

## **ADDENDUM TO HISTORY OF COMPUTER SIMULATION SOFTWARE: AN INITIAL PERSPECTIVE**

Richard E. Nance

C. Michael Overstreet

Virginia Tech  
Blacksburg, VA 24061 USA

Old Dominion University  
Norfolk, VA USA

### **PREAMBLE**

This document is an addendum to the paper:

Nance, R. E. and C. M. Overstreet. 2017. "History of Computer Simulation Software: An Initial Perspective". In *Proceedings of the 2017 Winter Simulation Conference* edited by W. K. V. Chan, A. D'Ambrogio, G. Zacharewicz, N. Mustafee, G. Wainer, and E. Page.

The full explanation of the organization and compression of data from the surveys given in the paper is partially repeated below. Readers accessing this document are assumed to have read the related sections of the parent paper. Explanation of the composition of the basic data structure is provided with less detail, and Figures 3 and 4 are repeated hopefully to minimize the need to access the paper for clarification purposes, section numbers are consistent with the parent paper but with an "A" appended.

Table 4 gives the data structure values, following the organization and compression actions described in Section 5.2 of the paper, that represent the simulation software surveys results published in *ORMS Today* for the six years shown (Swain 2003, 2005, 2009, 2011, 2013, 2015).

#### **5.2.1A Software Surveys Data: Reduction and Organization**

Responses to the 2003 questionnaire are represented in the source document by 23 descriptors (Swain 2003). Elimination and restructuring produces the retained descriptors listed below.

1. M&S Software Product and Vendor.
2. Host Operating Systems.
3. Model Building.
  - a. Graphical model construction (Icon or drag and drop).
  - b. Programming access to programmed modules.
  - c. Run-time debug capability.
  - d. Input distribution-fitting.
  - e. Output analysis support.
  - f. Batch run or experimental design.
  - g. Optimization (Specify).
  - h. Code reuse.
4. Animation
  - a. Animation.
  - b. Real-time viewing.
  - c. Export animation (*e.g.*, MPEG version that can run independent (sic) of simulation for presentation).
  - d. Compatible animation software.

To this set are added "First Year Appearing", "Last Year Appearing", and "Modeling Paradigms" with the last specifying paradigms (*e.g.*, discrete-event, continuous/mixed, system dynamics, agent-based, etc.) supported by the product. The model building and animation subsections constitute two vectors since

the values for the elements of each are restricted: “yes”, “no”, or “-“. After 2003, the explicit “no” fails to appear, giving way to “-“. In 2005, two elements are added to both the “Model Building” and “Animation” vectors. For the former, “Cost Allocation/Costing” (attaching cost parameters to model components), and “Mixed Discrete/Continuous Modeling;” for the latter, “3D Animation” and “Import CAD Drawings”. The data structure employed for representing each vector utilizes the ordering shown in Figure 3. Data element names follow those used in the survey questionnaire.

**Element in Position Number ( )**

**Model Building Vector** = Graphical Model Construction (1)  
Model Building Using Programming / Access to Programmed Modules (2)  
Run Time Debug (3)  
Input Distribution Fitting (4)  
Output Analysis Support (5)  
Batch Run or Experimental Design (6)  
Optimization (7)  
Code Reuse (*e.g.*, Objects, Templates) (8)  
Cost Allocation / Costing (9)  
Mixed Discrete / Continuous Modeling (10)

Example: -,y,-,y,-,y,-,- indicates a M&S software tool that provides Run-Time Debug, Output Analysis and Optimization support.

**Element in Position Number ( )**

**Animation Vector** = Animation (1)  
Run-time Viewing (2)  
Export Animation (3)  
Compatible Animation Software (4)  
3D Animation (5)  
Import CAD Drawings (6)

Example: y,-,-,y,- indicates a M&S software tool that provides Animation through Compatible Animation Software support.

Figure 3: Explanation of the Model Building and Animation vectors.

A key for the interpretation of survey responses is provided in Figure 4. All responses are recorded as listed in the published survey except for “Modeling Paradigms” supported by the software product, which is not a survey question. The importance of this descriptor from a historical perspective seems self-evident, and the attempt is made to extract this information from other responses or, in a very few cases, resorting to an Internet search for the product. If the correctness of an entry is in question, a “?” follows the response provided. Not all answers are easily interpreted, *e.g.*, does “message-based” mean “object-oriented” for a paradigm designation? Apparent inconsistencies are evident in a few cases; *e.g.*, a tool described as strictly a Monte Carlo add-on for financial simulation is also indicated to have the capability for mixed discrete/continuous modeling. A null answer or blank response is a rarity, suggesting that the cause might simply be an oversight.

