

# Simulation Reloaded

*Sixth biennial survey of discrete-event simulation software tools that empower users to imagine new systems, and study and compare alternative designs.*

**By James J. Swain**

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The blockbuster movie "The Matrix" and its recent sequel "The Matrix Reloaded" portray an interactive simulation environment so realistic that the participants remain ignorant that their "reality" is only a simulation, and only the hacker heroes such as Neo (Keanu Reeves) know the truth. It is a simulation so engaging that participants can convince themselves that they are dead! The pervasiveness of simulation and of role-playing games is great enough that the concept is easily accepted and imagined.

Increasingly, simulations are being used for visualization, exploration and training, taking advantage of advances in animation and computer processing to make this possible. Of course, we are used to thinking about simulation as a powerful tool for letting us imagine new systems and allowing us to both quantify and observe their behavior. Whether the system is a production line, a distribution network or communications system, simulation can be used to study and compare alternative designs or to troubleshoot existing systems. With simulation models we are free to imagine how an existing system might perform if altered, or imagine and explicitly visualize how a new system might behave before the prototype is even completed. The ability to easily construct and execute models and to generate statistics and animations about results has always been one of the main attractions of simulation software.

## Survey

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This survey is the sixth biennial survey of simulation software for discrete-event systems simulation and related products [Swain, 2001]. Following the pattern of previous surveys, the vendors have provided the information in the table. The survey summarizes important product features of the software, including price. Products that run on desktop computers to perform discrete-event simulation have been emphasized, since these are the most suitable for usage in management science and operations research. Simulation products whose primary capability is continuous simulation (systems of differential equations observed in physical systems) or training (e.g., aircraft and vehicle simulators) are omitted here.

There are 48 products listed in the survey, making it one of the largest surveys yet. The range and variety of these products continues to grow, reflecting the robustness of the products and the increasing sophistication of the users. The information elicited in the survey is intended to provide a general gauge of the product's capability, special features and usage. This survey includes information about experimental run control (e.g., batch run or experimental design capabilities) and special viewing features, including the ability to produce animations or demonstrations that can run independent of the simulation software itself. A separate listing gives contact information for all of the vendors whose products are in the survey. This survey is also available on the Lionheart Publishing Web site ([www.lionhrtpub.com](http://www.lionhrtpub.com)) and includes vendors

who missed the publishing deadline. Of course, most of the vendors provide their own Web sites with further details about their products.

Like all software, the relation between the vendor and the user is ongoing. Products evolve over time, and new versions of the software become available periodically. In addition, the vendor is a source of information about both its products and their application. Most vendors now maintain contact with their users through mailings, newsletters, their own Web sites and annual user-group conferences. These conferences showcase the application and usefulness of the products, nurture contact with the users, and provide a way for users to learn from each other.

In addition to users groups, there are a number of organizations and conferences devoted to the application and methodology of simulation. The INFORMS publications *Management Science*, *Operations Research* and *Interfaces* publish articles on simulation. The INFORMS College on Simulation sponsors sessions on simulation at the national INFORMS meeting, and makes awards for both the best simulation publication and recognition of service in the area, including the Lifetime Achievement Award for service to the area of simulation. Further information about the College on Simulation can be obtained from the Web site [www.informs-cs.org](http://www.informs-cs.org). This site now provides the complete contents of the *Proceedings* of the conference for the last three years, and also contains links to many vendors of simulation products and sources of information about simulation, simulation education and references about simulation.

The College on Simulation is also a co-sponsor of the annual Winter Simulation Conference. This year's conference will be held Dec. 7-10 at the Fairmont Hotel in New Orleans. The program includes tutorial, methodology and applications tracks, including specialized areas such as computer modeling, financial models, transportation and logistics, and other operations. Further information and registration information is available from the site [www.wintersim.org](http://www.wintersim.org). The sponsors of the conference are also ready sources of information about simulation. The sponsor Web sites will be linked from the Winter Simulation Conference Web site. The Informs College on Simulation Web site ([www.informs-cs.org](http://www.informs-cs.org)) has the complete proceedings of the WSC from 1997 to 2002.

## Selecting Simulation Products

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After reviewing the large number of products in the survey, the author is often queried about the best simulation product overall, for a particular area of application, or even for a given project. In the broadest sense, it is not clear that such a ranking is even possible, and in any case it is not attempted in this survey. Suitability is a function of a large number of factors, including cost, familiarity and features, which vary by user and by problem. The comparisons that have been made between products have been limited to details about their operation [e.g., Schriber and Brunner, 2002] or comparisons based upon modeling cases. *Simulation News Europe* has published a number of case studies that provide solutions based upon two or more simulation products. These studies are also available on the Web site [www.argesim.org/comparisons/index.html](http://www.argesim.org/comparisons/index.html). The 12 cases documented on that site include six involving discrete-event simulation.

Discussions with a number of consultants who are independent of a particular product line suggest that most consultants are familiar with and employ a variety of products depending upon the needs of the client and the characteristics of the problem. In the cases where the simulation

solution may have to interface with client software (e.g., databases or decision-support tools) compatibility is an increasingly important issue. A recent selection methodology developed for Accenture world-wide simulation [Tewoldeberhan, Verbraeck, Valentin, and Bardonnnet, 2002], provides a framework in which users can evaluate products in seven areas (e.g., model development, animation) as the basis for deciding upon a suitable tool. The user can score competing products in the seven areas and use those scores as the basis for making an informed decision about product choice.

## **The Discipline of Simulation**

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The phenomenal growth of simulation throughout industry and particularly within the Department of Defense (DoD) has led to a growing demand for simulation professionals to develop models and modeling tools, and to manage large and complex simulation-based projects. Lacking a source of simulation professionals, the traditional approach has been to re-train engineers, scientists or programmers in the specialized skills needed for a given modeling or software development effort. In the case of manufacturing and service fields where discrete-event simulation is the predominant approach, many of these skills could be obtained as part of a degree program in operations research, management science or industrial engineering. In general, of course, simulation is a component of an overall program, not the end in itself. In a similar manner, expertise in communications or radar simulation might be developed by recruiting and retraining generalists from physics or electrical engineering.

The need for simulation professionals appears to be outstripping the supply that can be provided through the traditional approach. For instance, in the Huntsville, Ala., area alone, a survey of job advertisements over a limited study period turned up over a hundred local firms looking for professionals to do simulation [Madewell and Swain, 2002]. An analysis of the advertisements characterized both the types of professionals sought (developer, analyst and manager) and the qualifications required by the employers.

