Information:

Language(s) Used: C, C++, Fortran, Java, Perl
Classification level: none
Distribution limitations: commercial product, while Khoros can not be redistributed, any algorithms or components developed within Khoros can be redistributed without restriction
Sponsor / Owner: Khoral Inc. has developed Khoros with internal funds, funds from DARPA, AFRL and commercial entities.
Developer (organization, point of contact, address, phone number, email): Khoral Inc., 6200 Uptown Blvd. NE, Suite200, Albuquerque, NM 87110 505-837-6500. Info@khoral.com
Distribution Point of Contact (name, title, organization, address, phone number, email)
Same
Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

There are over 25,000 users, mostly for image or signal processing

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Cantata, the visual programming environment for Khoros, is typically used for data flow algorithms. However, the underlying scheduler for Cantata is event-based and Cantata is suitable for creating all manner of event driven, component-based algorithms.

Other comments?

Tool Name: MaK PVD (Plan View Display)

Brief description of the tool, its primary use(s), and the issues it addresses:

2D viewer of DIS/HLA exercises including a C++ plug-in capability.

Application (please check all that apply):**No response**

Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool? **$4000**

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Implementation
☒M&S Testing and Integration:
- ☒Unit
- ☒Function
- ☒Sub-system
- ☒System

☒M&S Use/Application and Maintenance
☒M&S Interoperability / Compatibility

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
- ☒Real-Time
- ☒Human / System / Hardware-in-Loop
- ☒Distributed Processing
- ☒Distributed Simulation

Development Environment:
- ☒Object-Oriented
- ☒Waterfall
- ☒Evolutionary / Spiral
- ☒Rapid Prototyping

Software language(s) which the tool accommodates:

C++

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Prototypes
☒Test Planning / Execution
☒Results Evaluation

Tool Use Considerations:

Host Computer(s) **SGI, PC, Sun**
Disk Space / RAM Required **256K**
Operating System(s) **IRIX, Linux, Windows, Solaris**
Network(s)
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length **Minimal to None**
Where Available **Part of Mak Products course offered by Distributed Simulation Technology (DiSTi)**

Additional Tool Information:

Language(s) Used **C++**
Classification level **None**
Distribution limitations **None**
Sponsor / Owner **MaK Technologies**
Developer (organization, point of contact, address, phone number, email)
MaK Technologies
185 Alewife Brook Parkway
Cambridge, MA 02138
Mark Schlakman
Director of Sales
Len Granwetter
Director of Product Development
6170876-8085
info@mak.com
Distribution Point of Contact (name, title, organization, address, phone number, email)
See above.

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
Lockheed Martin				
Boeing				
Raytheon				
ITT				

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: MaK Stealth

Brief description of the tool, its primary use(s), and the issues it addresses:

3D viewer of DIS/HLA exercises including a C++ API.

Application (please check all that apply):**No response**

Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool? **$4000**

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Implementation
☒M&S Testing and Integration:
- ☒Unit
- ☒Function
- ☒Sub-system
- ☒System

☒M&S Use/Application and Maintenance
☒M&S Interoperability / Compatibility

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
- ☒Real-Time
- ☒Human / System / Hardware-in-Loop
- ☒Distributed Processing
- ☒Distributed Simulation

Development Environment:
- ☒Object-Oriented
- ☒Waterfall
- ☒Evolutionary / Spiral
- ☒Rapid Prototyping

Software language(s) which the tool accommodates:

C++

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Prototypes
☒Test Planning / Execution
☒Results Evaluation

Tool Use Considerations:

Host Computer(s) **SGI, PC**
Disk Space / RAM Required **256K**
Operating System(s) **IRIX, Linux, Windows**
Network(s)
Special Configurations **3D Graphic accelerator card for a PC Stealth Supports DIRECT#D, OpenGL, a nd Glide Boards.**
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length **Minimal to None**
Where Available **Part of Mak Products course offered by Distributed Simulation Technology (DiSTi)**

Additional Tool Information:

Language(s) Used **C++**
Classification level **None**
Distribution limitations **None**
Sponsor / Owner **MaK Technologies**
Developer (organization, point of contact, address, phone number, email)
MaK Technologies
185 Alewife Brook Parkway
Cambridge, MA 02138
Mark Schlakman
Director of Sales
Len Granwetter
Director of Product Development
6170876-8085
info@mak.com
Distribution Point of Contact (name, title, organization, address, phone number, email)
See above.

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
Lockheed Martin				
Boeing				
Raytheon				
ITT				
General Dynamics				

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: Mathcad 2001 Professional

Brief description of the tool, its primary use(s), and the issues it addresses:

Mathcad offers a robust set of features for handling technical design projects. Intelligent 2-D parametric CAD toolkit users create CAD designs easily from Mathcad specifications. Users can integrate text, math, and graphics into a single worksheet, making it easy to visualize, illustrate and annotate calculations.

- ☒ Verification
- ☒ Validation

Sponsor:

- ☒ Service
  - ☒ Army
  - ☒ Navy
  - ☒ Air Force
  - ☒ Marine Corps
- ☒ DoD Agency
- ☒ Government / Non-DoD
- ☒ Academic
- ☒ Commercial

Is the tool applicable to distributed systems?

- ☒ Yes

What is the cost of the tool?

$799.95 SRP

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒ M&S Conceptual Modeling
- ☒ M&S Design
- ☒ M&S Use/Application and Maintenance
- ☒ M&S Assessment / Evaluation
- ☒ M&S Interoperability / Compatibility
- ☒ V&V Documentation / Reporting

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response

Development Environment:

- ☒ Object-Oriented

Software language(s) which the tool accommodates:

C AND C++

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Human Interfaces (e.g., GUIs)
☒Algorithms
☒Behaviors
☒Prototypes
☒Results Evaluation

Tool Use Considerations:

Host Computer(s)
Disk Space / RAM Required
80 MB of disk space; 315 MB for full installation
Minimum of 32 RAM, 48 or higher recommended.
Operating System(s)
Windows 95, 98, 2000, NT 4.0 or higher
Network(s)
Yes
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length
Varies
Where Available
https://learning.mathsoft.com

Additional Tool Information:

Language(s) Used
Classification level
Distribution limitations
Sponsor / Owner
MathSoft, Inc EEPD
Developer (organization, point of contact, address, phone number, email)
Terry Rochford
101 Main St
Cambridge, MA 02142
617-577-1017
Distribution Point of Contact (name, title, organization, address, phone number, email)
Susan Z. Robins
101 Main St
Cambridge, MA 02142
617-577-1017

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Over 1.5 million users – including 90% of the fortune 1000 and 500 government installations and 2,000 colleges and universities.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Product has a GSA schedule. Mathcad 2001 Premium is also available. Contact us for more details.

Tool Name: MATLAB and Simulink

Brief description of the tool, its primary use(s), and the issues it addresses:

Technical professionals worldwide rely on MATLAB to accelerate their research, compact the time invested in analysis and development, reduce project costs, and produce effective solutions. The MATLAB environment is designed for interactive or automated computation. Using the built-in math and graphics functions and easy-to-use tools, you can analyze and visualize your data on the fly. The structured language and programming tools let you save the results of your interactive explorations and develop your own algorithms and applications. Users have found that the combination of the intuitive MATLAB interface, language, and the built-in math and graphics functions make MATLAB the preferred platform for technical computing compared to C, Fortran, and other languages and applications.

Simulink® is an interactive tool for modeling, simulating, and analyzing dynamic systems. It enables you to build graphical block diagrams, simulate dynamic systems, evaluate system performance, and refine your designs. Simulink integrates seamlessly with MATLAB®, providing you with immediate access to an extensive range of analysis and design tools. Simulink is tightly integrated with Stateflow® for modeling event-driven behavior. These benefits make Simulink the tool of choice for control system design, DSP design, communications system design, and other simulation applications.

Application (please check all that apply):

☒Verification
☒Validation

Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool?

PC and Linux Individual License
MATLAB $1900
Simulink $2800

Unix Individual License
MATLAB $2850
Simulink $4200

All-platform Concurrent License
MATLAB $3800
Simulink $5600

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒M&S Requirements
- ☒M&S Conceptual Modeling
- ☒M&S Design
- ☒M&S Implementation
- ☒M&S Testing and Integration:
  - ☒Function
  - ☒Sub-system
  - ☒System
- ☒M&S Configuration Management
- ☒M&S Use/Application and Maintenance
- ☒M&S Assessment / Evaluation
- ☒V&V Documentation / Reporting

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
- ☒Continuous
- ☒Discrete Event
- ☒Real-Time
- ☒Human / System / Hardware-in-Loop

Development Environment:
- ☒Object-Oriented
- ☒Rapid Prototyping

Software language(s) which the tool accommodates:
C, C++, Fortran, Ada, Java

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☒Data:
  - ☒Collection
  - ☒Reduction
- ☒Human Interfaces (e.g., GUIs)
- ☒Algorithms
- ☒Behaviors
- ☒Prototypes
- ☒Results Evaluation

Tool Use Considerations:

Host Computer(s)
PC: Pentium, Pentium Pro, Pentium II, Pentium III or AMD Athlon based personal computer ;
Linux or Unix: See http://www.mathworks.com for specific hardware requirements
Disk Space / RAM Required
PC or Linux: Disk space varies depending on size of partition and installation of online help files./64 MB RAM minimum, 128 MB RAM recommended

Linux or Unix: See http://www.mathworks.com for specific hardware requirements

Operating System(s)
Microsoft Windows 95, Windows 98 (original and Second Edition), Windows Millennium Edition, Windows NT 4.0 (with Service Pack 5 for Y2K compliancy or Service Pack 6a) or Windows 2000

Linux or Unix: See http://www.mathworks.com for specific hardware requirements

Network(s)
TCP/IP

Special Configurations
PC: 8-bit graphics adapter and display (for 256 simultaneous colors)

Linux or Unix: See http://www.mathworks.com for specific hardware requirements

Required Application Software

PC: One of the following is required to build your own MEX-files:

- Compaq Visual Fortran 5.0 or 6.1
- Microsoft Visual C/C++ version 5.0 or 6.0
- Borland C/C++ version 5.0, 5.02
- Borland C++Builder version 3.0, 4.0, or 5.0
- WATCOM version 10.6 or 11
- LCC 2.4 (bundled with MATLAB)

Linux or Unix: See http://www.mathworks.com for specific hardware requirements

VV&A Status of the Tool

What training is required for personnel to use the tool?

Length : Non required, but Recommend 2 days MATLAB, 2 days Simulink

Where Available: Natick, MA
On-site
Public training at cities around the US

Additional Tool Information:

Language(s) Used: C, Assembly, Java
Classification level: None
Distribution limitations: Licensed Software
Sponsor / Owner : The MathWorks, Inc.
Developer (organization, point of contact, address, phone number, email)

The MathWorks, Inc
Government Sales
3 Apple Hill Drive
Natick, MA 01760
508-647-7000
info@mathworks.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

The MathWorks, Inc
Government Sales
3 Apple Hill Drive
Natick, MA 01760
508-647-7000
info@mathworks.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Please contact The MathWorks for specific customer references

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: McCabe TEST

Brief description of the tool, its primary use(s), and the issues it addresses:

McCabe Test is an interactive visual environment for planning, monitoring, and measuring the thoroughness of software testing. Based on testing standards published by the National Institute for Standards and Technology, McCabe Test assures the delivery of exhaustively tested, bug free applications and systems. By automating, standardizing, and documenting your test-related processes you can immediately attain:

- Shorter testing cycles
- An audit of test thoroughness
- More effective testing
- Accurate test resources planning

McCabe Test will build accuracy, focus, and reliability into your test process, resulting in cheaper, faster, more complete testing with faster time to market.

Application (please check all that apply):

- ☒ Verification
- ☒ Validation

Sponsor:

- ☐ OSD
- ☐ Joint
- ☐ Service
  - ☐ Army
  - ☐ Navy
  - ☐ Air Force
  - ☐ Marine Corps
- ☐ DoD Agency
- ☐ Government / Non-DoD
- ☐ Academic
- ☐ Commercial

Widely used tools within all of the above services and/or agencies

Is the tool applicable to distributed systems?

- ☒ Yes

What is the cost of the tool?