### 5.2.2A Analysis of the M&S Software Surveys Data

Table 4 is quite large. The massive volume of data contributing to Table 4 warrants repetition of the caveat that errors are quite possible. Another caveat applicable to Table 4 is that minor variations in the

Symbol	Represents
DES	Discrete Event Simulation paradigm
MC	Monte Carlo Simulation
SD	System Dynamics
CS	Continuous Simulation paradigm
A-B	Agent-Based Modeling paradigm
EDUC	Educational use
Msg	Message-based Modeling paradigm
Auxiliary	Auxiliary M&S software tool; <i>e.g.</i> , distribution-fitting, animation
y	Yes, or capability/feature is provided
n	No, or capability/feature is not provided
-	Capability/feature is not provided or answer is undetermined
<u>  </u>	(Underscore) Blank or no answer is given
?	Uncertainty regarding answer or paradigm designation

Figure 4: The key for interpreting survey response presentation in Table 4.

vector values reported in consecutive survey responses for the same software product might be attributable to the varying interpretations from different responders.

Entries are organized by software product, with the vendor identified for each product. Each year a product appears is shown, with version changes if indicated. Changes in vendor associations with a single product are noted. Using the descriptors explained above, product entries are described for each year. The presentation assists in an analysis of the evolution of an individual product, a vendor's slate of products, or the body of M&S software over the period that surveys data are available.

During the period 2003 to 2015, analysis of the six survey responses for which full data are available identifies 135 M&S software products. Some 15 appear for the first time in 2015. Removing these from consideration, 43 products (36%) appear only once in the survey responses. Further, 22 products are listed in only two (18%). These figures reflect a volatile marketplace. Further analysis might cast additional light on these immediate impressions.

The (full) survey data begin midway in the series (six of eleven based on data from Table 3), and the existence of a commercial marketplace predates the initial survey (1991, according to the recognition of the 1997 survey as the fourth in the series (Swain 1997)). Thus, a "start-up effect" cannot be argued, either in terms of the surveys or the marketplace.

The Model Building and Animation vectors; *i.e.*, more specifically, changes in either over the period, enable recognition of product improvement, adaptation, or stability. Examples of an improvement or adaptation strategy are the products BLUESSS simulation package, CSIM 20, GoldSim, and Micro Saint Sharp. More indicative of stable products are Analytica, Arena, ExtendSim AT, ExtendSim Suite, Simcad Pro, SIMUL8 Professional, and SIMUL8 Standard.

An excerpt from Table 4 is presented in Figure 5 in the parent paper to show how the data structure facilitates analysis on the multiple levels noted above: individual product, a vendor's slate of products, or the body of M&S software. A reader experiencing difficulty in using Table 4 might benefit by reviewing the examples given in Figure 5.

Table 4: Vendor Product Listing from Swain Surveys, 2003-2015

Vendor Product Listed in Survey	First Year	Last Year	Operating Systems	Modeling Paradigms	Model Building Vector	Animation Vector
aGPSS	2011		Windows	DES	-,-,y,-,y,-,y,-,-,-	y,-,-,-,-,-
aGPSS	2013		Windows	DES	y,y,y,-,y,-,y,-,-,-	y,-,-,y,-,-
Belber AB aGPSS aGPSS Simulation System Education	2015		Windows, Mac	DES	y,y,y,-,y,-,y,-,-,-	y,-,-,-,-,-
atRISK	2005		Windows/Excel	MC	y,y,-,y,y,-,y,-,y,y	y,y,y,-,-,-
atRISK 5.5 Palisade Corporation	2009	2009	Windows/Excel	MC	y,y,-,y,y,-,y,y,y,y	y,y,-,-,-,-
AgenaRisk Agena	2005	2005	Windows, Unix, Linux	MC	y,y,-,y,y,y,-,y,y,y	-,-,-,-,-,-
Analytica	2003		Windows, Mac	DES, SD, MC	y,y,y,y,y,y,y,y	n,-,n,n
Analytica	2005		Windows, Mac	DES, SD, MC	y,y,y,y,y,-,y,y,-,y	-,-,-,-,-,-
Analytica 4.2	2009		Windows	DES, SD, MC	y,y,-,y,y,-,y,y,-,y	-,-,-,-,-,-
Analytica 4.4	2011		Windows	DES, SD, MC	y,y,y,y,y,y,y,y,-,y	-,-,-,-,-,-
Analytica	2013		Windows	DES, SD, MC	y,y,y,y,y,y,y,y,y,y	-,-,-,-,-,-
Analytica Lumina Decisions Systems, Inc	2015		Windows	DES, SD, MC	y,y,y,y,y,y,y,y,-,y	-,-,-,-,-,-
AnyLogic 5.0	2003		Windows	DES, SD, A-B	y,y,y,y,y,y,y,y	y,y,y,-
AnyLogic 6.0	2005		Java-enabled platform	DES, SD, A-B	y,y,y,y,y,y,y,y,y,y	y,y,-,-,-,y
AnyLogic XJ Technologies	2009		Windows, Mac, Linux	DES, SD, A-B	y,y,y,y,y,y,y,y,y,y	y,y,-,-,y,y
AnyLogic AnyLogic North America	2015		Windows, Mac, Linux	DES, SD, A-B	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Arena	2003		Windows	DES	y,y,y,y,y,y,y,y	y,y,n,y
Arena Rockwell Software	2005	2005	Server added	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Arena Simulation Software	2011		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,-,y,y
Arena	2013		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Arena Professional Edition	2015		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y