Simulation application far transcends the methods favored by individual disciplines, such as operations research. In fact, application areas and their disparate simulation approaches have sub-divided simulation, but there is an increasing sense that modeling and simulation may constitute a discipline in itself. Simulation programs have appeared at the University of Arizona, University of Central Florida, Old Dominion University, Georgia Tech and the University of Alabama in Huntsville to name a few. Last summer, a "simulation summit" of interested educational, governmental and industry representatives was held to consider what common body of knowledge characterized simulation and steps that could be taken to recognize this field as a specialty. The DoD is considering a job designation that would identify the particular skills and knowledge of a modeling and simulation professional.

**Vendors, Typical Applications of the software, Primary Markets for which the software is applied, System Requirements: RAM , Operating Systems**

				System Requirements	
Software	Vendor	Typical Applications of the software	Primary Markets for which the software is applied	RAM	Operating Systems
Analytica	Lumina Decision Systems, Inc.	Business modeling, decision and risk analysis, widely used as a more flexible alternative to spreadsheets	Industry, government, and education: telecommunications, healthcare, energy, pharmaceuticals, environment, consumer products, manufacturing, automotive, transportation, defense	8 MB	Windows 95, 98, NT, 2000, XP and ME; Mac OS 7, 8 and 9
AnyLogic 5.0	XJ Technologies	Business and system dynamics, performance, cost, and risk analysis, optimization, planning, decision support, agent-based, discrete/continuous	Strategic management, manufacturing, service, logistics, supply chain, material handling, healthcare, transportation, IT management, telecom, scientific	128MB min., 512MB recom.	Windows NT, 2000 and XP
Arena	Rockwell Software	Manufacturing, supply chain, customer management, business process, healthcare, military, warehousing and logistics improvement	Manufacturing, supply chain/logistics, business process, military, healthcare	64MB min., 128MB recom.	Windows 95, 98, ME, NT, 2000 and XP
AutoMod	Brooks Automation	Material handling and movement systems, warehousing, baggage handling and manufacturing	Automotive, aerospace, airport operations, manufacturing, warehousing and distribution	512MB or higher recom.	Windows OS
Crystal Ball Professional Edition	Decisioneering, Inc.	Business planning and analysis, cost/benefit analysis, risk management, petroleum exploration, portfolio optimization, project management	Financial services, financial planning, oil and gas, pharmaceuticals, telecom, manufacturing, energy, utilities, insurance, government, aerospace	16MB min.	Windows 95, 98, Me, 2000, NT 4 and XP
Crystal Ball Standard Edition	Decisioneering, Inc.	Business planning and analysis, cost/benefit analysis, risk management, petroleum exploration, environmental assessment, project management	Financial services, environmental, oil and gas, pharmaceuticals, telecom, manufacturing, energy, utilities, insurance, government, aerospace	16MB min.	Windows 95, 98, Me, 2000, NT 4 and XP
DecisionPro	Vanguard Software Corporation	Business financial modeling, process optimization, decision-making	Management consulting, oil and gas, manufacturing, legal	16MB	Windows 95, 98, 2000 , NT4 and XP
DecisionScript	Vanguard Software Corporation	Web-based financial planning, online sales assistance, management reporting, portfolio simulation	Financial services, Web site development	Client:32 MB; Server:12 8MB	Windows 95, 98, 2000 , NT4 and XP

eM-Plant	Tecnomatix Technologies Inc.	Manufacturing, material handling, business process simulation, logistics, distribution, scheduling, line balancing, process verification, supply chain	Discrete manufacturing (automotive, electronics, shipyard, machining, line builder, etc), logistic, distribution, consulting, healthcare, banking	64MB min., 512MB recom.	Windows NT, 2000 and XP
Enterprise Dynamics 5.0	Incontrol Enterprise Dynamics	Simulation, emulation, capacity analysis, staffing, material handling, facilities layout, line balancing, resource utilization, supply chain	Dedicated simulation suites for manufacturing, material handling, warehousing, airports, research and education, steel industry, ports	64MB	Windows 95, 98, 2000, NT, ME and XP
ExpertFit	Averill M. Law & Associates	Automatically and accurately fits probability distributions to data; helps choose distributions with absence of data	Manufacturing, defense, communications, transportation, healthcare, process reengineering, call centers, services, data analysis in general	64MB	Windows 98, ME, 2000, NT and XP
Extend Industry	Imagine That, Inc.	Indispensable for large-scale simulation projects. Includes an internal relational database and a module for simulating	Large scale and rate-based systems including distribution logistics, high volume call centers, packaging lines, etc.	64MB min., 128MB+ recom.	Windows XP, 2000, NT, ME, 98; Power Macintosh OS X and 9.1+
Extend OR	Imagine That, Inc.	Message-based discrete event architecture to model any process that involves physical or logical objects moving	Manufacturing and business modeling; communication systems, healthcare, six sigma, transportation, supply chain dynamics, etc.	64MB min., 128MB+ recom.	Windows XP, 2000, NT, ME, 98; Power Macintosh OS X and 9.1+
Extend Suite	Imagine That, Inc.	Model continuous, discrete event, or discrete rate processes, plus get a relational data management system	Large scale and rate-based systems, manufacturing, logistics, packaging lines, transportation, business, call centers, engineering, scientific	64MB min., 128MB+ recom.	Windows XP, 2000, NT, ME, 98; Power Macintosh OS X and 9.1+
Factory Explorer	Wright Williams & Kelly	Gross margin optimization, cycle time reduction, ramp up and ramp down planning, bottleneck analysis	Semiconductors, flat panel displays, thin film record heads, solar panels, automotive, discrete manufacturing and assembly	256MB min., 512MB recom.	Windows 98 or later
FirstSTEP Designer	Interfacing Technologies	FirstSTEP Designer is a comprehensive business process management tool that gives decision makers the power	Enterprises focused on establishing operational standards or obligation to implement highly regulated processes & environments	32MB	Windows 95, 98, 2000, NT and XP
Flexsim	Flexsim Software Products, Inc	Manufacturing, material handling, warehousing, distribution, real-time monitoring/analysis, supply chain, container shipping, storage access systems	Manufacturing, material handling, warehousing, distribution, real-time monitoring/analysis, supply chain, container shipping, storage access systems	128MB min., 256MB recom.	Windows XP and 2000
GAUSS	Aptech Systems, Inc.	GAUSS is a general purpose scientific and statistical programming language with multiple tools	Economics, finance, social sciences, engineering, or any field that does data analysis or model fitting	256MB recom.	Windows, AIX4, HP-UX11, Solaris and Linux