Dependent upon # of concurrent users on a server

Average 5 concurrent user McCabe QA/TEST/ w 1anguage $50K and up

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Testing and Integration:
- ☒Unit
- ☒Function
- ☒Sub-system
- ☒System

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response

Development Environment: No response

Software language(s) which the tool accommodates:

C, C++, JAVA, ADA, VISUAL BASIC, FORTRAN, and COBOL

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Test Planning / Execution

Tool Use Considerations:

Host Computer(s)

PC	Microsoft Windows: -Windows95 -Windows98 -WindowsNT 4.0 -Windows2000
IBM	IBM AIX version 4.1 or higher, with Motif version 1.2 or higher
HP	HP-UX version 10.2 or higher, with Motif version 1.2 or higher
SGI	SGI IRIX version 6.2 or higher, with Motif version 1.2 or higher 5.3
Sun Unix	Sun Solaris version 2.51 or higher, with Motif version 1.2 or higher 5.3

Disk Space / RAM Required

Product disk space usage is approx 50 megabytes

Operating System(s)

See above

Network(s)

N/A

Special Configurations

N/A

Required Application Software

N/A

VV&A Status of the Tool

What training is required for personnel to use the tool?

Length - 3 to 5 days

Where Available Onsite or at the customer site

Additional Tool Information: No response

Language(s) Used
Classification level
Distribution limitations
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)

Distribution Point of Contact (name, title, organization, address, phone number, email)

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

NIST Special Publication #500-235 "Structured Testing: A Testing Methodology Using the Cyclomatic Complexity Metric

Integration with Configuration Management Tools (i.e. Clearcase, PVSC, TrueChange)

Integration with GUI Test Tools (i.e. Mercury Winrunner and Xrunner)
Other comments?
Supports C, C++, JAVA, ADA, FORTRAN, VISUAL BASIC, and COBOL

Tool Name: WebWinds

Brief description of the tool, its primary use(s), and the issues it addresses:

Science visualization and analysis tool. Addresses data access, subsetting, visualization and analysis/

Application (please check all that apply):

☒Verification
☒Validation
☒Accreditation

Sponsor:

☒Government / Non-DoD

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool? **$0**

Simulation **phases** for which the tool is applicable (please check all that apply):

☒Other (specify) **Depends on many things. Could be applicable to some or all phases.**

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

☒Other (specify) **Depends on many things. Could be applicable to some or all types.**

Development Environment:

☒Object-Oriented
☒Rapid Prototyping

Software language(s) which the tool accommodates:

Java and C (via JNI)

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Other (specify)) **Depends on many things. Could be applicable to some or all aspects.**

Tool Use Considerations:

Host Computer(s) **Any**
Disk Space / RAM Required **Greater than 20 MB / 60 MB**
Operating System(s)
Network(s) **Amy**
Special Configurations
Required Application Software **Java**
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length **1 hour to 1 day**
Where Available **http://webwinds.jpl.nasa.gov**

Additional Tool Information:

Language(s) Used **Java**
Classification level **Unclassified**
Distribution limitations **Network download only. License agreement required.**
Sponsor / Owner **Caltech**
Developer (organization, point of contact, address, phone number, email)
Lee Elson818-354-4223, elson@magus.jpl.nasa.gov
Distribution Point of Contact (name, title, organization, address, phone number, email)

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: NeumaCM+

Brief description of the tool, its primary use(s), and the issues it addresses:

NeumaCM+ is a System Development Management Tool. Standard applications include Configuration Management, Change Control, Document Management, Problem/Issue/Defect Tracking, Activity Management, Test Suite Management, Requirements Traceability. This process-oriented tool is highly configurable, allowing easy modification to the default schema, without any down time, definition of state transitions for the various objects (e.g. problem reports, changes, documents) including permissions on a per transition basis, drop-down and object-oriented pop-up menu definition. NeumaCM+ is based on the STS engine which provides a repository with high availability and reliability, exceptional performance, a powerful scripting language integrated with repository query language and the GUI generation capabilities, rules and triggers on data changes and on command execution. The repository combines relational, hierarchical, object-oriented and data-revisioning capabilities to provide a sophisticated development management environment. Additional applications can be added by Neuma Staff or by the Customer, with little effort (from a few hours to a few days).

The key advantage is the seamless integration of all applications, permitting point-and-click navigation between, for example, release data and problems/activities, changes and requirements/problems, etc. Interactive reporting and zoom in capabilities.

Primary uses: Configuration management (i.e. version/change control, release/build management)
Document management
Test Suite management
Problem Tracking
Activity/Task Management
Requirements Traceability

Issues addressed:

- Seamless integration of applications
- Easy deployment of files [test cases, documents, software, etc.]
- Ability to customize verification data records
- High performance and reliability
- Focus is on using the tool to support and evolve processes while improving quality, efficiency and performance.
- Low footprint, near-zero administration.
- Full cross-platform support.
- Most advanced change control and configuration management capabilities available in the commercial marketplace.

Application (please check all that apply):

☒Verification
☒Validation
☒Accreditation

Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☒Yes **[remote login, Web interface, multi-site capability]**

What is the cost of the tool? ALL AMOUNTS IN U.S. Dollars

Server (NT, Linux, Unix) $10,000 (up to 25 users, or non-CM application);
$25,000 (over 25 users or for multi-site operation)
NOTE: Server includes Repository and Applications

Client (NT, Linux , Unix) Full CM+ Application Suite: Floating: $2,650 Fixed: $1,900
Single non-CM Application: Floating: $1,400 Fixed: $950
Add 1 non-CM Application (Neuma supplied): $8,000
C-Language API (per platform): $8,000

Multi-Site Feature $19,500 plus license costs
Licenses may not be shared across sites

Web Server Feature $9,500

Training: $695/user/day Training materials included.
Consulting: $1,200/day $750/half-day T&L costs additional.
Maintenance: @15% pre-paid annually; @17% prepaid quarterly, @19% not pre-paid
Includes all minor upgrades and major upgrades.

Simulation **phases** for which the tool is applicable (please check all that apply):

PLEASE NOTE THAT CHECKED ITEMS REFER TO MANAGEMENT ASPECTS OF A PHASE

- ☒M&S Planning (including resource estimation)
- ☒M&S Requirements
- ☐M&S Conceptual Modeling **[not certain; perhaps for version/change control]**
- ☒M&S Design
- ☒M&S Implementation
- ☒M&S Testing and Integration:
  - ☒Unit
  - ☒Function
  - ☒Sub-system
  - ☒System
- ☒M&S Configuration Management
- ☒M&S Use/Application and Maintenance
- ☐M&S Assessment / Evaluation **[Not certain]**
- ☐M&S Interoperability / Compatibility **[Not certain]**
- ☒M&S Modification
- ☒V&V Planning (including resource estimation)
- ☒V&V Documentation / Reporting
- ☒V&V Management
- ☒Standards Compliance **[Process or Quality related]**

☒Other (specify) **[Related: Release Tracking, Site Management, user-defined applications may be defined to manage and seamlessly integrate applications from the same environment]**

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response
Development Environment:
☒Structured
☒Object-Oriented
☒Formal System
☒Waterfall
☒Evolutionary / Spiral
☒Rapid Prototyping
☒Other (specify) **As the tool focuses on management aspects and as it is highly configurable, it can be easily adapted to most development environments.**

Software language(s) which the tool accommodates:
C++; C; ADA; PASCAL; Modula2; Assembler; CMS-2; any language where the unit of management is a file or where multiple units may be managed as a single object for control purposes. In addition, dependency relationships may be tracked between objects for quick dependency reporting.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

Almost all of these are supported in some form or another, but in many cases, customization will lead to a more complete level of support.

☒Architecture **[Component break-down; documentation]**
☒Data:
☒Collection **[May be used as a repository for data collected by test run, release, version, etc. – requires customization]**
☐Reduction **[Boolean set operation on the data could permit some reduction; data revisioning can be used to reduce data storage requirements between successive runs]**
☒System / Component Interfaces **[System archictecture; component and interface overviews organized in a hierarchical fashion; interface specification storage]**
☒Management **Data and process management**
☒Test Planning / Execution **Planning, tracking, launching test apps, results collection**
☒Results Evaluation **Reporting on success/failure rates [assumes data collection]**
☐Other (specify) **Aspects where a configurable database, GUI, process will help out.**

Tool Use Considerations:

Host Computer(s): Unix Workstations (including NightHawk), PCs, VAX, Alphas
Server & command line interface(CLI) operation easily ported to any platform.
GUI easily ported to any Unix-based or Windows-based platform

Disk Space / RAM Required: Minimum recommended is 16MB for client, 32MB for server.
However, for small repositories, CLI and server require minimal memory (e.g. 4MB)

Operating System(s)

- Windows 95, Windows 98, Windows ME
- Windows NT, Windows 2000
- HP-UX, SunOS, Solaris, IBM AIX, Linux, DG-UX, SCO Unix, SGI Iris
- VAX/VMX ALPHA/VMS [VAX implementations are not interoperable with other platforms]

Network(s):
NFS, Windows NT, any network which allows view of remote file systems
Upcoming release will permit full operation over any TCP/IP connection
Web-based operation supported [functionality configurable]

Special Configurations
Easily adapted to special requirements.

Required Application Software

- No additional application software required (other then editors, word processors, spreadsheets, etc. depending on types of documents being managed).

VV&A Status of the Tool
Release 4.2 completed full verification and is production version
Release 5.0 in verification for initial release in Q1 of 2001. 5.1 to follow in Q2/Q3

What training is required for personnel to use the tool?

Length

Initially, 3 to 4 days.
Advanced training and special application training additional

Where Available

Ottawa, ON. Canada
On-site by request

Additional Tool Information:

Language(s) Used: C, C++
Classification level: [not classified]
Distribution limitations: None, subject to licensing agreement.
Sponsor / Owner:

Neuma Technology Inc.
51-5450 Canotek Rd.,
Ottawa, ON Canada
K1J 9G3
www.neuma.com

Developer (organization, point of contact, address, phone number, email):

Neuma Technology Inc
51-5450 Canotek Rd.,
Ottawa, ON Canada
K1J 9G3
www.neuma.com
support@neuma.com
Joseph A. Farah (farah@neuma.com)
(613) 749-9450

Distribution Point of Contact (name, title, organization, address, phone number, email)

Neuma Technology Inc
51-5450 Canotek Rd.,
Ottawa, ON Canada
K1J 9G3
www.neuma.com
support@neuma.com
Joseph A. Farah (farah@neuma.com)
(613) 749-9450

Previous Users and Uses:

A number of organizations are presented below. Additional ones are available on request. In most cases, names and contact information can not be presented below. Please contact Neuma Technology (support@neuma.com) if you need to pursue a contact and we will request a reference contact from the organization.

Name	Organization	Phone number	Email	Use of Tool
Jim Knox	TRW/USAF Robins AFB Warner-Robins GA			F15 Training/Simulation Configuration Management on NightHawk
------	Canadian Dept. of National Defense/ Lockheed Martin Canada			Canadian Patrol Frigate Configuration Management Issue/Quality Management
-------	Canadian Dept. of National Defense			TRUMP Program CM and Problem Tracking
-------	Fujitsu Network Telecom Richardson, Texas			Software CM + Problem Tracking
-------	City of Ottawa Ottawa, ON. Canada			CM-II Certification support Requirements Management Problem Tracking Test Case Management Configuration Management SAP integration
--------	Nortel Networks			PBX Development, CM, Test Case Management Document Management
---------	Thomson CSF			CM, Document Management, Requirements Management, Problem Tracking,

Quality/Process Improvement

---------	Liebherr-Aerospace Lindenberg GmbH Germany	Aerospace applications CM, Problem tracking, Activity management, Document management.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)
Reviewed by OVUM Ltd, UK in "OVUM Evaluates: Configuration Management", Dec. 1996.

Easily integrated with additional CASE tools using the built-in scripting and GUI generation tools.
Can configure tool so that objects are opened with the appropriate case/business tool.

Other comments?
First commercial offering for NeumaCM+ (under the name STS, and later STS/CM+) was in 1991.
First used internally at Neuma in November, 1989 for problem tracking and activity management and in 1990 for software configuration management.

Tool Name: OneSAF Testbed Baseline (OTB) Plan View Display (PVD)

Brief description of the tool, its primary use(s), and the issues it addresses:

The PVD provides the OTB user with the following interface capabilities:

- ✓ For the units or entities being simulated, the user can select a unit for performing operations or immediate interventions. The user can also interrupt or change the unit's currently executing mission.

- ✓ Provides a 2-dimensional terrain map that allows the user to create scenarios and monitor simulated battles. Its view represents real world locations, showing grid lines, roads, water, power lines, pipe lines, railroads, political boundaries, trees, contour lines, and buildings.