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Rockwell Automation							
Arena Standard Edition	2015		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y	
Rockwell Automation							
Argo Booz Allen Hamilton	2015		Windows	MC	-, -, -, y, -, -, -, -, -	-, -, -, -, -	
AutoMod Brooks Automation							
Blues Simulation System (Bluess)	2009		Windows	DES, CS	y,y,-, -, y,y,-, -, y,-, y	y,-, -, -, -, -	
Bluess Simulation System	2011		Windows	DES	-, -, -, -, y, -, -, -, y,-, y	y,-, -, -, -, -	
Bluess Simulation System	2013		PC Windows	DES, CS	y,y,-, -, y,-, -, y,-, y	y,y,-, -, -, -	
BLUESSS simulation package Stanislaw Raczynski	2015		Windows	DES, CS	y,y,y,-, y,y,-, y,-, y	y,y,-, -, -, -	
Capacity Planning Simulator ProModel Corporation							
CircuitLogix Logic Design Inc	2015		Windows	DES, CS	-, -, y,-, y,-, -, -, y,-, y	y,y,-, -, -, y,y	
Clinical Trials Simulator ProModel Corporation							
Crystal Ball Pro Edition	2003		Windows/Excel	MC	n,n,n,y,y,y,y,n	y,y,n,n	
Crystal Ball Pro Edition Decisioneering, Inc	2005	2005	Windows/Excel	MC	-, -, -, y,y,y,y,y,-, -	y,y,-, -, -, -	
Crystal Ball Std Edition							
Crystal Ball Std Edition Decisioneering, Inc	2003		Windows/Excel	MC	n,n,n,y,y,n,n,n	y,y,n,n	
Crystal Ball Std Edition Decisioneering, Inc	2005	2005	Windows/Excel	MC	-, -, -, y,y,-, -, y,	y,y,-, -, -, -	

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Inc							
CSIM for Java Mesquite Software	2009	2009	Any system with Java	DES	- , y , - , - , - , - , - , - , -	- , - , - , - , - , -	
CSIM 19	2005		Windows, MAC, Linux	DES	- , y , y , - , - , y , y , y , - , -	- , - , - , y , - , -	
CSIM 20	2009		Windows, MAC, Linux	DES	- , y , y , - , - , - , y , y , - , -	- , - , - , - , - , -	
CSIM 20	2011		Windows, MAC, Linux	DES	- , y , y , - , - , y , y , y , - , -	- , - , - , - , - , -	
CSIM20	2013		Windows, MAC, Linux	DES	- , y , y , - , - , - , - , y , - , -	- , - , - , - , - , -	
CSIM 20 Mesquite Software	2015		Windows, Linux	DES	- , y , y , - , - , y , - , y , - , -	- , - , - , - , - , -	
DecisionPro	2003		Windows	MC	y , y , y , y , y , y , y , y	n , n , n , n	
DecisionPro Vanguard Software Corporation	2005	2005	Windows	MC	y , y , y , y , y , y , y , y , y	- , - , - , - , - , -	
DecisionScript	2003		Windows, Web	MC	y , y , y , n , y , y , y , y	y , y , n , n	
DecisionScript Vanguard Software Corporation	2005	2005	Windows, Web	MC	y , y , y , - , y , y , y , y	y , y , - , - , - , -	
DecisionTools Suite Palisade Corporation	2009	2009	Windows	MC	y , y , y , y , y , - , y , - , - , y	- , y , - , - , - , -	
DiscoverSim Version 2 SigmaXL, Inc	2015		Windows	MC, DES?	- , - , - , y , y , - , y , - , - , y	- , - , - , - , - , -	
DPL	2013		Windows	MC, DES?	y , y , - , - , y , - , y , y , y , y	- , - , - , - , - , -	
DPL Syncopation Software	2015		Windows, Mac (beta)	MC	y , y , - , - , y , - , y , y , y , y	- , - , - , - , - , -	
eM-Plant	2003		Windows	DES	y , y , y , y , y , y , y , y	y , y , y , y	
eM-Plant Tecnomatix Technologies, Inc	2005	2005	Windows	DES	y , y , y , y , y , y , y , y , - , -	y , y , y , y , y , y	
Enrmgmsuite Techno Software International	2011	2011	Windows	MC?	- , - , y , - , y , y , y , - , - , -	- , - , - , - , - , -	
Enterprise Dynamics 5.0 Incontrol Enterprise Dynamics	2003		Windows	DES	y , y , y , y , y , y , y , y	y , y , y , y	