GoldSim	GoldSim Technology Group	Strategic planning, risk analysis and management, business dynamics, engineered systems modeling, portfolio management, environmental modeling	Manufacturing, mining, water resources, insurance, power, government (hazardous and radioactive waste management)	64MB	Windows 98 or later
GPSS World for Windows	Minuteman Software	Modeling of manufacturing, telecommunications, computer networks, queuing networks, modeling of discrete event systems	Operations research departments, industrial engineering professionals doing simulation modeling	32MB	Windows 98, ME, 2000, NT and XP
HighMAST™	Highpoint Software Systems, LLC	.Net object-oriented framework for development of simulation services & components for master, slave or peer-level integration with larger systems.	Various - currently in use in batch manufacturing and schedule/plan validation, under consideration for others.	160 MB 256 MB	Servers : Windows NT or later, with .Net Framework (Client : Various)
MAST	CMS Research Inc.	Design and planning of flexible labor and flexible machine systems/ cells	Low inventory - high mix manufacturing that use flexibility as the substitute to inventory; lean manufacturing applications	128MB	Windows 2000, XP, NT or later
MedModel	ProModel Solutions	Wait times; staffing; patient flow; bed management; space and resource allocation; facility design; cost analysis	Healthcare	64MB min., 128MB recom.	Windows 98 or later
Micro Saint	Micro Analysis & Design, Inc.	Has been used primarily to model applications in defense, human factors, manufacturing, and service industries	Defense industry, human factors	64MB	Windows 95,98,2000,ME,XP and NT
mystrategy	Global Strategy Dynamics Ltd.	Business strategy and planning, business architecture modeling. Uses Strategy Dynamics approach (see Web site)	Any business system; audience is strategy planners and general management wishing to understand business performance	32MB min., 64MB+ recom.	Windows 95 and later
NAG C Library	Numerical Algorithms Group	Forecasting, logistics, portfolio/product, risk management, scheduling, linear/integer programming, optimization, non-linear programming, data mining	Chemical/process industries, finance, military, manufacturing, healthcare, oil/natural gas, environment, biotech, telecommunications, transportation	256MB, depending on data set size	Windows, Linux, Unix, etc.
NAG SMP Library	Numerical Algorithms Group	Forecasting, logistics, portfolio/product, risk management, scheduling, linear/integer programming, optimization, non-linear programming, data	Chemical/process industries, finance, military, manufacturing, healthcare, oil/natural gas, environment, biotech, telecommunications, transportation	256MB, depending on data set size	Windows, Linux, Unix, etc.

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PASION Simulation System	Stanislaw Raczynski	Supports discrete events, queuing, continuous ODE models, bond graphs, signal flow graphs, rigid body dynamics	Education, universities, simulation consultants and companies	64Mb min.	Windows 98 or later, including XP
PIMSS	MJC2 Limited	Modeling, optimisation and planning of manufacturing operations	Food, beverages, petroleum, cement, timber, bulk chemicals, pharmaceuticals, automotive, textiles, footwear, furniture, construction, plastics, telecommunications	256MB min., 512MB recom.	Windows 2000/XP, UNIX and Linux
ProcessModel	ProcessModel, Inc.	Business Process Analysis (BPA) process improvement, Six Sigma, ISO certification, requirements definition and application development	Can analyze and improve discrete event processes in all markets	64MB min., 128MB recom.	Windows 95, NT, 98, 2000 and XP
ProModel	ProModel Solutions	Lean; Six Sigma; project & portfolio planning; capacity, cost analysis; process, cycle time improvement; supply chain	Manufacturing & logistics, pharmaceutical	64MB min., 128MB recom.	Windows 98 or later
Proplanner Manufacturing Process Management Software	Proplanner	Process planning and engineering solution to create, document, manage and access your manufacturing process information	Manufactures discrete product that involves product complexity greater than 25 components and variations of product	32MB min., 96MB+ recom.	-
ProVision	Proforma Corporation	Primarily used for process improvement and redesign, Six Sigma, ISO/TQM, system modeling, and enterprise architecture	Fortune 1000 and consulting companies with heavy concentration in manufacturing, telecommunications, finance, retail, and government	256MB	Windows 98 and later
Resource Manager	User Solutions, Inc.	Manufacturing planning and scheduling models with inventory 'what-ifs' and alternate routing analysis	Manufacturing and operations management with people, machines, and material considerations\conststraints	128MB min., 512MB recom.	Windows 98, 2000, NT, XP, etc.
SAIL	CMS Research Inc.	Daily scheduling and performance monitoring of FMS	Metalworking, machining, automated CNC, machine cells, machine parts supplier	128MB	Windows NT, 2000, XP or later
SansGUI Modeling and Simulation Environment	ProtoDesign Inc.	Scientific and engineering model building, simulation program development and deployment, dynamic charting and visualization	General systems, scientific research, engineering, and educational software development	64MB	Windows 95/98, ME, NT4, 2000 and XP
SAS Software	SAS Institute Inc.	Network traffic, call center activity, emergency room traffic, computer network activity, inventory	Public sector, oil and gas, telecommunications, health care, retail, banking, academics	Varies	All major Unix and Windows operating systems

		levels, queue modeling			
ServiceModel	ProModel Solutions	Process improvement & optimization; capacity, transaction, financial analysis; staffing; scheduling; customer volumes; transportation; security systems	Financial, banking, insurance, airline, securities, call center, business re-engineering and other service industries	64MB min., 128MB recom.	Windows 98 or later
ShowFlow	Webb Systems Limited	New facility planning; throughput time reduction; bottleneck analysis; staffing level analysis	Manufacturing, logistics, financial services, retail operations	64MB+	Windows 9x, NT4, Me and XP
SIGMA	Custom Simulations	General discrete event systems, supporting all world views with an event relationship graphical interface	General manufacturing and service systems including bioproduction, semiconductor, health care, and banking enterprises	-	All Windows systems
SimCAD Pro	CreateASoft, Inc.	Manufacturing, assembly line, robotics, lab automation, factory layout, workflow re-engineering, conveyor simulation, mail order and fulfillment	Manufacturing, assembly line, robotics, lab automation, factory layout, workflow re-engineering, conveyor simulation, mail order and fulfillment	128MB	Windows NT, 2000 and XP
SIMPROCESS	CACI Products Company	SIMPROCESS is a key component in the business process and reengineering improvement life cycle	SIMPROCESS is designed for organizations that need to analyze varied scenarios and to mitigate risk	256MB min., 512MB recom.	Windows (next version in Linux)
SIMUL8 Professional	SIMUL8 Corporation	Work flow management, throughput analysis, de-bottlenecking, new product/process development, capacity analysis, continuous improvement, what-if scenarios	Business process, call centers, manufacturing, supply chain, logistics, healthcare, financial, pharmaceutical, customer service, Six Sigma	64MB	Windows 95 or later
SIMUL8 Standard	SIMUL8 Corporation	Work flow management, throughput analysis, de-bottlenecking, new product/process development, capacity analysis, continuous improvement, what-if scenarios	Business process, call centers, manufacturing, supply chain, logistics, healthcare, financial, pharmaceutical, customer service, Six Sigma	-	Windows 95 or later
SLIM	MJC2 Limited	Strategic modeling, optimisation and analysis of distribution networks, transport operations and supply chain networks	Logistics, distribution, petroleum, retail, 3PL, express delivery, transport, bulk chemicals, construction, container shipping, food, beverages	256MB min., 512MB recom.	Windows 2000/XP, UNIX, Linux
Supply Chain Builder	Simulation Dynamics	SCB is used to gain understanding of complex supply and/or distribution chains and evaluate	Automotive, consumer goods, food and beverage, transportation, pharmaceutical	128MB min., 1GB recom.	Windows 2000/XP
VisSim	Visual Solutions	Nonlinear dynamic systems, control	Automotive, aerospace, HVAC, power, process,	-	Windows 9x, ME, NT, 2000, XP, and