- ✓ The PVD contains Editor Buttons that let the user access editor menus. These buttons are organized in three groupings.

  Create Buttons:

- Creates text to annotate a graphic.
- Creates lines to use as boundaries, phase lines, or routes.
- Creates polygons to use as designated areas.
- Creates markers for minefields and breach lanes.
- Creates single vertex graphics to use as a destination, tgt ref point, refuel point, or control measure.
- Crates chemical contaminations which can be placed and modified.
- Creates military ground vehicles, air vehicles, dismounted infantry, and units.
- Controls a unit's mission by setting a specific date and time for executing the various phases of its mission.
- Creates communication links.
- Creates combat engineering objects (minefields and obstacles)

  Action Buttons:

- Set User Preferences
- Configures the map display (select which terrain features to show and how to display the vehicle icons).
- Controls the three-dimensional Stealth when there is one running on the network.
- Creates and controls artillery barrages.
- Activates/deactivates IFF modes.
- Assigns and executes fire missions for artillery vehicles.
- Presents a picture of specified map terrain showing visibility (from terrain locations or between vehicles) and a cross-section elevation display.
- Allows the user the capability to damage or repair damages to a particular vehicle's mobility, firepower, or communications.

- Provides the capability to add and remove supplies, change supply levels, and modify resupply levels.
- Specify rules of engagement.
- Removes graphics, obstacles, and units from the map and the simulation.
- Creates, configures, and deletes overlays.
- Accesses an editor for setting environmental parameters.
- Accesses an editor for setting the environmental parameters for a "grid section" of the terrain instead of the entire terrain map.
- Allows the user to modify environment parameters, relevant to the sea, and the surf zone.

  Map Buttons:

- Changes the map scale and enlarges the viewing area by zooming in or out around a location.
- Changes the map viewing area while remaining in the same scale
- Obtains data about a vehicle or a terrain location.

Application (please check all that apply):

☒Verification (of OTB functionality)
☒Validation (of OTB functionality)

Sponsor:

☒Service
☒Army

Is the tool applicable to distributed systems?

☒Yes (The OTB is a distributed system, and the PVD is a part of that system).

What is the cost of the tool?

The PVD is an integrated part of the OTB. The US Army STRICOM distributes the OTB free of charge to organizations with a valid need of the system. Requestors must sign a distribution agreement.

Simulation **phases** for which the tool is applicable (please check all that apply):

Applicable to OTB simulation phases.
☒M&S Planning (including resource estimation)
☒M&S Design
☒M&S Implementation
☒M&S Testing and Integration:
☒Unit
☒Function
☒Sub-system
☒System
☒M&S Use/Application and Maintenance
☒M&S Assessment / Evaluation
☒M&S Interoperability / Compatibility
☒M&S Modification
☒V&V Documentation / Reporting

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
☒Continuous
☒Real-Time
☒Human / System / Hardware-in-Loop
☒Distributed Simulation

Development Environment:

☒Structured
☒Object-Oriented
☒Evolutionary / Spiral

Software language(s) which the tool accommodates:

The OTB runs primarily C code and to a lesser degree C++. In addition, there are a handful of editors that use Java.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Architecture
☒Data:
☒Collection
☒System / Component Interfaces
☒Human Interfaces (e.g., GUIs)
☒Behaviors

Tool Use Considerations:

Host Computer(s):
- ✓ PCs with Pentium II/III/PentiumPro
- ✓ SGI Indy, Indigo, Indigo2
- ✓ Sun Ultra1
- ✓ Motorola Power PC

Disk Space / RAM Required
- ✓ 1 GB hard disk space
- ✓ 256 MB of swap space
- ✓ 256 MB RAM

Operating System(s)
- ✓ Debian Linux 2.1 or 2.2
- ✓ Redhat Linux 6.0, 6.1 or 6.2
- ✓ WindowsNT 4.0 Service Pack 4
- ✓ IRIX 5.3, 6.2 or 6.5
- ✓ Solaris 2.5.1 or 2.6
- ✓ SunOS 5.5.1 or 5.6
- ✓ AIX v4.2

Network(s)

Special Configurations

Required Application Software
- ✓ Open Motif

VV&A Status of the Tool

- ✓ The PVD itself has not been subject to VV&A. However, the tool has been in use with the users in excess of six years. Users are provided with online web capability to submit problem reports (to include the PVD) to the materiel developers. Fixes to these problems are implemented prior to next version release.

What training is required for personnel to use the tool?

Length

- ✓ Approximately two days.

Where Available

- ✓ I am familiar with two sources; SAIC (OTB developers) and Sagacitech. This training is specific to the OTB. However, a User course will familiarizes the student with the PVD.

Additional Tool Information:

Language(s) Used: C
Classification level: unclassified
Distribution limitations: Requires signed distribution agreement. Redistribution strictly prohibited.
Sponsor / Owner: US Army STRICOM
Developer (organization, point of contact, address, phone number, email): US Army STRICOM, POC: John Logsdon, 12350 Research Parkway, Orlando, FL 32826, 407-384-3622, john_logsdon@stricom.army.mil.

Distribution Point of Contact (name, title, organization, address, phone number, email): US Army STRICOM, POC: Tim Behan, 12350 Research Parkway, Orlando, FL 32826, 407-384-3694, tim_behan@stricom.army.mil.

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

- ✓ There has been nearly 200 different organizations that have used ModSAF in the past. ModSAF will soon be retired and replaced by the OneSAF Testbed Baseline, which was developed from the ModSAF 5.0 baseline. A list of these organizations may be available through the OneSAF Project Office (developer POC listed above).

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: Perforce

Brief description of the tool, its primary use(s), and the issues it addresses:

Perofrce is the Fast Software Configuration Management (SCM) system, architected for high performance using a true TCP/IP-based client/server architecture. Perforce runs on more than 40 platforms and provides comprehensive configuration management, including version control, workspace management, atomic change transactions and a unique and powerful branching model. Perforce has been designed to be easy and intuitive to use with minimal administration overhead.

Application (please check all that apply):

☒Verification

Sponsor:

☒Commercial

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool?

Perforce is licensed on a per-user basis. The cost is $600 per user for the first 20 users. Licenses for users 21-50 are $550 each; users 51-100 are $500; users 101-250 are $450 $400 each for users 251 and above. The first year of telephone and email support, as well as software upgrades, is included in the purchase price. The cost of support and upgrades per subsequent years is $ 120 per user. (the per user price is based on the cumulative number of users purchased, not just the number in any one order.)

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Implementation
☒M&S Testing and Integration:
- ☐Unit
- ☐Function
- ☐Sub-system
- ☐System

☒M&S Configuration Management

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: **No response.**

Development Environment:
- ☒Structured
- ☒Object-Oriented
- ☒Formal System
- ☒Waterfall
- ☒Evolutionary / Spiral

☒Rapid Prototyping

Software language(s) which the tool accommodates:

Perforce is not language specific.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Management
☒Test Planning / Execution

Tool Use Considerations:

Host Computer(s)

CLIENT CPU: NEGLIGIBLE

Server CPU: 1 SPECint95 per 100 users

Disk Space / RAM Required

Client Disk Space: Size of the managed files.
Server Disk Space: Three times the size of the managed files.
Client RAM: Approximately 8 MB (for Windows GUI), less ofr command line.
Server RAM: Approximately 1.5K per file transaction. For operations on 10000 files, 150 MB RAM will suffice.

Operating System(s)

Perforce runs on over 40 platforms, including Windows, Linus, Macintosh, and nearly every flavor of Unix. See http://www.perforce.com/perforce/loadprog.html#plats **for a complete list.**

Network(s)

CLIENT: VENDOR TCP/IP

Server: vendor TCP/IP

Special Configurations

N/A

Required Application Software

N/A

VV&A Status of the Tool

N/A

What training is required for personnel to use the tool?

Length

Users familiar with configuration management need only spend approximately one half-day learning Perforce' systems. Perforce Software offers a three-day off-site

training course for those interested. Perforce trainers are also available for on-site training. Email training@perforce.com **for more information.**

Where Available

Off-site courses are offered in San Fransisco and London.

Additional Tool Information:

Language(s) Used **C++**
Classification level **None**
Distribution limitations **None**
Sponsor / Owner **Perforce Software, Inc.**
Developer (organization, point of contact, address, phone number, email)

Perforce Software, Inc
2420 Santa Clare Ave, Suite 200
Alameda, CA 94501
510/864-2400 (phone)
510-864-5320 (fax)
info@perfoce.com
Nigel Chanter, Chief Operating Officer

Distribution Point of Contact (name, title, organization, address, phone number, email)

See above.

Previous Users and Uses:

Name Organization Phone number Email Use of Tool
Richard Geiger Network Appliance (Contact Perforce Software for phone number or email.) (software Configuration Management, Defect Tracking)
Matty Bruce FENICS (Contact Perforce Software for his phone number or email.) (Software Configuration Management, Document Management, Web Content Management, Intranet Content Management)
manfred Heiss IXOS Software AG (Contact Perforce Software for phone number or email.) (Software Configuration Management, Document Management)

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: ProSim Version 6.0

Brief description of the tool, its primary use(s), and the issues it addresses:

Automated process knowledge capture, process design & simulation. ProSim enables users to organize their enterprise's processes into superior quality, high performance workflows with predictable results. (30 Words)

(100-word)
Learn how your organization does what it does with KBSI's unique group of process modeling tools. Document your procedures and model the logical constraints present in your organization. Understand your organization's workflow and workload capabilities. As always, numerous forms are provided allowing you to further document each step of the process. Track the flow of objects through your processes, as well as the changes those objects undergo. Export your models to powerful simulation packages and gain the benefit of evaluating your processes and any changes you might make to them *before* you implement those changes.

Application (please check all that apply):

X Verification
X Validation
X Accreditation

Sponsor:

☐ Service
  X Army
  X Navy
  X Air Force
X Commercial

Is the tool applicable to distributed systems?

X Yes

What is the cost of the tool?

Tool is available on the GSA schedule…GS – 35F – 4433G Expires 31 March 2001.
Please contact sales@kbsi.com for pricing information.

Simulation **phases** for which the tool is applicable (please check all that apply):

- X M&S Planning (including resource estimation)
- X M&S Requirements
- X M&S Conceptual Modeling
- X M&S Design
- X M&S Implementation
- X M&S Testing and Integration:
  - X Unit
  - X Function
  - X Sub-system
  - X System
- X M&S Assessment / Evaluation
- X M&S Interoperability / Compatibility
- X M&S Modification
- X V&V Planning (including resource estimation)
- X V&V Documentation / Reporting
- X Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
- X Discrete Event
- X Real-Time
- X Human / System / Hardware-in-Loop
- X Distributed Processing
- X Distributed Simulation

Development Environment:
- X Structured
- X Formal System
- X Rapid Prototyping

Software language(s) which the tool accommodates:

The software program will accommodate the .txt file formats from the other KBSI tool suite as well as produce both .mdb (Access Databases) and .wcl (Witness Command Language) files. In addition to these file types, the ProSim Option Pack allows for the use of .mpx and Visio file formats. .MPX file formats are very popular in the Project Manangement arena.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- X Architecture
- X Data:
  - X Collection
  - X Reduction

X System / Component Interfaces
X Human Interfaces (e.g., GUIs)
X Behaviors
X Prototypes
X Management
X Test Planning / Execution
X Results Evaluation

Tool Use Considerations:

Host Computer(s)
The software is available for both single user and multi-user licenses.
Disk Space / RAM Required
Min Disk Space – 10 MB / Min Ram – 8 MB
Operating System(s)
Windows Operating Systems - 95/98/ME/2000
Network(s)
Novell /
Special Configurations
None
Required Application Software
None
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length – Minimum – 2 days
Where Available – Available at your location or at one of KBSI's office facilities.

Additional Tool Information:

Language(s) Used
Classification level
Distribution limitations – None
Sponsor / Owner - KBSI
Developer (organization, point of contact, address, phone number, email)
KBSI / Ronald Fernandes / 1408 University Drive East, College Station, TX 77840
979-260-5274 E-mail – rfernandes@kbsi.com

Distribution Point of Contact (name, title, organization, address, phone number, email)
Byon Williams, Director of Marketing and Sales, KBSI
1408 University Drive East, College Station, TX 77840
979-260-5274 E-mail – bwilliams@kbsi.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: SAS offers a variety of tools that work seamlessly together to meet your decision support needs.