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Enterprise Dynamics Incontrol Simulation Solutions	2009		Windows	DES	y,y,y,y,-,y,y,y,y,-	y,y,y,-,y,y
Enterprise Dynamics	2011		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Enterprise Dynamics 9	2013		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,-,y,y
Enterprise Dynamics INCONTROL Simulation Solutions	2015		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Enterprise Dynamics Airport INCONTROL Simulation Solutions	2011	2011	Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Enterprise Dynamics Logistics INCONTROL Simulation Solutions	2011	2011	Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Enterprise Dynamics Plato INCONTROL Simulation Solutions	2011	2011	Winters	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Enterprise Dynamics Sim Software Production Modeling Corporation	2005	2005	Windows	DES	y,y,y,y,y,y,y,y,y,-	y,y,y,y,y,y
Enterprise Dynamics Studio Incontrol Enterprise Dynamics	2005	2005	Windows	DES	y,y,y,y,y,y,y,y,y,-	y,y,y,y,y,y
Enterprise Portfolio Simulator	2009		Windows: Server	MC	-, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -
Enterprise Portfolio Simulator (EPS)	2011		Windows: Server	MC	-, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -

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Enterprise Portfolio Simulator (EPS)	2013		Windows: Server	MC	-,-,-,y,y,y,y,y,y,-	-,-,-,-,-,-
Enterprise Portfolio Simulator (EPS) ProModel Corporation	2015		Windows: Server, PC or Mac: Client	MC	-,-,-,y,y,y,y,y,y,-	-,-,-,-,-,-
Epicenter SaaS Platform Forio	2015		Windows, Mac, IOS, Linux, Android	DES	-,y,y,y,y,-,y,y,y,y	y,y,-,-,-,-
ExpertFit	2003		Windows	Auxiliary	-,-,-,y,-,y,-,-	-,-,-,-
ExpertFit	2005		Windows	Auxiliary	-,-,-,y,y,y,-,-,-,-	-,-,-,-,-,-
ExpertFit	2011	2011	Windows	Auxiliary (Stat Dist Modeling)	-,-,-,y,-,y,-,-,-,-	-,-,-,-,-,-
Averill M. Law & Associates						
Extend Industry	2003		Windows, Mac	DES	y,y,y,y,y,y,y,y	y,y,n,y
Extend Industry	2005	2005	Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,-,y,-,y
Imagine That, Inc						
Extend OR	2003		Windows, Mac	DES, Msg?	y,y,y,y,y,y,y,y	y,y,n,y
Extend OR	2005	2005	Windows, Mac	DES, Msg?	y,y,y,y,y,y,y,y,y,y	y,y,-,y,-,y
Imagine That, Inc						
ExtendSim AT	2009		Windows, Mac	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,-,y
ExtendSim AT	2011		Windows, Mac	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,-,y
ExtendSim AT	2013		Windows, Mac	DES, CS	y,y,y,y,-,y,y,y,y,y	y,y,-,y,-,y
ExtendSim AT	2015		Windows, Mac	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,-,y,-,y
Imagine That Inc						
ExtendSim OR	2009		Windows, Mac	DES, Msg?	y,y,y,y,y,y,y,y,y,y	y,y,y,y,-,y
ExtendSim OR	2011		Windows, Mac	DES, Msg?	y,y,y,y,y,y,y,y,y,y	y,y,y,y,-,y
ExtendSim OR	2013	2013	Windows, Mac	DES, Msg?	y,y,y,y,y,y,y,y,y,y	y,y,-,y,-,y
Imagine That Inc						
Extend Suite	2003		Windows, Mac	DES, Msg?CS	y,y,y,y,y,y,y,y	y,y,y,y
Extend Suite	2005	2005	Windows	DES, Msg?CS	y,y,y,y,y,y,y,y,y,y	y,y,-,y,y,y
Imagine That, Inc						
ExtendSim Suite	2009		Windows, Mac	DES, Msg?CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
ExtendSim Suite	2011		Windows, Mac	DES, Msg?CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
ExtendSim Suite	2013		Windows, Mac	DES, Msg?CS	y,y,y,y,y,y,y,y,y,y	y,y,-,y,y,y
ExtendSim	2015		Windows, Mac	DES, CS, A-B	y,y,y,y,y,y,y,y,y,y	y,y,-,y,y,y