		design, embedded systems, logistics, economics, motion control, real-time simulation of virtual plants	industrial control, logistic scheduling		Solaris
Visual Simulation Environment	Orca Computer, Inc.	The Visual Simulation Environment software product is an integrated development and execution environment for discrete-event, general-purpose	VSE is a general-purpose simulation product that can be used for discrete-event modeling and simulation	128MB min.	Windows 98, NT, 2000 and XP
WebGPSS (micro-GPSS)	FLUX Software Engineering	General purpose discrete events simulation	Educational (business and engineering)	-	Windows 95, 98, 2000, NT 4, ME and XP

**Model Building: Graphical model construction (icon or drag-and-drop), Model building using programming/ access to programmed modules, Run time debug**

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Software	Model Building		
	Graphical model construction (icon or drag-and-drop)	Model building using programming/ access to programmed modules	Run time debug
Analytica	y	y	y
AnyLogic 5.0	y	y	y
Arena	y	y	y
AutoMod	y	y	y
Crystal Ball Professional Edition	n	n	n
Crystal Ball Standard Edition	n	n	n
DecisionPro	y	y	y
DecisionScript	y	y	y
eM-Plant	y	y	y
Enterprise Dynamics 5.0	y	y	y
ExpertFit	-	-	-
Extend Industry	y	y	y
Extend OR	y	y	y
Extend Suite	y	y	y
Factory Explorer	n	y	y
FirstSTEP Designer	y	y	y
Flexsim	y	y	y
GAUSS	n	y	y
GoldSim	y	y	n
GPSS World for Windows	y	y	y
HighMAST™	n	y	y
MAST	y	y	y
MedModel	y	y	y
Micro Saint	y	y	y
mystrategy	y	n	n
NAG C Library	n	y	y
NAG SMP Library	n	y	y

PASION Simulation System	y	y	n
PIMSS	y	y	y
ProcessModel	y	y	y
ProModel	y	y	y
Proplanner Manufacturing Process Management Software	y	n	n
ProVision	y	n	-
Resource Manager	n	y	y
SAIL	y	y	y
SansGUI Modeling and Simulation Environment	y	y	y
SAS Software	y	n	y
ServiceModel	y	y	y
ShowFlow	y	y	y
SIGMA	y	y	y
SimCAD Pro	y	y	y
SIMPROCESS	y	y	n
SIMUL8 Professional	y	y	y
SIMUL8 Standard	y	y	y
SLIM	y	y	y
Supply Chain Builder	y	y	y
VisSim	y	y	y
Visual Simulation Environment	y	y	y
WebGPSS (micro-GPSS)	y	y	y

**Model Building (continued): Input Distribution Fitting (Specify), Output Analysis Support (Specify), Batch run or experimental design (Specify)**

Software	Model Building (continued)		
	Input Distribution Fitting (Specify)	Output Analysis Support (Specify)	Batch run or experimental design (Specify)
Analytica	y Simple methods	y Includes powerful graphical analysis, deterministic and probabilistic sensitivity analysis, and many statistical functions	y Random or systematic sampling for select inputs
AnyLogic 5.0	y Stat::Fit directly supports over 40 AnyLogic distributions	y Data collection and statistical processing (mean, deviation, confidence, etc.), presentation (Gantts, plots, histograms)	y Experiment types supported: simulation, optimization, Monte-Carlo, sensitivity analysis, custom script-based experiment
Arena	y -	y -	y -
AutoMod	y With the use of ExpertFit	y The AutoStat module provides enhanced statistical analysis during the experimentation phase of simulation projects	y Batch run with AutoStat; AutoMod allows for experimental design
Crystal Ball Professional Edition	y Three fitting methods (Chi-Square, Kolmogorov-Smirnov, Anderson-Darling) for continuous distributions	y Analyzes statistics and displays results in output charts. Can extract raw data and create reports	y Developer Kit contains macros and functions that can be programmed to automate all simulation

Crystal Ball Standard Edition	y	Three fitting methods (Chi-Square, Kolmogorov-Smirnov, Anderson-Darling) for continuous distributions	y	Analyzes statistics and displays results in output charts. Can extract raw data and create reports.	n	-
DecisionPro	y	Uniform, discrete, triangular, normal, lognormal, gamma, exponential, beta, Bernoulli, binomial, Poisson, custom	y	Simulation statistics, sensitivity analysis, graphical presentation, all available as OLE objects	y	Batch and interactive run
DecisionScript	n	-	y	Simulation statistics, sensitivity analysis, graphical presentation, all available as Web pages	y	Batch and interactive run
eM-Plant	y	Standard data analysis tool included (DataFit)	y	Standard data analysis tool included (DataFit, e.g. Confidence interval etc.)	y	Experiment manager, supports batch runs, rule based experiment design, neural networks, confidence interval calculation
Enterprise Dynamics 5.0	y	Built-in auto fit curve fitting	y	Built-in reports, graphs, direct Excel connection, DDE, IP, ActiveX and ODBC connections to external analysis software	y	Design of experiments; batch run script on (remote) computer
ExpertFit	y	40 distributions, 4 technically correct goodness-of-fit tests, 30 graphs, context-sensitive help	-	-	y	Many data sets can be automatically simultaneously analyzed in a batch.
Extend Industry	y	-	y	Confidence intervals are calculated at the click of a button	y	Automated execution of different scenarios is supported
Extend OR	y	-	y	Confidence intervals are calculated at the click of a button	y	Automated execution of different scenarios is supported
Extend Suite	y	Stat::Fit is included in the Extend Suite package	y	Confidence intervals are calculated at the click of a button	y	Automated execution of different scenarios is supported
Factory Explorer	n	-	y	Confidence intervals on CT, Var(CT); initialization bias test	y	Batch run sequence can be stored in Excel worksheet; user interface DOE module
FirstSTEP Designer	y	For duration and volume we offer several different distributions, raw data distribution fitting is currently unsupported	y	Process analysis & reporting for: resource capacity planning, activity based costing, critical path, cycle time	n	-
Flexsim	y	Flexsim supports 29 different distributions; Flexsim bundles ExpertFit distribution fitting software	y	Flexsim supports 29 different distributions; Flexsim bundles ExpertFit distribution fitting software	y	Flexsim includes a design of experiment module that assists in defining a models batch runs
GAUSS	y	Wide range of statistical models available	y	Confidence intervals, profile t and likelihood traces, bootstrap, and other metrics	y	Batch and interactive modes
GoldSim	n	-	y	Scatter plots, correlation analysis, distribution statistics, complete result export to ASCII, binary or database format	n	-
GPSS World for Windows	n	-	y	Analysis of variance	y	Automatic design and execution of screening experiments and optimizing experiments
HighMAST™	y	Framework for generating time-variant distribution from	y	Output histogram and data series provision. Many data-	y	Demo example that performs Monte Carlo