Brief description of the tool, its primary use(s), and the issues it addresses:

SAS' tools can reside on practically any platform and pull information from practically any source. SAS can then cleanse the data. This provides the ultimate foundation for warehousing allowing you to look at and analyze the data in its historical context. A warehouse also provides the opportunity to perform highly sophisticated data mining giving you insight into missing data and even have a statistically significant indicator of future activity. Since SAS can read all your data, cleanse it and store it in one logically organized location, we like to say it gives you the "*one version of the truth*" that you need for your operational decision support.

Application (please check all that apply):

- ☒Verification
- ☒Validation
- ☒Accreditation

Sponsor:

- ☒DoD Agency
- ☒Government / Non-DoD
- ☒Academic
- ☒Commercial

Is the tool applicable to distributed systems?

- ☒Yes

What is the cost of the tool?
The tools costs depend upon your specific needs and your particular computing environment.

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒M&S Planning (including resource estimation)
- ☒M&S Requirements
- ☒M&S Conceptual Modeling
- ☒M&S Design
- ☒M&S Implementation
- ☒M&S Testing and Integration:
  - ☒Unit
  - ☒Function
  - ☒Sub-system
  - ☒System
- ☒M&S Configuration Management
- ☒M&S Use/Application and Maintenance
- ☒M&S Assessment / Evaluation
- ☒M&S Interoperability / Compatibility
- ☒M&S Modification
- ☒V&V Planning (including resource estimation)
- ☒V&V Documentation / Reporting

☒V&V Management
☒Accreditation / Certification
☒Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
- ☒Closed Form
- ☒Continuous
- ☒Discrete Event
- ☒Real-Time
- ☒Human / System / Hardware-in-Loop
- ☒Distributed Processing
- ☒Distributed Simulation
- ☐Other (specify)

Development Environment:
- ☒Structured
- ☒Object-Oriented
- ☒Formal System
- ☒Waterfall
- ☒Evolutionary / Spiral
- ☒Rapid Prototyping
- ☐Other (specify)

Software language(s) which the tool accommodates:
SAS can read and write data to and from practically every data format placed on practically every type of computing environment. SAS' data sets can also be queried using ODBC, OLE-DB and COM.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Architecture
☒Data:
- ☒Collection
- ☒Reduction

☒System / Component Interfaces
☒Human Interfaces (e.g., GUIs)
☒Algorithms
☒Behaviors
☒Prototypes
☒Management
☒Test Planning / Execution
☒Results Evaluation
☐Other (specify)

Tool Use Considerations:

The tool use considerations depend upon your specific needs and your particular computing environment.

Host Computer(s)
Disk Space / RAM Required
Operating System(s)
Network(s)
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

The training depends upon your specific needs and your particular computing environment.

Additional Tool Information: No response

Language(s) Used
Classification level
Distribution limitations
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)
Distribution Point of Contact (name, title, organization, address, phone number, email)

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

SAS keeps the corporate reference information confidential until the specific requirements are defined and a specific solution is considered.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: SLATE

Brief description of the tool, its primary use(s), and the issues it addresses:

SLATE is computer aided systems design software aimed the front end of the development process. This includes capture and analysis of requirements, capture of design alternatives, linking of requirements into those alternatives, and generation of design specs. (along with verification/validation of requirements)

Application (please check all that apply):

X Verification
X Validation

Sponsor:

X Commercial

Is the tool applicable to distributed systems?

X Yes

What is the cost of the tool?

SLATE is priced based on enabled features--$495-$12,995

Simulation **phases** for which the tool is applicable (please check all that apply):

X M&S Requirements
X M&S Conceptual Modeling
X M&S Design
X M&S Testing and Integration:
- ☐ Unit
- ☐ Function
- ☐ Sub-system
- ☐ System

X M&S Use/Application and Maintenance
X V&V Documentation / Reporting
X V&V Management
X Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
- X Continuous
- X Discrete Event
- X Other (specify) System-Level interoperability, algorithms, inter-domain trade-offs

Development Environment:
- X Object-Oriented

X Waterfall
X Evolutionary / Spiral

Software language(s) which the tool accommodates:

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

X Architecture
X Algorithms
X Management
X Test Planning / Execution

Tool Use Considerations:

Host Computer(s) Unix or PC platforms
Disk Space / RAM Required
100 mb
Operating System(s)
Unix Solaris, HPUX
Windows NT/2000/98
Network(s)
Standard TCP/IP
Special Configurations
Required Application Software
Everything included except interfaces such as CASE environments or Windows Desktop suites
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length 3 days
Where Available In Richardson or on your site.

Additional Tool Information:

Language(s) Used English, Latin 1 Character set
Classification level
Distribution limitations None
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)
SDRC
Mark Sampson
SLATE Product Mgr.
2425 N. Central Exp. Suite 200
Richardson, TX 75080
Distribution Point of Contact (name, title, organization, address, phone number, email)
As above.

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Provided upon request.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

SLATE provide integrated requirements management that allows it to drive requirements from the systems level down into the CASE development environments including Rose, GD-Pro, Teamwork and others.

Other comments?

Tool Name: **SNiFF+/SNiFF+ PRO 4.0**

Brief description of the tool, its primary use(s), and the issues it addresses:
SNiFF+™ is a source code analysis environment for professional software developers who work with large amounts of source code. SNiFF+ increases productivity and quality by providing a comprehensive set of intuitive, interactive and integrated code visualization and navigation tools.
SNiFF+™ PRO is composed of a software bundle that contains the SNiFF+ code analysis environment, plus a build and debug module and the VisaJ GUI builder for Java development.

Application (please check all that apply): No response

Sponsor:

☐ Commercial

Is the tool applicable to distributed systems?

☒ Yes

What is the cost of the tool?

$1,990.- (basic edition)
$3,200.- (full edition)

Simulation **phases** for which the tool is applicable (please check all that apply):

☒ M&S Implementation
☒ M&S Configuration Management
☒ M&S Use/Application and Maintenance
☒ M&S Modification
☒ V&V Documentation / Reporting
☒ V&V Management

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response

Development Environment:

☒ Structured
☒ Object-Oriented
☒ Formal System
☒ Waterfall
☒ Evolutionary / Spiral
☒ Rapid Prototyping

Software language(s) which the tool accommodates:

C, C++, Java, Fortran, Corba IDL, Ada, Assembly

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒System / Component Interfaces
☒Human Interfaces (e.g., GUIs)
☒Algorithms

Tool Use Considerations:

Host Computer(s)	Windows NT/2000, Linux, Solaris, HP-UX, AIX
Disk Space / RAM Required	50-75 MB (Disk), 128 MB (RAM)
Operating System(s)	Windows NT/2000, Linux, Solaris, HP-UX, AIX
Network(s)	
Special Configurations	
Required Application Software	
VV&A Status of the Tool	

What training is required for personnel to use the tool?

Length	1 day
Where Available	from vendor (Wind River)

Additional Tool Information:

Language(s) Used
Classification level
Distribution limitations
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)
Distribution Point of Contact (name, title, organization, address, phone number, email)

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: SpyWright

Brief description of the tool, its primary use(s), and the issues it addresses:

SpyWright is an 'Active Application Source Code Browser'. It makes the task of identifying and understanding C++ Class Names and structures in MFC (Microsoft Foundation Class) applications easy. Use SpyWright to spy on a running MFC application, or on one of the application's child windows, and reveal a graphical hierarchy of class names. All C++ Class Names for the selected window and its child windows are presented in the hierarchy, including the window's frames, toolbars, buttons, controls and more.

Application (please check all that apply):

- ☐ Verification
- ☐ Validation

Sponsor:

- ☐ Commercial

Is the tool applicable to distributed systems?

- ☐ Yes

What is the cost of the tool?

$99 for single user.

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☐ M&S Design
- ☐ M&S Implementation
- ☐ M&S Use/Application and Maintenance
- ☐ M&S Modification

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☐ Real-Time

Development Environment:

- ☐ Object-Oriented

Software language(s) which the tool accommodates:

C++ with Microsoft Foundation Classes

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☐ Architecture
- ☐ System / Component Interfaces
- ☐ Human Interfaces (e.g., GUIs)

Tool Use Considerations:

Host Computer(s) Intel 486 or better, or compatible chip set.
Disk Space / RAM Required Minimal; 486 processor with 8 Mb RAM and a VGA display.
Operating System(s) Microsoft Windows 2000, '95, '98, NT 4.0
Network(s) Any that works with above listed OS.
Special Configurations N/A
Required Application Software SpyWright
VV&A Status of the Tool unknown

What training is required for personnel to use the tool?

Length 1 day, maximum.
Where Available Online Help.

Additional Tool Information:

Language(s) Used C++; Microsoft Foundation Classes
Classification level
Distribution limitations
Sponsor / Owner Starbase Corp.
Developer (organization, point of contact, address, phone number, email)

Starbase Corp
Sales@starbase.com
9615 SW Allen Blvd Ste 107
Beaverton, OR 97219

Distribution Point of Contact (name, title, organization, address, phone number, email)

Phone: (503) 641-6000
(800) 547-9902
Fax: (503) 641-6001

Email
Sales **-** sales@premia.com
Support **–** support@premia.com

Office Hours
We are available to answer your calls between the hours of
7am and 5pm PST,
Monday – Friday
(except holidays).

Mail
Premia Corporation
9615 SW Allen Blvd.
Beaverton, OR 97005
USA

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: STATGRAPHICS *Plus Version 5*

Brief description of the tool, its primary use(s), and the issues it addresses:

Provides an out-of-the-box all purpose statistical tool with user friendly interface specializing in increased efficiency of data analysis and reporting. Provides enterprise wide solutions for easy collaboration via file transfer, e-mail, or Internet. There are over 250 statistical procedures for Data Visualization and Transformation; Data Exploration, Identification and Comparison; Statistical Process Control; Experimental Design, Creation, Analysis and Optimization; Advanced Regression, Time Series, and Multivariate Method procedures; Parametric and Non-Parametric analyses.

Application (please check all that apply):

☒ Validation

Sponsor:

☒ Commercial

Is the tool applicable to distributed systems?

☒ Yes

What is the cost of the tool?

Product	Single User	Multi User
STATGRAPHICS *Plus* Standard Edition	$749	Call
STATGRAPHICS *Plus* Quality and Design	$999	Call
STATGRAPHICS *Plus* Professional	$1649	Call
STATGRAPHICS *Plus* Enterprise (Network)		Call

Simulation **phases** for which the tool is applicable (please check all that apply):

☒ M&S Planning (including resource estimation)
☒ M&S Conceptual Modeling
☒ M&S Design
☒ M&S Assessment / Evaluation
☒ V&V Documentation / Reporting
☒ Accreditation / Certification

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☒ Closed Form
- ☒ Continuous
- ☒ Discrete Event
- ☒ Real-Time
- ☒ Human / System / Hardware-in-Loop
- ☒ Distributed Processing
- ☒ Distributed Simulation

Development Environment:

- ☒ Structured
- ☒ Object-Oriented
- ☒ Formal System
- ☒ Waterfall
- ☒ Evolutionary / Spiral
- ☒ Rapid Prototyping

Software language(s) which the tool accommodates:

The program is written in C++. Input / Output in XML format

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☒ Data:
  - ☒ Collection (Input manually, imported data or real-time importation by linking to other database or through RS-232 port)
  - ☒ Reduction (Parsing, transformations)
- ☒ System / Component Interfaces
- ☒ Human Interfaces (e.g., GUIs)
- ☒ Algorithms
- ☒ Behaviors
- ☒ Results Evaluation

Tool Use Considerations:

Host Computer(s)
Pentium class PC
Disk Space / RAM Required
At Least 32 MB
Operating System(s)
Windows 95/98/2000, NT
Network(s)
Special Configurations
None
Required Application Software
None
VV&A Status of the Tool
Unknown

What training is required for personnel to use the tool?
No training is required but training is available.
Length
3 Day Introduction to STATGRAPHICS Plus
2 Day Advanced Classes
Where Available
Rockville, MD (offered monthly)
Itasca, Ill (offered every three months)

Additional Tool Information:

Language(s) Used
Written in C++ . Will import / export XML
Classification level
Unknown
Distribution limitations
None
Sponsor / Owner
Manugistics / Statgraphics Corporation
Developer (organization, point of contact, address, phone number, email)
Dr. Neil Polhemus
Statgraphics Corporation
P.O. Box 1124
Englewood Cliffs, NJ. 07632-0124
Neil@sgcorp.com
Distribution Point of Contact (name, title, organization, address, phone number, email)
Seth Wyatt
Manugistics
2115 East Jefferson Street
Rockville, MD 20852
Swyatt@manu.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: STATISTICA with Power Analysis, Experimental Design, and Quality Control Charts

Brief description of the tool, its primary use(s), and the issues it addresses:
This is statistical software used to hold data, analyze data, graph data, and explain data.
It is the highest powered, strongest and most accurate statistical software available.