		any mathematically specified or custom PDF.		exposing events fired by existing infrastructure.		analysis.
MAST	n	-	y	Uses rough cut results to compare to simulated results to determine capacity or integration effect performance issues	n	-
MedModel	y	User-defined distributions, 15 predefined distributions, plus distribution fitting using Stat::Fit software (included)	y	Complete output analysis reports and charts included; also outputs to Excel and Access for analysis	y	Unlimited scenarios can be predefined to experiment on parameters
Micro Saint	n	-	y	Some automatic graphs and statistics are available; results files can be opened in other analysis software	n	-
mystrategy	n	-	n	-	n	-
NAG C Library	n	-	n	-	y	Batch
NAG SMP Library	n	-	n	-	y	Batch
PASION Simulation System	y	Uniform, normal, lognormal, triangular, exponential, erlang, beta, gamma, Weibull, sample (empiric) and user-defined	y	Various graphical results representation, including variance and confidence intervals in function of time, queuing models	y	Automatically repeating simulations for off-line variance analysis
PIMSS	y	Configurable toolset to enable input variable mapping and correlation	y	Output is graphical and/or tabular as required	-	-
ProcessModel	y	Stat::Fit curve fitting software included	y	Management and detailed analysis	y	Scenario planner allows for unlimited batch experimentation
ProModel	y	User-defined distributions, 15 predefined distributions, plus distribution fitting using Stat::Fit software (included)	y	Complete output analysis reports and charts included; also outputs to Excel and Access for analysis	y	Unlimited scenarios can be predefined to experiment on parameters
Proplanner Manufacturing Process Management Software	n	-	y	Data is managed and shared; output is exported via a text file	n	-
ProVision	y	ProVision has 11 different distribution patterns available for arrivals and process timing	y	Graphical charts and data tables for cost, timing, and resource usage as a result of a simulation run	y	ProVision's simulator can be called from another application through a COM interface
Resource Manager	n	-	y	Data export to Excel with user defined query and selection for custom reporting	y	Runs can be made in Planned Mode takes snapshot of current restraints without loading them
SAIL	n	-	y	Optimize capacity allocation configurations using performance criteria	y	Uses heuristic search method of 4 input variables to define capacity allocations
SansGUI Modeling and Simulation Environment	n	-	y	Use plug-in code in C/C++ or Fortran, simulation result view, dynamic charting, 3D graphics display	y	Symbolic parameters for multiple-case runs, external process execution support with customizable invocation script
SAS Software	y	Extensive statistical capabilities available in SAS	y	Several built-in analyses are supplemented by statistical analysis capabilities elsewhere	n	-

				in SAS	
ServiceModel	y	User-defined distributions, 15 predefined distributions, plus distribution fitting using Stat::Fit software (included)	y	Complete output analysis reports and charts included. Also outputs to Excel and Access for analysis	y Unlimited scenarios can be predefined to experiment on parameters
ShowFlow	y	ShowFlow has an autofit tool that will find a best fit distribution for input data	y	User defined reports and graphs, plus DDE links with Excel read and write	y Both batch run and experiment design are supported
SIGMA	y	Supports most useful input distributions	y	Graphical and statistical	y Allows extensive experimentation in spreadsheet or web input formats
SimCAD Pro	y	-	y	-	y -
SIMPROCESS	y	SIMPROCESS comes with ExpertFit statistical distribution software to help model input data	y	Output reports can be exported to databases and spreadsheets for more detailed analysis	y SIMPROCESS features an experiment manager to help the user quickly and easily run multiple simulation scenarios
SIMUL8 Professional	y	Stat::Fit included with software	y	Customizable statistical reports including 95% to 99% confidence intervals and graphs; export to Excel, Minitab	y -
SIMUL8 Standard	y	Stat::Fit for SIMUL8 can be purchased as Plug-in for \$245	y	Customizable statistical reports including 95% to 99% confidence intervals and graphs; export to Excel, Minitab	y -
SLIM	y	Configurable toolset to enable input variable mapping and correlation	y	Output is graphical and/or tabular as required	- -
Supply Chain Builder	y	Using JMP or internal database	y	SDI provides comprehensive consulting services including verification, validation support, and analysis of model-generated reports	y Supply Chain Builder allows you to run a series of designed scenarios/experiments
VisSim	y	Using built in optimizer	y	FFT, filtering, Kalman filtering for on-line analysis	y Monte Carlo simulation support
Visual Simulation Environment	n	-	y	VSE Output Analyzer tool provides output a	

**Model Building (continued): Optimization (Specify), Code reuse (e.g., objects, templates), Model Packaging (e.g., can completed model be shared with others who might lack the software to develop their own model?), Tools to support packaging (Specify), Does this feature cost extra?**

Software	Model Building (continued)						
		Optimization (Specify)		Code reuse (e.g., objects, templates)	Model Packaging (e.g., can completed model be shared with others who might lack the software to develop their own model?)	Tools to support packaging (Specify)	Does this feature cost extra?
Analytica	y	Parametric and automated methods	y	y	Free Player Version or via Web (with Analytica Decision Engine)	n	
AnyLogic 5.0	y	Built-in OptQuest engine can handle	y	y	Special tools not needed	n	

		classical as well as large-scale problems including structural optimization				
Arena	y	-	y	y	-	n
AutoMod	y	Optimization is based on evolution strategies algorithm	y	y	Run-time license (fee) or AutoView player (no fee)	-
Crystal Ball Professional Edition	y	Includes OptQuest, a global optimization software tool that provides optimal solutions despite conditions of uncertainty	n	y	Excel models that have been enhanced with Crystal Ball can be viewed by anyone with Excel.	n
Crystal Ball Standard Edition	n	-	n	y	Excel models that have been enhanced with Crystal Ball can be viewed by anyone with Excel.	n
DecisionPro	y	Simplex, integer	y	y	Can publish live models as Web applications using DecisionScript Server	y
DecisionScript	y	Simplex, integer	y	y	DecisionScript Server	y
eM-Plant	y	Genetic algorithms, neural networks	y	y	Different packaging level: Libraries (easy modeling), Model (parameter changes), Viewer (simulation only, no extra cost)	y
Enterprise Dynamics 5.0	y	Through OptQuest and Issop	y	y	Viewer (no fee) and runtime versions (fee)	-
ExpertFit	-	-	-	-	-	-
Extend Industry	y	An open source evolutionary optimizer is included in all versions of Extend	y	y	Free downloadable Player and Demo from the Web site opens, views, and runs models	n
Extend OR	y	An open source evolutionary optimizer is included in all versions of Extend	y	y	Free downloadable Player and Demo from the Web site opens, views, and runs models	n
Extend Suite	y	An open source evolutionary optimizer is included in all versions of Extend	y	y	Free downloadable Player and Demo from the Web site opens, views, and runs models	n
Factory Explorer	n	-	y	y	Model assumptions, reports, and charts are stored in Excel worksheets; can be linked or shared	n
FirstSTEP Designer	y	Easily break processes down into discrete steps; select the best process by running 'what if' analysis	y	y	XML, HTML, CSV	n
Flexsim	y	Flexsim includes design of experiments module that assists in defining multiple runs and multiple scenarios	y	y	Flexsim's Presenter module is self-contained; no external software is required	-
GAUSS	y	Nonlinear programming, quadratic programming, linear	y	y	GAUSS Run-Time module	y

		programming, unconstrained optimization				
GoldSim	n	-	y	y	A free player version is available that can be used to view, edit and run models	n
GPSS World for Windows	y	Experiments can be designed and executed automatically	y	-		-
HighMAST™	n	-	y	y	Visual Studio.Net, or any other compiler that can consume C# and produce a .Net DLL or executable	y
MAST	y	MAST will iterate through several inventory levels to identify that level with the highest performance	-	n	-	y
MedModel	y	Optimization available using OptQuest and/or SimRunner	y	y	Models packaged within software, then models and output can be viewed using free ProModel Player	n
Micro Saint	y	OptQuest automatically searches for and finds the optimal/near optimal values for decision variables	n	y	Unique to Micro Saint	n
mystrategy	n	-	n	n	-	n
NAG C Library	y	Linear, non-linear, constrained, unconstrained, sparse, dense integer, quadratic, sum of squares	y	y	Model can be incorporated into existing applications via C, Java, C#, C++, VB, Fortran, etc.	n
NAG SMP Library	y	Linear, non-linear, constrained, unconstrained, sparse, dense integer, quadratic, sum of squares	y	y	Model can be incorporated into existing applications via C, Java, C#, C++, VB, Fortran, etc.	n
PASION Simulation System	n	-	y	n	-	-
PIMSS	y	PIMSS is capable of optimising highly complex production and manufacturing operations	y	n	-	-
ProcessModel	y	SimRunner optimization software included	y	y	Web browser	n
ProModel	y	Optimization available using OptQuest and/or SimRunner	y	y	Models packaged within software, then models and output can be viewed using free ProModel Player	n
Proplanner Manufacturing Process Management Software	y	Line balancing module provides manual balancing of operations at workstations	y	n	-	n
ProVision	y	Via user	y	y	Models are available for	-

		experimentation			viewing using HTML publishing (no fee) or dynamically using standard internet browsers (fee)	
Resource Manager	y	Optimization of per job/routing cycle times based on best alternate workcenter route	y	y	Excel	y
SAIL	y	Continues search until match on 3 performance variables	n	y	Run time version	y
SansGUI Modeling and Simulation Environment	n	-	y	y	SansGUI Run-Time Environment	y
SAS Software	n	-	y	y	Models can be stored and shared as SAS data sets	n
ServiceModel	y	Optimization available using OptQuest and/or SimRunner	y	y	Models packaged within software, then models and output can be viewed using free ProModel Player	n
ShowFlow	y	The experiment mode allows the determination of the best of a set of preset options	y	y	All models can be executed using the evaluation software which is a free download	n
SIGMA	y	Direct implementation of time dilation methodology for selection and optimization	y	y	Creates C source code of simulations to attach to spreadsheets or run from web	y
SimCAD Pro	y	-	y	y	-	n
SIMPROCESS	y	SIMPROCESS is now bundled with OptQuest, a simulation optimization tool	y	n	-	-
SIMUL8 Professional	y	OptQuest for SIMUL8 included with software	y	y	SIMUL8 Professional simulations can be run and edited in the SIMUL8 Viewer	n
SIMUL8 Standard	y	OptQuest for SIMUL8 can be purchased as Plug-in for \$495	y	n	-	-
SLIM	y	SLIM is capable of optimising very large networks using set of configurable algorithms	y	n	-	-
Supply Chain Builder	y	Supply Chain Builder allows you to optimize the sourcing network prior to model runs	y	y	SDI offers an SE (run-time) version of SCB. Users can run models and make changes to the model data	y
VisSim	y	Provide parameter unknown" blocks and "cost" block so users can define own objective function"	y	y	File menu has send" option that packages current diagram into an email to be sent"	n
Visual Simulation Environment	n	-	y	n	-	n
WebGPSS (micro-GPSS)	y	Grid search with confidence intervals	n	n	-	-

**Animation: Animation, Real-time viewing, Export animation (e.g., MPEG version that can run independent of simulation for presentation), Compatible animation software; Price: Standard, Student Version**

Software	Animation				Price	
	Animation	Real-time viewing	Export animation (e.g., MPEG version that can run independent of simulation for presentation)	Compatible animation software	Standard	Student Version
Analytica	n	-	n	n	Professional: \$995, Enterprise: \$1,595, Decision Engine: \$3,995	Free
AnyLogic 5.0	y	y	y	-	\$3,950-\$12,250	\$395-\$1,400
Arena	y	y	n	y	\$495-\$25,000	Free
AutoMod	y	y	y	y	Average: \$24,000	\$25
Crystal Ball Professional Edition	y	y	n	n	\$1,490	\$69 annual fee
Crystal Ball Standard Edition	y	y	n	n	\$685	\$49 annual fee
DecisionPro	n	n	n	n	Personal: \$495, Professional: \$795	\$99
DecisionScript	y	y	n	n	Client: \$995, Server: \$3,995	50% educational discount
eM-Plant	y	y	y	y	Standard: \$19,000, Professional: \$31,000	Call
Enterprise Dynamics 5.0	y	y	y	y	Starting at \$3,500. Educational Suite starting at \$750	Free
ExpertFit	-	-	-	-	\$495-\$995	\$325-\$795
Extend Industry	y	y	n	y	\$2,295	Academic: \$1,150, Student: \$125
Extend OR	y	y	n	y	\$1,595	Academic: \$795, Student: \$125
Extend Suite	y	y	y	y	\$3,995	Academic: \$1995, Student: \$125
Factory Explorer	n	n	n	y	\$29,800	\$295
FirstSTEP Designer	y	n	n	n	\$2,950	\$1,500
Flexsim	y	y	y	y	\$19,500	Academic: \$250 - \$500, Student: Free
GAUSS	n	-	-	-	-	-
GoldSim	n	y	n	-	\$3,950	Academic: Free, Research: \$950
GPSS World for Windows	n	-	-	-	\$4,500	Full Version: \$995, Student Version: Free
HighMAST™	y	y	n	y	Call	Call
MAST	y	y	n	n	\$7,500	\$750
MedModel	y	y	n	-	\$18,500	Academic: \$995, Student: \$30