Application (please check all that apply):

- ☐ Verification
- ☒ Validation

Sponsor:

- ☒ Commercial

Is the tool applicable to distributed systems?

- ☒ Yes

What is the cost of the tool?
$2780 for a single-user of Statistica with Power Analysis, Experimental Design, and QC Charts

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒ M&S Testing and Integration:
  - ☒ Unit
  - ☒ Function
  - ☒ Sub-system
  - ☒ System
- ☒ M&S Assessment / Evaluation
- ☒ Accreditation / Certification

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☒ Closed Form
- ☒ Continuous
- ☒ Discrete Event
- ☒ Real-Time
- ☒ Distributed Processing
- ☒ Distributed Simulation

Development Environment: Any

Software language(s) which the tool accommodates:

The current version provides a language called Statistica Basic. However, the next version will use Visual Basic Applications.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Data:
- ☒Collection
- ☒Reduction

☒Algorithms
☒Test Planning / Execution
☒Results Evaluation

Tool Use Considerations:

Host Computer(s)
Disk Space / RAM Required
For the Windows version, 8 megs of RAM are required and 16 is recommended. The complete program requires 25 Megs of hard disk space and 30 Megs is required on drive C (only temporarily) for the installation procedure.
Operating System(s)
Windows NT, 95,98, and 2000
Network(s)
Yes, standard networks are available, also concurrent networks are available... depending
on your needs (how many users at one time).
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length
Depending on the individual, I would give a few days or a week to get used to the program.
Where Available
Training classes are available either at your site for your employees, or at various seminars
given across the U.S, and here in Tulsa, OK monthly. Please read further on training on our
website, or call anytime.

Additional Tool Information:

Language(s) Used
Statistica Basic and Statistica Command Language
Classification level
unclassified
Distribution limitations
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)
Distribution Point of Contact (name, title, organization, address, phone number, email)

Company is StatSoft. At 2300 East 14th Street, Tulsa, OK 74104. Phone : 918-749-1119
email : info@statsoft.com

Previous Users and Uses:

Name Organization Phone number Email Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: Surveyor

Brief description of the tool, its primary use(s), and the issues it addresses:

Surveyor scans C/C++ files and generates an easy-to-navigate website that organizes and documents code. Surveyor facilitates code review, knowledge transfer, and team communication. If you support unfamiliar or rapidly changing code or if you deliver code to a third party, you'll be glad you own Surveyor.

Application (please check all that apply):

☐ Verification
☐ Validation

Sponsor:

☐ Commercial

Is the tool applicable to distributed systems?

☐ Yes

What is the cost of the tool?

$299 for single user.

Simulation **phases** for which the tool is applicable (please check all that apply):

☐ M&S Use/Application and Maintenance
☐ M&S Modification
☐ V&V Documentation / Reporting
☐ V&V Management

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
☐ Human / System / Hardware-in-Loop

Development Environment:
☐ Object-Oriented

Software language(s) which the tool accommodates:

C/C++

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☐ Algorithms

Tool Use Considerations:

Host Computer(s)
486-based PC or higher with 16 MB RAM (20 MB or higher recommended)
Disk Space / RAM Required
20MB of hard disk space16 MB RAM (20 MB or higher recommended)
Operating System(s) Windows 32-bit operating system
Network(s) Any that work with above OS's.
Special Configurations System and workstation setup.
Required Application Software Editor or Development environments to write C/C++ code.
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length 1 day maximum.
Where Available Online help. Onsite training is demand is great enough.

Additional Tool Information:

Language(s) Used C/C++
Classification level
Distribution limitations
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)
Starbase Corp
Distribution Point of Contact (name, title, organization, address, phone number, email)

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(800) 547-9902
Fax: (503) 641-6001

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Support **-** support@premia.com

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7am and 5pm PST,
Monday – Friday
(except holidays).

Mail
Premia Corporation
9615 SW Allen Blvd.
Beaverton, OR 97005
USA

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: Temporal Rover

Brief description of the tool, its primary use(s), and the issues it addresses:

Specification-based verification tool for automatic verification of protocols and reactive systems

Application (please check all that apply):

- ☒Verification
- ☒Validation

Sponsor:

- ☒Commercial

Is the tool applicable to distributed systems?

- ☒Yes

What is the cost of the tool? $4900

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒M&S Requirements
- ☒M&S Testing and Integration:
  - ☒Unit
  - ☒Function
  - ☒Sub-system
  - ☒System
- ☒Other (specify) Formal specification and automatic validation

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☒Discrete Event
- ☒Real-Time
- ☒Other (specify) Reactive systems

Development Environment:

- ☒Structured
- ☒Object-Oriented
- ☒Formal System
- ☒Waterfall
- ☒Rapid Prototyping

Software language(s) which the tool accommodates:

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☒Architecture

☒Algorithms
☒Behaviors
☒Test Planning / Execution

Tool Use Considerations:

Host Computer(s)
Disk Space / RAM Required 32Meg RAM Min.
Operating System(s)
Network(s)
Special Configurations
Required Application Software Java JVM
VV&A Status of the Tool Release

What training is required for personnel to use the tool?

Length: 1-day
Where Available: on site

Additional Tool Information:

Language(s) Used:
Classification level
Distribution limitations
Sponsor / Owner: Time Rover, Inc.
Developer (organization, point of contact, address, phone number, email):
Doron Drusinsky, Time-Rover, doron@time-rover.com, 408-252-2808
Distribution Point of Contact (name, title, organization, address, phone number, email):
Doron Drusinsky, Time-Rover, doron@time-rover.com, 408-252-2808

Previous Users and Uses:

Name	Organization
Misty Uemura	ISI

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: TEMPORAL VERIFICATION TOOL

Brief description of the tool, its primary use(s), and the issues it addresses:
Operational verification of a simulation model deals with determining how well the behavior exhibited by an implemented model conforms to its specification in a conceptual model of real system. Although it has not been used widely for this purpose, temporal logic appears to be a suitable technique to capture key temporal requirements of discrete event systems. Temporal logic meshes well with the event based nature of discrete event systems and can be derived directly from natural language statements.

"Temporal Verification Framework" offers a verification process based on Temporal Reasoning. The tool takes simulation execution results (state variables and related times) and temporal formulas that represent the behavior of the system as inputs and generates verification result according to the temporal formulas.

Temporal assertions are directly related the real world, they can be generated from natural language statements since it is based on logic. These assertions impose safety and liveness conditions when they are generated based on the correct behaviors of systems. Temporal assertions based verification bridges the gap between the operation of simulation models and what is expected from the simulation.

This framework offers a well-defined process for operational verification in developing verified, validated and accredited simulation models and HLA Federations.

For HLA domain, the approach enables us to focus on whole federation behavior as well as separate federate behaviors. This allows simulation developers to verify that they have behaviorally correct federations that are composed of dynamically verified federates. The realization of this framework in the HLA domain requires an architecture as given in the paper. The main parts of the architecture are observer, language acceptor *and* verificator*. When these two modules are plugged in a federation execution, the behavior of federation is verified at execution time. A proof-of-concept program was developed using the DEVSJAVA, and Prolog and DEVS/HLA environments. The software shows the advantages of OOP paradigm with Logic programming paradigm combination.*

Some Practical Advantages of the Tool : 1) Suggests "Temporal Logic based behavioral verification approach" for "Verification of HLA Federations" as a Framework, 2) Provide an architecture for HLA Federations Verification, 3) Algorithm has a well-defined stepwise approach which promotes automation of verification, 4) To verify the models using Temporal Formulas is close to human thinking, 5) The process localizes the problems, 6) To explain the errors close to human thinking, 7) To test Federation behaviors rather than attribute and object interactions between individual models in the Federation, 8) Logic based programming paradigm is the most suitable, 9) The knowledge bases are extends, 10) Easy to update inference engines, 11) The program structure avoids complex if-then structures, 12) Programming procedure close to the problem narrative definition

Application (please check all that apply):

☒Verification

Sponsor:

☒Academic

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool?

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Conceptual Modeling
☒M&S Design
☒M&S Implementation

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
☒Discrete Event
☒Distributed Simulation

Development Environment:
☒Object-Oriented
☒Other (specify): Logic Programming

Software language(s) which the tool accommodates: JAVA, DEVS/JAVA, Prolog

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Behaviors
☒Results Evaluation

Tool Use Considerations:

Host Computer(s)
Disk Space / RAM Required
3MB
Operating System(s)
Windows 95/98/NY, unix
Network(s)
Special Configurations
Required Application Software
DEVS/JAVA
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length Temporal Logic 1 week; w/ some other training total 2 weeks.

Where Available The university of Arizona, Arizona Center for Integrative Modeling and Simulation (ACIMS) Tucson/ Arizona

Additional Tool Information:

Language(s) Used DEVS/JAVA, Prolog, JAVA
Classification level unclassified
Distribution limitations non
Sponsor / Owner The University of Arizona/ TUBITAK Marmara Research Center, Turkey
Developer (organization, point of contact, address, phone number, email)

Mehmet Fatih Hocaoglu, Cuneyd Firat, Bernard P. Zeigler (hocaoglu, firat, zeigler@ece.arizona.edu)
The University of Arizona
Electrical & Computer Engineering Dept.
1230 E. Speedway Blvd
University of Arizona
Tucson, AZ 85721-0104
Phone: (520) 621-6184

Distribution Point of Contact (name, title, organization, address, phone number, email)

Mehmet Fatih Hocaoglu (hocaoglu@ece.arizona.edu), Cuneyd Firat (firat@ece.arizona.edu)

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: V&V Manager's Toollkit (Not yet released)

Brief description of the tool, its primary use(s), and the issues it addresses:

This tool was a collaborative effort between TRADOC Analysis Center (TRAC)-Leavenworth and Developmental Test Command (DTC). The DTC sponsored portion is based on the DTC Pamphlet 73-4, VV&A guidance and methodology. This tool provides an automated step-by-step procedure for identifying specific tasks and activities for each phase of the M&S development life cycle. These tasks and activities are selected based on model maturity, type, complexity, risk management, etc. Costs required to accomplished these tasks will be estimated for each phase of the life cycle and can be re-adjusted according to the risk level.

Application (please check all that apply):

- X☐ Verification
- X☐ Validation
- X☐ Accreditation

Sponsor:

- ☐ Service
  - X☐ Army

Is the tool applicable to distributed systems?

- X☐ Yes

What is the cost of the tool? $130K

Simulation **phases** for which the tool is applicable (please check all that apply):

- X☐ M&S Planning (including resource estimation)
- X☐ M&S Requirements
- X☐ M&S Conceptual Modeling
- X☐ M&S Design
- X☐ M&S Implementation
- X☐ M&S Testing and Integration:
  - X☐ Unit
  - X☐ Function
  - X☐ Sub-system
  - X☐ System
- X☐ M&S Configuration Management
- X☐ M&S Use/Application and Maintenance
- X☐ M&S Assessment / Evaluation
- X☐ M&S Interoperability / Compatibility
- X☐ M&S Modification
- X☐ V&V Planning (including resource estimation)
- X☐ V&V Documentation / Reporting
- X☐ V&V Management
- X☐ Accreditation / Certification
- X☐ Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- X Closed Form
- X Continuous
- X Discrete Event
- X Real-Time
- X Human / System / Hardware-in-Loop
- X Distributed Processing
- X Distributed Simulation

Development Environment:

- X Structured
- X Object-Oriented
- X Formal System
- X Waterfall
- X Evolutionary / Spiral
- X Rapid Prototyping

Software language(s) which the tool accommodates:

One of the inputs to the planning tool is lines of code to be changed/added/reused and software languages. The software languages that the user can pick from are: Assembly, C, Chill, Pascal, PL/1, Ada83, C++, Ada95, Objective C, and Smalltalk. If the user needs to input lines of code for a different language, he/she would need to pick one closest to those listed.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- X Architecture
- X Data:
  - Collection
  - Reduction
- X System / Component Interfaces
- X Human Interfaces (e.g., GUIs)
- X Algorithms
- X Behaviors
- X Prototypes
- X Management
- X Test Planning / Execution
- X Results Evaluation

Tool Use Considerations:

Host Computer(s): desktop computer
Disk Space / RAM Required: size is 3.64MB
Operating System(s): Microsoft Windows

Network(s): stand-alone
Special Configurations: none
Required Application Software: none
VV&A Status of the Tool: being reviewed, contains some software bugs

What training is required for personnel to use the tool?

Length: 1 hour
Where Available: Developmental Test Command, TRADOC Analysis Center at Ft. Leavenworth or Tec-Masters Inc in Huntsville AL.

Additional Tool Information:

Language(s) Used:

Classification level: unclassified
Distribution limitations:
Sponsor / Owner:
Developmental Test Command at Aberdeen Proving Ground & TRADOC Analysis Center at Ft. Leavenworth, KS
Developer (organization, point of contact, address, phone number, email)
Robert O. Lewis and Anthony Hanson
Tec-Masters, Inc. Suite 215
1500 Perimeter Parkway
Huntsville, AL 35806
256-721-6659 or 6703
e-mail: blewis@tecmasters.com
chanson@tecmasters.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

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Cindy Sullivan
Operations Research Analyst
U.S. Army Yuam Proving Ground
ATTN: CSTE-DTC-YP-CD
Yuma, AZ 85365

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Tool Name: Vega

Brief description of the tool, its primary use(s), and the issues it addresses:

MultiGen-Paradigm's Vega is a comprehensive software development environment for the creation and delivery of realtime 3D audio or visual simulation applications. A large number of modules are available for specific functionality such as DIS/HLA, marine simulation, and mathematically accurate Sensor simulation including IR, NVG, and Radar. The primary purpose of the tool is Visual, Audio, and Sensor Simulation. Ideal uses include flight simulation, nautical simulation, sensor simulation, and general visualization applications. Vega is a cross-platform, COTS software solution that allows the rapid development and delivery of visual simulation and sensor applications of all types. The tool provides a full API for flexibility, as well as an easy-to-use GUI for non-programmers to gain access to the functionality.

Application (please check all that apply):

- ☒ Verification
- ☒ Validation

Sponsor:

- ☒ Service
  - ☒ Army
  - ☒ Navy
  - ☒ Air Force
  - ☒ Marine Corps
- ☒ DoD Agency
- ☒ Government / Non-DoD
- ☒ Academic
- ☒ Commercial

Is the tool applicable to distributed systems?

- ☒ Yes

What is the cost of the tool?
Development Licenses from $3,500

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒ M&S Planning (including resource estimation)
- ☒ M&S Requirements
- ☒ M&S Conceptual Modeling
- ☒ M&S Design
- ☒ M&S Implementation
- ☒ M&S Testing and Integration:
  - ☒ Unit
  - ☒ Function
  - ☒ Sub-system
  - ☒ System
- ☒ M&S Use/Application and Maintenance
- ☒ M&S Assessment / Evaluation

☒M&S Interoperability / Compatibility
☒M&S Modification
☒Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:
☒Discrete Event
☒Real-Time
☒Human / System / Hardware-in-Loop
☒Distributed Processing
☒Distributed Simulation

Development Environment:
☒Structured
☒Object-Oriented
☒Rapid Prototyping

Software language(s) which the tool accommodates:
Primarily C, also C++, scripting languages like TKL and TCK.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Architecture
☒Prototypes
☒Management
☒Test Planning / Execution
☒Results Evaluation

Tool Use Considerations:

Host Computer(s): n/a
Disk Space / RAM Required: 400 Disk Space, 128+ RAM
Operating System(s): Irix, NT, Linux available Q2
Network(s): n/a
Special Configurations: n/a
Required Application Software: SGI Performer on Irix, Linux
VV&A Status of the Tool: n/a

What training is required for personnel to use the tool?

None is required, some experience in 3D and programming is helpful. MPI offers frequent training courses in all of our products either at our facilities or training is available on-site.

Length:	4 Days +
Where Available:	MPI Dallas, on-site

Additional Tool Information:

Language(s) Used:	C, C++, TCK, TCL
Classification level:	n/a
Distribution limitations:	n/a
Sponsor / Owner:	n/a

Developer (organization, point of contact, address, phone number, email):

MultiGen-Paradigm Inc.
Christian D. Cole
Product Marketing Manager
14900 Landmark Blvd. #400
Dallas, TX 75240
972-960-2301
christian.cole@ca.com

Distribution Point of Contact (name, title, organization, address, phone number, email):

MultiGen-Paradigm Inc.
Chris Hawkins
VP of Sales
14900 Landmark Blvd. #400
Dallas, TX 75240
972-960-2301
christopher.hawkins@ca.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)
Other comments?

Tool Name: Vermont HighTest Plus 3.21

Brief description of the tool, its primary use(s), and the issues it addresses:
Vermont HighTest Plus is a GUI regression testing tool based upon capture/replay technology. This tool allows you to record and/or write test scripts that can be replayed to verify the proper operation of newer versions of the application under test. By creating test scripts, the process of testing an application becomes much easier and the thoroughness of the testing increases dramatically over time.

Application (please check all that apply):

☒Verification

Sponsor:
☒Commercial

Is the tool applicable to distributed systems?
☒Yes

What is the cost of the tool? $195.00 per user. Discounts available on volume purchases.

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Testing and Integration:
☒Sub-system
☒System

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response.
Development Environment:
☒Structured

Software language(s) which the tool accommodates:

Works with virtually any Windows application. Has native support for most Windows standard controls and derrivitives such as Visual Basic and Microsoft Visual C.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Human Interfaces (e.g., GUIs)
☒Test Planning / Execution

Tool Use Considerations:

Host Computer(s): Windows-based PC
Disk Space / RAM Required: 10 MB Disk, 5 MB RAM
Operating System(s): All Windows versions for Workstations
Network(s): All
Special Configurations: None
Required Application Software: None
VV&A Status of the Tool

What training is required for personnel to use the tool?

Due to the simplified and intuitive user interface and scripting language, this tool requires very little formalized training. Users can be creating tests almost immediately upon installing the software.

Length: 3 Days
Where Available: On-site

Additional Tool Information:

Language(s) Used
Classification level
Distribution limitations
Sponsor / Owner: Vermont Creative Software, Inc.
Developer (organization, point of contact, address, phone number, email):

Janice Simmons
Vermont Creative Software, Inc.
140 Main St.
P.O. Box 250
Richford, VT 05476
(800) 848-1248 (Sales – US and Canada)
(802) 848-7731 (Local, Overseas)
(802) 848-3502 (FAX)
info@vtsoft.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

Available from developer and many other retailers specializing in development and testing tools including: Programmer's Paradise, ComponentSource, GrayMatter (U.K.), Download Warehouse

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

There are many online references describing or listing this tool. More information available upon request.

Other comments?

Vermont HighTest Plus is by far the easiest GUI regression testing tool to use on the market. The tool was designed from the ground up to be easy to use and emphasizes the ability to record scripts that can then be replayed without modification. When editing of scripts is necessary, the proprietary scripting language makes it simple and quick to extend the script through the english like commands that are very intuitive.

Also included is a built-in suite manager for combining scripts into groups that can be played back as a group, a sub-set of the group or singly – all with a few clicks of the mouse.

Tel: (800) 265-2797
Fax: 519.884.8861
Web: www.VerticalSky.com
410 Albert Street, Waterloo, ON, Canada N2L 3V3

Tool Name:
Vertical Sky Solution 3.1 consisting of:

1.1.7.1.1 Software Manager

Collaboration Manager

Content Manager

Brief description of the tool, its primary use(s), and the issues it addresses:

The Vertical Sky Software Manager allows team members to effectively manage multiple development projects, secure software assets, meet deadlines and contribute throughout the application and Web development lifecycle.

The Vertical Sky Collaboration Manager automates and synchronizes your business and IT processes so that only authorized application changes are delivered with accuracy and at the right time. Organizations using the Vertical Sky Collaboration Manager will strengthen their chain of action - particularly when faced with constant business pressure to respond to changes.

The Vertical Sky Content Manager allows any individual - whether artist or a high-tech wizard - to contribute content or code to their public Web site. And it's the only content management solution that totally integrates with software management for the back office

Application (please check all that apply):

- ☒ Verification
- ☒ Validation
- ☒ Accreditation

Sponsor:
No response

Is the tool applicable to distributed systems?

- ☒ Yes

What is the cost of the tool
Please see "Appendix A" this response

Simulation **phases** for which the tool is applicable (please check all that apply):

☒M&S Requirements
☒M&S Implementation
☒M&S Configuration Management
☒M&S Use/Application and Maintenance
☒M&S Modification
☒V&V Management
☒Accreditation / Certification
☒Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type: No response

Development Environment:
☒Structured
☒Object-Oriented
☒Formal System
☒Waterfall
☒Evolutionary / Spiral
☒Rapid Prototyping

Software language(s) which the tool accommodates:
IDE's include MS Visual Studio, Powerbuilder, and JBuilder. However, the Software Management tool can support versioning of any flat files, so essentially we support any and all languages.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Management

Tool Use Considerations:

Host Computer(s)
PC or Solaris box
Disk Space / RAM Required
Server: 512 MB RAM, 90 MB disk space (180 MB for install)
Operating System(s)
Windows NT, 2000, Solaris
Network(s)
Special Configurations
Required Application Software
VV&A Status of the Tool

What training is required for personnel to use the tool?

Length – Full training on the entire solution (end-user) is 3 days
Full training for an administrator is 5 – 7 days
Full Installation and Set-up – varies on size and complexity (3 days – 3 weeks)
Where Available – Customer location or Vertical Sky's Chicago location

Additional Tool Information:

Language(s) Used
Written in Java (1.3), with a splash of legacy C++ in Software Manager.
Classification level
Distribution limitations
Sponsor / Owner
Developer (organization, point of contact, address, phone number, email)
Distribution Point of Contact (name, title, organization, address, phone number, email)

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

See Apendix B this response

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

Appendix A

410 Albert St. W., Waterloo, Ontario, Canada, N2L 3V3
Main: (800) 265-2797 Fax: (519) 884-8861
http://www.mks.com

1.1.8 Pricing for Rapid eVOLUTION line of products
1.1.9 (Software Manager, Collaboration Manager, and Content Manager)

SOFTWARE MANAGER

1 user of **Software Manager**	- $750.00
Preferred Customer Support[1]	- $250.00
	- $1,000.00 each

COLLABORATION MANAGER

1 user of **Collaboration Manager**	- $750.00
Preferred Customer Support	- $250.00
	- $1,000.00 each

eVOLUTION Server

1 **eVOLUTION Server**	-$4,000.00
Preferred Customer Support (PCS)	-$ 1,400.00

[1] *Annual fee equal to 35% of then current license fee.*

-$ 5,400.00 each

Con't…

Content Manager

1 user of Content Manager	- $750.00
Preferred Customer Support (PCS)	- $250.00
	- $1,000.00 each

RAPID EVOLUTION MANAGER **(REQUIRED TO USE CONTENT MANAGER CLIENTS)**

1 Rapid eVOLUTION Manager server	- $12,000.00
Preferred Customer Support (PCS)	- $ 4,200.00
	- $16,200.00 each

DISCOUNT STAGES

50 – 100 (users)	10%
101-250	*15%*
251-500	*20%*
500+	25%

Con't…

1.1.10 Concurrent Pricing

Concurrent pricing is not limited to a user. As a result, if a 10-user concurrent license is purchased, any 10 people may have access to the system at any given time. For example, if there are 25 developers, and on any given day only 10 of them use the system, you would only need a 10-user concurrent license.