Micro Saint	y	y	n	n	\$8,995	Academic: \$1,500; Student: \$60
mystrategy	n	y	n	-	£65.00	E-mail: sales@strategydynamics. com
NAG C Library	n	n	n	-	\$995+	\$395+
NAG SMP Library	n	n	n	-	\$995+	\$395+
PASION Simulation System	y	y	n	n	\$90	\$20
PIMSS	y	y	y	-	POA (Price On Application)	POA (Price On Application)
ProcessModel	y	y	n	y	\$2,395	Academic: \$995 (waived for certified training sites), Student: \$50
ProModel	y	y	n	-	\$18,500	Academic: \$995, Student: \$30
Proplanner Manufacturing Process Management Software	n	n	n	n	Internet: \$500/month, Server/client: \$25,000+	Server/client: \$500
ProVision	y	y	n	n	-	-
Resource Manager	n	n	-	-	\$1,200	\$125
SAIL	y	y	n	-	\$15,000	\$1,500
SansGUI Modeling and Simulation Environment	y	y	n	n	\$599	Academic: \$299, Student: \$99
SAS Software	y	y	n	-	Varies	Varies
ServiceModel	y	y	n	-	\$18,500	Academic: \$995, Student: \$30
ShowFlow	y	y	n	y	£345/\$570	Academic version: £500, Student version: £250/ten
SIGMA	y	y	y	y	\$1,850-\$5,000	Full courses only, \$35/student
SimCAD Pro	y	y	n	-	\$995	-
SIMPROCESS	y	y	y	-	\$9,995	Class of 20 users: \$750
SIMUL8 Professional	y	y	n	n	\$3,995	\$1,450
SIMUL8 Standard	y	y	n	n	\$1,295	Academic: \$1,450, Student: Free with Academic purchase
SLIM	y	y	y	-	POA (Price On Application)	POA (Price On Application)
Supply Chain Builder	y	y	n	n	Call for pricing	n/a
VisSim	y	y	y	-	Professional: \$2,500, Personal: \$495	Professional: \$375, Personal: \$75
Visual Simulation Environment	y	y	n	n	\$1,999	\$999
WebGPSS (micro-GPSS)	y	n	n	y	\$700	\$30 (150 blocks), \$80 (400 blocks)

## Major new features (since February 1999), Vendor Comments

<b>Software</b>	<b>Major new features (since February 2001)</b>	<b>Vendor Comments</b>
Analytica	Analytica 3.0 includes richer modeling language, unlimited array sizes, more powerful optimization, XML data format, and over twice the speed	Provides intuitive visual modeling, Monte Carlo, and Intelligent Arrays for powerful scale-up; combines systems dynamics, decision analysis, and uncertainty analysis
AnyLogic 5.0	Built-in animation and applet generation, OptQuest optimizer, much faster engine, experiment planning, System Dynamics view, DB connectivity, XML, libraries	A new generation tool that allows agent-based, flowchart and system dynamics style modeling on one foundation and produces Java models
Arena	See web site for details - Several new features in the areas of data integration, data manipulation, visualization and animation	Visit <a href="http://www.arenasimulation.com">www.arenasimulation.com</a> to sign up for a free web-seminar on how Arena can help you proactively improve your business
AutoMod	Composite models allow you to import commonly used systems into new models, have multiple simulation analysts work on different sub-models	Brooks Automation and SIMUL8 Corporation have formed an alliance to jointly offer a wide range of simulation software products
Crystal Ball Professional Edition	Forecast filtering, Excel charts, enhanced reports, improved network licensing, updated for Office 11	Suite of user-friendly Excel-based simulation, optimization and time-series forecasting desktop tools. Trial versions available on Web site
Crystal Ball Standard Edition	Forecast filtering, Excel charts, enhanced reports, improved network licensing, updated for Office 11	Most popular and easy-to-use spreadsheet simulation tool available. Trial versions and examples models available on Web site
DecisionPro	New version 4.0 includes improvements in Monte Carlo simulation, decision tree analysis, optimization, and forecasting capabilities	DecisionPro is a general-purpose modeling and simulation tool. It supports Monte Carlo simulation, DecisionTree analysis, linear programming and expert system development
DecisionScript	-	DecisionScript supports the same analytic capabilities as DecisionPro but is designed for building Web-based applications and smart Web sites
eM-Plant	Easy UI customization, experiment manager, enhanced 3D animation, integration with Tecnomatix eMPower solutions, XML, AutoCAD, SDX interfaces, layout oriented modeling	eM-Plant is the state-of-the-art, object oriented simulation solution for all types of applications and industries
Enterprise Dynamics 5.0	ActiveX server for integration and access to simulations on remote computers, graphical and functional CAD Import, Ole for Process Control	Enterprise Dynamics provides a range of solutions from ready-to-use applications to a full development and programming environment.
ExpertFit	Standard and advanced modes, greatly improved algorithms for distribution fitting, new models for no-data case, on-line feature index	ExpertFit is bundled with the Flexsim and SIMPROCESS simulation products
Extend Industry	Fully integrated Evolutionary Optimizer, interactive source code debugger, COM/ActiveX, Explorer-style Navigator, Gantt charts, web-based data exchange, run multiple models	Extend Industry adds a relational database for data management to Extend OR and additional high-end features and tools for the power simulation user
Extend OR	Fully integrated Evolutionary Optimizer, interactive source code debugger, COM/ActiveX, Explorer-style Navigator, Gantt charts, web-based data exchange, run multiple models	The essential tool for simulating the operation of any system or process, Extend OR adds message-based discrete event architecture
Extend Suite	Fully integrated Evolutionary Optimizer,	A comprehensive and integrated set of tools,