Concurrent Software Manager – Client

1 user of Software Manager	- $2,250.00
Preferred Customer Support (PCS)	- $ 787.50
	- $5,670.00 each

Concurrent Collaboration Manager – Client

1 user of Collaboration Manager	- $2,250.00
Preferred Customer Support (PCS)	- $ 787.50
	- $5,670.00 each

Concurrent eVOLUTION License – Server

1 Concurrent eVOLUTION Server	- $12,000.00
Preferred Customer Support (PCS)	- $ 4,200.00
	- $16,200.00 each

Upgrade to Concurrent License

Migration from a standard license of Software Manager or *Collaboration Manager to a concurrent license*	*- $2,800.00*
Preferred Customer Support (PCS)	*- $ 980.00*
	- $3,780.00 each

Concurrent Content Manager License

1 user of Content Manager	- $2,250.00
Preferred Customer Support (PCS)	- $ 750.00
	- $3,000.00 each

CONCURRENT RAPID EVOLUTION MANAGER **(REQUIRED TO USE CONTENT MANAGER CLIENTS)**

1 Rapid eVOLUTION Manager server	- $36,000.00
Preferred Customer Support (PCS)	- $12,600.00
	- $48,600.00 each

APPENDIX B

REFRENCES

Richard Streck

Electronic Data Systems (EDS)
(717) 763-6019
rich.streck@eds.com

EDS uses all components of the Vertical Sky solution in some form or another. The most common use is for managing changes to code and/or content for clients. The Camp Hill location where Richard manages his team, is the largest installation with over 300 users. Their main client is the Department of Defense.

Bob Neideker
American Management Systems (AMS)
(703) 227-5590
bob_neidecker@mail.amsinc.com

AMS uses Source Integrity. All code changes are managed with Source Integrity. AMS works with finacial sector of the government. 100+ users.

David Eldredge
Pragmatics
(703) 761-4033 x134
eldredge@pragmatics.com

Pragmatics uses Source Integrity Professional and manages all changes to code for their clients. They currently have 35 users.

VERTICAL SKY ELITE CUSTOMER CARE

Top-Tier Services with Guaranteed Rewards

> ELITE CUSTOMER CARE COMPONENTS

Vertical Sky Elite Customer Care offers the following services:

• 1-800 Phone Support—A toll-free number (for North America) so you can get in touch with support staff quickly during regular business hours to resolve your issues and get answers.

• Email Request Service—A convenient way to submit technical support requests after regular business hours via email. An email confirmation of receipt will be sent to you, and a Customer Care representative will contact you the next business morning to address your issue.

• Automatic Product Notifications—An email notice is sent to you each time one of the Vertical Sky software products you've purchased has been upgraded.

• Product Upgrades and Patches— Product upgrades and product patches are made available to you via the Web, so you'll always have the latest and greatest versions of Vertical Sky solutions.

• Web-based Support—A wealth of Web-based, self-service support , including an extensive support knowledge base with a powerful Web search engine, which lets you ask questions and find answers on your own with ease. You will also get FAQ lists sorted by the most helpful FAQ's, as rated by our customers; online chat capabilities for communicating with support representatives; and online registrations and password requests. Extensive Web-based training opportunities are also available.

• Support Advocate Program—Our steward program whereby an assigned technical support advocate works hand-in-hand with other support reps and Vertical Sky teams to manage any outstanding issues or problems on your behalf. You'll get regular update reports documenting open issues, conference call opportunities with Customer Care representatives, and proactive communications on enhancements and bug fixes. We also maintain a technical profile of each customer so your information is at our fingertips for faster problem resolution.

• User Council Membership—An optional membership on our
Customer User Council, which empowers customers to discuss their business needs in various formats (e.g., chat groups, personal interviews, online seminars, conference calls, etc.). It's an invaluable opportunity

to be heard and offer input on product design to ensure that Vertical Sky's solution directions will address your most important business challenges.

If you're running a large, complex, or highly demanding eBusiness, or you simply want the best the world has to offer, you'll find that Vertical Sky Elite Customer Care is the ideal support solution. It's our top-tier support package, offering services with great returns for your business. Our Elite customer care package has it all—everything you need to ensure smooth sailing, from around-the-clock global assistance to our enhanced Web-based, self-service support resources and on-site consultations. When you go with Elite, our knowledge-rich, seasoned Customer Care professionals will be there for you day and night, no matter where you are or how complex your challenges. We'll ensure that you get the most out of your Vertical Sky software solutions and your technology environment.

Vertical Sky Elite Customer Care will give you a real business advantage in today's chaotic, Web-driven markets. You'll receive top-notch 24 x 7 global assistance, and you'll have the security of knowing our guaranteed 2-hour emergency response service is just a phone call away. When you choose Elite Customer Care, you'll reap incredible rewards for your business and get the peace of mind of knowing someone's there for you every step of the way, working for your success.

Your Organization Is Evolving At Breakneck Speed.

The Internet is changing the way you do business, deliver services, and manage customer relationships. This web-driven, rapid evolution means your company must be adaptable, agile, and forward-thinking. To thrive, you must be equipped to fully exploit the vast potential and raw power of Internet technology for business advantage—without compromising your existing infrastructure or incurring mind-blowing costs.

Your eBusiness applications must enable you to turn on a dime to meet constantly changing market conditions and customer demands—without compromising web site or software integrity or fueling the fires of organizational chaos. This means successfully managing a skyrocketing number of code and content components to ensure consistent, on-time delivery of web applications, content, and e-based services.

If your company can't stay one step ahead of customer growth and deliver business-critical content at web speed, evolution shock can bring your company to its knees. A single software or content failure can choke your web-based revenues. Competitors can leapfrog you.

And, customer relationships can suffer. Evolution shock can devastate any company—at any time. To mitigate the risk, you need a comprehensive business solution that will enable you to manage rapid evolution and clear the obstacles that can hold your company back.

Evolutionize Your eBusiness With A Total Solution

Vertical Sky empowers you to manage the software, content, people, and business processes that will enable your rapidly evolving eBusiness to soar to new heights of efficiency and success. We offer a surefire business solution that can help you leverage your existing technology infrastructure, content, business processes, and software investments to achieve a significant competitive advantage in today's high-pressure business-to-business and consumer markets.

The Vertical Sky solution is a complete solution that encompasses Rapid Evolution Management software, expertise, and services for rapidly building, sustaining, and evolving eBusiness processes, web content, and software applications. Our powerful, integrated mix of products and services is absolutely critical for companies that want to redirect, retool, and redefine their eBusiness to respond to the relentless pace of change in the market. Moreover, it's a scalable solution, which means it grows just as fast as your web business.

Our consulting-led approach to Rapid Evolution Management means we're there for you every step of the way, from initial discovery and needs analysis through implementation and deployment. Our unique process creates new synergies within your organization, helping everyone work together better by fostering collaboration among line of business and IT staff, partners, suppliers, and customers. It speeds and streamlines the creation, approval, and delivery of fresh web content, marketing programs, and services.

The results? Order and efficiency replace the chaos of site production. Your time to market shrinks significantly. Cost of ownership plummets. And, customer relationships flourish, giving you an even greater edge over fierce market competition.

> > > > > > > > > > > > eVOLUTIONIZING BUSINESS

`www.VerticalSky.com collaboration l content l software`

```
>Realization of eBusiness Vision
>Accelerated Time to Market
>Reduced Total Cost of Ownership
>High Customer Satisfaction and Loyalty
>Enhanced Employee Collaboration and Productivity
>Rapid Solution Implementation
```

>Increased Site and Application Quality
>Streamlined Change Processes
>Less Site and Application Down Time
>Reduced Legal Liabilities“ ...the web site is the central business application.
And this increasingly complex technical environment must be carefully managed to ensure a bullet proof level of customer satisfaction 24/7,365 days a year."

Tool Name: The Visualization Toolkit (VTK)

Brief description of the tool, its primary use(s), and the issues it addresses:

An open-source, portable C++ toolkit for 3D graphics, visualization, volume rendering, and image processing. Also has automatically generated language bindings to Tcl, Python, and Java.

Application (please check all that apply):

- ☒Verification
- ☒Validation

Sponsor(s):

- ☒DoD Agency
- ☒Government / Non-DoD
- ☒Academic
- ☒Commercial
- ☒Other – open-source community

Is the tool applicable to distributed systems?

- ☒Yes

What is the cost of the tool?

No cost for software; manuals and support provided by Kitware,Inc. at nominal charge.
Of the 600+ classes, a few are patented and a license is required for commercial application. These patented classes are not required to use the software.

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒M&S Conceptual Modeling
- ☒M&S Design
- ☒M&S Implementation
- ☒M&S Configuration Management
- ☒M&S Use/Application and Maintenance
- ☒M&S Assessment / Evaluation
- ☒V&V Documentation / Reporting

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☒Continuous
- ☒Human / System / Hardware-in-Loop
- ☒Distributed Processing
- ☒Distributed Simulation

Development Environment:

- ☒Object-Oriented

☒Rapid Prototyping
☒Other (specify) – Extreme programming in open-source environment

Software language(s) which the tool accommodates:
C++, Tcl, Python, Java

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Data:
☐Collection
☒Reduction
☒Human Interfaces (e.g., GUIs)
☒Algorithms
☒Behaviors
☒Prototypes
☒Results Evaluation

Tool Use Considerations:

Host Computer(s): Any
Disk Space / RAM Required: Core: pre-compiled binaries 25 Mbytes
Development: 300 MBytes
Full Install: 1 Gbyte (includes test images & data)
Operating System(s): Unix (many flavors), Linux, Windows 95/98/NT/2000
Network(s): TCP/IP
Special Configurations
Required Application Software: OpenGL
MPI if distributed parallel processing
Thread library if shared memory parallel processing
Tcl/Tk, Python, and/or Java is using these languages
VV&A Status of the Tool

What training is required for personnel to use the tool?
Length: Books are available; 2-day course is available
Where Available: Books available at any major reseller; on-site and off-site training available from Kitware, Inc.

Additional Tool Information:

Language(s) Used: C++, Tcl, Java, Python
Classification level
Distribution limitations: None
Sponsor / Owner: Source code copyright: Will Schroeder, Ken Martin, Bill Lorensen
Developer (organization, point of contact, address, phone number, email)
Kitware, Inc. http://www.kitware.com, kitware@kitware.com
Distribution Point of Contact (name, title, organization, address, phone number, email)
Kitware, Inc. http://www.kitware.com, kitware@kitware.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
Jim Ahrens	Los Alamos Nat'l. Lab			Computational Vis.
Terry Yoo	National Library of Medicine			Medical Vis.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

VTK is used around the world in commercial, government, and academic applications. Applications include medical visualization, simulation, computational visualization, immersive environments, geophysical exploration, information visualization, FEM pre- and post-processing, computational geometry, segmentation, registration, modeling, and 3D graphics.

Other comments?
VTK is supported by an active open-source community including a user's list with approximately 1000 subscribers. There are roughly two-dozen developers (having write-access to the source code repository). The developers are employed by a number of institutions around the world.

The quality of VTK code is high. A regression test suite, consisting of over 600 tests, is run every day and the software is released daily, with major releases occurring every 6-9 months.

Tool Name: Verification, Validation, and Accreditation Cost Estimating Tool (VVACET)

Brief description of the tool, its primary use(s), and the issues it addresses : The CET is a parametric cost estimating tool designed specifically for VV&A programs. It covers six types of Models and Simulations (M&S)--1) Legacy M&S with good VV&A history, 2) Legacy M&S with Poor VV&A History, 3) Modified Legacy M&S, 4) New M&S, 5) M&S for Developmental Test Command (DTC), and 6) HLA M&S Federations.

- It bases it estimates for all models on a combination of M&S size and cost data, complexity, risk and uncertainty profile questions, and specific question pertaining to type of effort and pre-existing constraints and attributes of the M&S itself.
- This way, the cost estimates are closely aligned to the reality of the condition and maturity of the M&S and its documentation.
- An unique feature of the tool allows weighting of risk and uncertainty factors to have an appropriately proportioned effect on cost.
- Because of the cost estimating relationships being used, the tool automatically compensates for the size, complexity, and risk of the M&S to which the VV&A effort is to be applied.
- This model was calibrated with a large sample of V&V efforts and is adjusted to current dollars.
- It contains calibrated cost data for 10 popular software languages ranging from assembler to SmallTalk including C, C++, Ada 83 and 95, Pascal, etc.
- The CET includes features for generating the VV&A Work Breakdown Structure (WBS), program schedule, task lists by phase, other direct costs, and VV&V Plan outlines to assist in generation of the necessary plans. This last feature allows the tailored V&V tasks produced by the tool to be transferred directly to the V&V Plan for elaboration by the project planner.
- Most of the planning activities--cost estimating, task definitions, etc.--are performed within the tool reducing the time for planning the VV&A effort for weeks to hours. A typical tool-based session requires less than one hour to derive the total cost and task definition for the effort followed by an editing session to complete the plans for a specific project.

Application (please check all that apply):

☒ Verification
☒ Validation
☒ Accreditation

Sponsor:

☐ Service
☒ Army

Is the tool applicable to distributed systems?

☒ Yes

What is the cost of the tool? No, there is no cost if the user will download from the following website.

http:\\vvacet.tecmasters.com

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒ M&S Planning (including resource estimation)
- ☒ M&S Requirements
- ☒ M&S Conceptual Modeling
- ☒ M&S Design
- ☒ M&S Implementation
- ☒ M&S Testing and Integration:
  - ☐ Unit
  - ☐ Function
  - ☐ Sub-system
  - ☐ System
- ☒ M&S Use/Application and Maintenance
- ☒ M&S Assessment / Evaluation
- ☒ M&S Interoperability / Compatibility
- ☒ V&V Planning (including resource estimation)
- ☒ V&V Management
- ☒ Accreditation / Certification

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☒ Closed Form
- ☒ Continuous
- ☒ Discrete Event
- ☒ Real-Time
- ☒ Human / System / Hardware-in-Loop
- ☒ Distributed Processing
- ☒ Distributed Simulation

Development Environment:

- ☒ Structured
- ☒ Object-Oriented
- ☒ Formal System
- ☒ Waterfall
- ☒ Evolutionary / Spiral
- ☒ Rapid Prototyping

Software language(s) which the tool accommodates: Most common languages from Assembler to SmallTalk including C, C++, Pascal, Ada 83, 95, etc.

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

☒Other (specify) **All aspects of VV&A**

Tool Use Considerations:

Host Computer(s): PC running Windows 95 or later, NT, etc.
Disk Space / RAM Required: runs on 64Megs or better
Operating System(s)
Network(s): N/A
Special Configurations: Not rqd.
Required Application Software: Microsoft Office Professional
VV&A Status of the Tool: This is the fourth generation of the tool and it has undergone extensive testing and verification. It has been validated against several programs over the past two years, which have been used to determine the calibration points for the various models embedded in the tool.

What training is required for personnel to use the tool?

Length: One hour familiarization or less: Reading the documentation
Where Available: Downloadable from the website above

Additional Tool Information:

Language(s) Used: C++
Classification level: UNC
Distribution limitations: None on the executable
Sponsor / Owner: TRAC, AMSO, DTC all combined to sponsor tool development effort
Developer (organization, point of contact, address, phone number, email):

Tec-masters, Inc.
1500 Perimeter Parkway
Huntsville, Alabama, 35806 Telephone: 256-721-6659 or 6703
Contacts: Clint Hanson Help Desk - chanson@tecmasters.com

Bob Lewis - Designer - blewis@tecmasters.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

Download executable and documents from http:\\vvacet.tecmasters.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

We have given out over fifty copies of the tool to all Services, a number of commercial clients, and have received generally good feedback. Contacts are available upon request from the developers.

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

N/A

Other comments?

If you become a user, give us your feedback. Thank you! The developer

Tool Name: XTie-RT Requirements Tracer (pronounced Cross-Tie)

Brief description of the tool, its primary use(s), and the issues it addresses:

XTie-RT is a requirements management tool distributed by Teledyne Brown Engineering. XTie-RT is a database-centric tool that is a solution for information management and traceability. It provides facilities for entering documents into the database as individual requirements, organizing these requirements by assigning attributes, editing and manipulating requirements, creating links between them and generating documentation. XTie-RT is a multi-user system designed for use by one of all of the project team members. It is used mainly in the areas of:

Requirements capture
Management of changing requirements
Requirements Traceability
Generating Documentation

Application (please check all that apply):

☒Verification
☒Validation
☒Accreditation

Sponsor: No response

Is the tool applicable to distributed systems?

☒Yes

What is the cost of the tool?

The current prices of XTie-RT version 3.1.02 are as follows:

XTie-RT Server software for Windows 95, NT, 98 - $1299.00 USD
XTie-RT client software for Windows 95, NT, 98 - $450.00 USD
(clients are node-locked)

XTie-RT SOLO (stand-alone version) - $999.00 USD

No annual maintenance fees

Price includes: CD,-ROM, installation instructions, tutorial, on-line help and technical support via e-mail, fax or phone during regular business hours

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☒M&S Planning (including resource estimation)
- ☒M&S Requirements
- ☒M&S Conceptual Modeling
- ☒M&S Design
- ☒M&S Implementation
- ☒M&S Testing and Integration:
  - ☒Unit
  - ☒Function
  - ☒Sub-system
  - ☒System
- ☒M&S Configuration Management
- ☒M&S Use/Application and Maintenance
- ☒M&S Assessment / Evaluation
- ☒M&S Interoperability / Compatibility
- ☒M&S Modification
- ☒V&V Documentation / Reporting
- ☒V&V Management
- ☒Accreditation / Certification
- ☒Standards Compliance

Simulation **environments** for which the tool is applicable (please check all that apply):

Environment is not an issue for XTie-RT. All environments are applicable.

Software language(s) which the tool accommodates:
ALL

*Simulation **aspects** for which the tool is applicable (please check all that apply):*

- ☒Algorithms
- ☒Test Planning / Execution
- ☒Results Evaluation

Tool Use Considerations:

Host Computer(s)
PC, 486 processor minimum
Disk Space / RAM Required
Storage: 8 Mbytes minimum
Memory Requirements: recommended for OS
Operating System(s)
Windows 95, 98, NT for both Server and Client software
Network(s) Ethernet, TCPIP
Special Configurations NONE
Required Application Software NONE

VV&A Status of the Tool

What training is required for personnel to use the tool?

Formal training is not required to be able to effectively use XTie-RT. A brief tutorial is included with shipment and we recommend spending 3-4 hours going thru the exercise. The users should be productive within 8 hours and proficient within 2 days. On-site training is available upon request.

Additional Tool Information:

Language(s) Used – C, Visual C++
Classification level
Distribution limitations – Client software is node-locked
Sponsor / Owner – Sponsor – MICOM, Owner – Teledyne Brown Engineering
Developer (organization, point of contact, address, phone number, email)

Teledyne Brown Engineering, Randy Edger, 300 Sparkman Dr. Huntsville, AL 35805; (256) 726-1474randy.edger@tbe.com
Teledyne Brown Engineering, Donald Parker, 300 Sparkman Dr. Huntsville, AL 35805 (256) 726-1995; donald.parker@tbe.com

Distribution Point of Contact (name, title, organization, address, phone number, email)

Sherry Adlich, XTie-RT Marketing and Sales, Teledyne Brown Engineering, 300 Sparkman Dr, Huntsville, AL 35805, MS 145; 256-726-2122; sherry.adlich@tbe.com

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool
Tom Nelson	Evans & Sutherland	801-588-1507		software V&V
Dave Willets	Tenix Defence Systems		willettd@tenix.com	risk management for ship building
Jim Delligatti	General Dynamics	703-492-3224		hardware and software requirements for AAAV program

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.
Other comments?

APPENDIX A-5: THE "RAW" SURVEY FORM

SURVEY FORM FOR VV&A AUTOMATED SUPPORT TOOLS

Tool Name:

Brief description of the tool, its primary use(s), and the issues it addresses:

Application (please check all that apply):

- ☐ Verification
- ☐ Validation
- ☐ Accreditation

Sponsor:

- ☐ OSD
- ☐ Joint
- ☐ Service
  - ☐ Army
  - ☐ Navy
  - ☐ Air Force
  - ☐ Marine Corps
- ☐ DoD Agency
- ☐ Government / Non-DoD
- ☐ Academic
- ☐ Commercial

Is the tool applicable to distributed systems?

- ☐ Yes
- ☐ No

What is the cost of the tool?

Simulation **phases** for which the tool is applicable (please check all that apply):

- ☐ M&S Planning (including resource estimation)
- ☐ M&S Requirements
- ☐ M&S Conceptual Modeling
- ☐ M&S Design
- ☐ M&S Implementation
- ☐ M&S Testing and Integration:
  - ☐ Unit
  - ☐ Function
  - ☐ Sub-system
  - ☐ System
- ☐ M&S Configuration Management
- ☐ M&S Use/Application and Maintenance
- ☐ M&S Assessment / Evaluation
- ☐ M&S Interoperability / Compatibility
- ☐ M&S Modification
- ☐ V&V Planning (including resource estimation)
- ☐ V&V Documentation / Reporting
- ☐ V&V Management
- ☐ Accreditation / Certification
- ☐ Standards Compliance
- ☐ Other (specify)

Simulation **environments** for which the tool is applicable (please check all that apply):

Simulation Type:

- ☐ Closed Form
- ☐ Continuous
- ☐ Discrete Event
- ☐ Real-Time
- ☐ Human / System / Hardware-in-Loop
- ☐ Distributed Processing
- ☐ Distributed Simulation
- ☐ Other (specify)

Development Environment:

- ☐ Structured
- ☐ Object-Oriented
- ☐ Formal System
- ☐ Waterfall
- ☐ Evolutionary / Spiral
- ☐ Rapid Prototyping
- ☐ Other (specify)

Software language(s) which the tool accommodates:

Simulation **aspects** for which the tool is applicable (please check all that apply):

- ☐ Architecture
- ☐ Data:
  - ☐ Collection
  - ☐ Reduction
- ☐ System / Component Interfaces
- ☐ Human Interfaces (e.g., GUIs)
- ☐ Algorithms
- ☐ Behaviors
- ☐ Prototypes
- ☐ Management
- ☐ Test Planning / Execution
- ☐ Results Evaluation
- ☐ Other (specify)

Tool Use Considerations:

Host Computer(s)

Disk Space / RAM Required

Operating System(s)

Network(s)

Special Configurations

Required Application Software

VV&A Status of the Tool

What training is required for personnel to use the tool?

Length

Where Available

Additional Tool Information:

Language(s) Used

Classification level

Distribution limitations

Sponsor / Owner

Developer (organization, point of contact, address, phone number, email)

Distribution Point of Contact (name, title, organization, address, phone number, email)

Previous Users and Uses:

Name	Organization	Phone number	Email	Use of Tool

Other information about the tool (references describing it, methods/metric employed, any special relationship between this tool and CASE tools or other software development/testing automation, etc.)

Other comments?

APPENDIX A-6: REFERENCES

Reference A:
"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.

Reference B:
"Capability Maturity Model[SM] for Software, Version 1.1" by Mark C. Paulk, Bill Curtis, Mary Beth Chrissis, and Charles V. Weber. Technical Report CMU/SEI-93-TR-024, Software Engineering Institute, Carnegie Mellon University, February 1993.

Reference C:
DoD Directive DoD 5000.59-P: Modeling and Simulation (M&S) Master Plan, October 1995, http://www.dmso.mil

Reference D:
SIMVAL99: Making VV&A Effective and Affordable, The Simulation Validation Workshop 1999. Military Operations Research Society and the Society for Computer Simulation International, May 12, 1999

APPENDIX A-7: THE MSIAC

The mission of the Modeling and Simulation Information Analysis Center (MSIAC) is to be the single, integrated support activity for the use, employment, and sustainment of modeling and simulation for the Department of Defense (DoD). MSIAC provides DoD with emerging, M&S-related scientific, technical, and operational support information in support of the warfighter. Specific areas of MSIAC expertise include research and development, design, analysis, test and evaluation, training, operations, maintenance of DoD systems, and military systems operated by allied and friendly nations. One of thirteen DoD-sponsored Information Analysis Centers (IACs), MSIAC is sponsored by the Defense Technical Information Center (DTIC) and the Defense Modeling & Simulation Office (DMSO).

MSIAC provides the M&S infrastructure for satisfying training, analysis, acquisition, and experimentation needs in support of the warfighter. MSIAC services and products include the collection, analysis, storage, and dissemination of M&S scientific, technical, and operational support information; support for user inquiries (the "help" desk); education and training; technical and management support to the Modeling and Simulation Resource Repository (MSRR); verification, validation, and accreditation (VV&A) technical assistance; High Level Architecture (HLA) compliance testing; current awareness activities (including *The MSIAC M&S Journal Online* at http://www.msiac.dmso.mil/journal/index.html); and the development of state-of-the-art reports.

State-of-the-art reports (SOAR) provide in-depth analyses of current technologies, evaluate and synthesize the latest information resulting from research and development activities, and provide a comprehensive assessment of M&S-related technologies. Topic areas for MSIAC state-of-the-art reports are solicited from the M&S Community to ensure applicability to emerging warfighter requirements.

Additional MSIAC services include assistance to conducting joint training, building doctrine and tactics, developing operational plans, assessing warfighting situations, assessing technologies, and structuring forces.

Please address inquiries concerning capabilities, products, and services to:

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