	interactive source code debugger, COM/ActiveX, Explorer-style Navigator, Gantt charts, web-based data exchange, run multiple models	Extend Suite bundles leading analysis software with the Extend Industry product
Factory Explorer	Cluster tool modeling, inventory buffers, alternative steps with goto's, execution speed improvements, expanded cost modeling inputs, split lots during processing	Factory Explorer is an integrated capacity, cost, layout, and simulation tool designed for detailed analyses, yet easy to use
FirstSTEP Designer	Exporting to HTML, categories view, reference files, structural checking, searching a list, exporting to the EPC, activity templates	-
Flexsim	Enhanced open GL 3D graphics/animation, integrates Microsoft's Visual C++ IDE, presenter module (like having a 3D PowerPoint software product)	Flexsim is the only new major simulator released in the past five years; it was created for newer operating and hardware systems
GAUSS	Structures and arrays of structures, N-dimensional arrays, options-pricing functions, Lapack generalized eigenvalues and singular value decompositions, new random number generators	-
GoldSim	Reliability Module to support analysis of complex engineering systems; enhanced vector/matrix operations; enhanced discrete event modeling capabilities	Simulate discrete event and continuous processes simultaneously; Monte Carlo engine supports distributed processing; supports construction of very large models
GPSS World for Windows	Software is highly interactive and has over twenty graphics windows that display information dynamically as the model runs	
HighMAST™	The entire framework is new since February 2001.	Build simulation servers or components or combine with other best-of-breed vendors to create applications that use or provide simulation.
MAST	MAST generates work center, labor and production maps useful in the planning of lean manufacturing transition	
MedModel	Customizable trace, location state Gantt charts, anchored background graphics; Zoom-in-a-box, xls format enabled for external files, additional statements and functions	ProModel's a process optimization and decision support company whose solutions are driven by VAO (Visualize, Analyze, Optimize) Technology, leading to superior decisions
Micro Saint	Enhanced external communication, better file management, improved execution speed control, new task functions, improved debugger, and multiple ActionView backgrounds	Micro Saint offers interoperability and maximum flexibility (i.e. any process that can be represented by a flow chart can be modeled)
mystrategy	New product – released October 2002	Single user copies may be purchased online; demo is available for download from the Web site
NAG C Library	New sparse capabilities, performance enhancements, time series, optimizations, random number generators, decision trees, neural networks	The Numerical Algorithms Group (NAG) has a 30+ year reputation for high performance, accuracy and robustness
NAG SMP Library	New sparse capabilities, performance enhancements, time series, optimizations, random number generators, decision trees, neural networks	The Numerical Algorithms Group (NAG) has a 30+ year reputation for high performance, accuracy and robustness
PASION Simulation System	Improved animations, new fast 2D animator for queuing models, augmented model size	Platform: PC Windows 98 or later, including XP; must have the Borland's Delphi installed to run PASION
PIMSS	Inter-factory work in progress, labour constraints and balancing, on-line/off-line processing models	PIMSS is designed to accurately model complex production/manufacturing operations, taking account of production and capacity

		constraints at a detailed level
ProcessModel	Model objects, outside data import, model packaging, model protection, refined genetic algorithm optimization, scenario costing, and ProcessModel 5	Live Animation communicates complex ideas fast, Visual Staffing provides a graphical method of assigning and viewing, One-Step Modeling reduces time
ProModel	Customizable trace, location state Gantt charts, anchored background graphics; Zoom-in-a-box, xls format enabled for external files, additional statements and functions	ProModel's a process optimization and decision support company whose solutions are driven by VAO (Visualize,Analyze,Optimize) Technology, leading to superior decisions
Proplanner Manufacturing Process Management Software	Proplanner is a manufacturing process management application that manages data by discrete event simulation packages	Proplanner's suite of products is a manufacturing engineering tool for the process engineer to design manufacturing systems without using D.E.S.
ProVision	Specify availability of individual resources (to the minute) using calendars and schedules; use empirical streams for arrivals and process timing	ProVision combines the industry's most complete business modeling software with powerful simulation capability to effectively analyze and improve business processes
Resource Manager	Compatible with Resource Manager-DB	Specialize in Excel based tools for planning, scheduling, 'what-if', simulation, and more for manufacturing and operations management
SAIL	SAIL uses production requirements to generate an optimal" schedule downloads this schedule into the cell control computer and monitors actual performance	SAIL provides the ability to manage flexible capacity at ensure that utilization is maintained at a planned level
SansGUI Modeling and Simulation Environment	Object-oriented class schema, version evolution, extensible unit conversion, GUI without programming, dynamic charting, C/C++, Fortran, and OpenGL API support	An application framework for developers to implement model building blocks and simulation programs without writing any graphical user interface code
SAS Software	-	Significant new development underway to add batch run capabilities, programmatic modeling interface, enhanced input distribution and output analysis, and more
ServiceModel	Customizable trace, location state Gantt charts, anchored background graphics; Zoom-in-a-box, xls format enabled for external files, additional statements and functions	ProModel's a process optimization and decision support company whose solutions are driven by VAO (Visualize,Analyze,Optimize) Technology, leading to superior decisions
ShowFlow	In June 2003 a revised help file was released which further enhances the ease of use of the product	ShowFlow combines excellent visualization with rapid/easy model building; don't be misled by the price, this is a powerful product
SIGMA	Increased use of priority queueing methods	-
SimCAD Pro	-	-
SIMPROCESS	Java based architecture; remote application interfaces; publish models in HTML format; OptQuest optimization software included; interface with UML tools	SIMPROCESS is a hierarchical and integrated process simulation tool that combines process mapping, discrete-event simulation, and activity based costing (ABC)
SIMUL8 Professional	COM, SQL, VR, Track Changes so simulations can be merged, ABC costing. See Web site for full feature list	SIMUL8 Corporation is in alliance with Brooks/AutoMod to address the full spectrum of simulation needs - a translator is available
SIMUL8 Standard	Run multiple simulations simultaneously, traveling resources, import from Visio and many more BPM applications, XML. See Web site for features	SIMUL8 Corporation is in alliance with Brooks/AutoMod to address the full spectrum of simulation needs - a translator is available
SLIM	Multi-modal transport modeling, supply point costing functionality	SLIM is capable of modeling and optimising very large distribution or transport networks without partitioning
Supply Chain Builder	Experiment management capabilities enhanced, network optimization added,	-

	redeployment options enhanced, and production transfer capability added	
VisSim	Support for automatic code generation to Texas Instruments DSPs (C2xxx, C3x, C4x, C6x), Fixed point block set, OLE embedded	-
Visual Simulation Environment	-	-
WebGPSS (micro-GPSS)	WebGPSS now available both at <a href="http://www.webgpss.com">www.webgpss.com</a> and as stand-alone on CD; new book with 84 program examples	Best simulation package when at most 20 classroom hours available, as affirmed by 6000+ students

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