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Suite Imagine That Inc						
Factory Explorer Wright Williams & Kelly	2003	2003	Windows	DES	n,y,y,n,y,y.n.y	n,n,n,y
FirstSTEP Designer Interfacing Technologies	2003	2003	Windows	DES?	y,y,y,y,y,n,y,y	y,n,n,n
Flexsim	2003		Windows	DES	y,y,y,y,y,y,y,y	y,y,y,y
Flexsim	2005		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Flexsim	2009		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,-,y,y
Flexsim	2011		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
FlexSim	2013		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,-,y,y
FlexSim	2015		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,-,y,y
Flexsim Software Products, Inc						
Flexsim CT Flexsim Software Products, Inc	2009	2009	W0?	DES	y,y,y,y,y,y,y,y,y,-	y,y,y,y,y,y
Flexsim HC	2009		Windows	DES	y,y,y,y,y,y,y,y,y,-	y,y,y,y,y,y
Flexsim HC	2011		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
FlexSim Healthcare	2013		Windows	DES	y,y,y,y,y,y,y,y,y,-	y,y,y,y,y,y
FlexSim Healthcare Flexsim Software Products Inc	2015		Windows	DES	y,y,y,y,y,y,y,y,y,-	y,y,y,-,y,y
Fluid Flow Simulator	2011		Windows	CS	-,y,y,y,y,y,y,y,y,-	y,-,y,-,-
Fluid Flow Simulator Fluids6 Stanislaw Raczynski	2013	2013	PC, Windows	CS	y,-,y,-,y,-,y,-,y,-	y,y,-,y,-,y
ForeTell DSS	2009		Windows, Mac, Linux	MC	y,y,y,y,y,y,y,-,y,y,y	-,y,-,y,-,-
ForeTell DSS	2011		Windows, Mac, Linux	MC	-,y,y,y,y,y,y,-y,-,y	-,y,-,y,-,-
ForeTell DSS DecisionPath, Inc	2013	2013	Windows, Mac, Linux Java enabled	MC	-,y,y,y,y,y,y,y,-,-	-,y,-,y,-,-
GAUSS	2003		Windows,	?	n,y,y,y,y,y,y,y	n,-,y,-,-

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GAUSS matrix programming language Aptech Systems, Inc	2005	2005	AIX4, HPUX11 Solaris, Linux	?	- , y , y , - , - , - , y , y , - , -	y , - , - , - , y , -
GoldSim	2003		Windows	DES, MC, CS	y , y , n , n , y , n , n , y	n , y , n , -
GoldSim	2005		Windows	DES, MC, CS	y , y , - , - , y , - , y , y , y , y	- , - , - , - , - , -
GoldSim	2009		Windows	DES, MC, CS	y , y , - , - , y , y , y , y , y , y	- , - , - , - , - , -
GoldSim	2011		Windows	DES, MC, CS	y , y , - , - , y , y , y , y , y , y	y , - , - , - , - , -
GoldSim	2013		Windows	DES, MC, CS	y , y , - , - , y , y , y , y , y , y	y , - , - , - , - , -
GoldSim	2015		Windows	DES, MC, CS	y , y , y , - , y , y , y , y , y , y	y , - , - , - , - , -
GoldSim Technology Group						
GPSS/H	2013		Windows	DES	- , - , - , - , - , - , - , - , - , -	- , - , - , - , - , -
GPSS/H	2015		Windows	DES	- , y , y , - , - , - , - , - , - , -	- , - , - , - , - , -
Wolverine Software						
GPSS World for Windows Minuteman Software	2003	2003	Windows	DES	y , y , y , n , y , y , y , y	n , - , - , -
Integrated Perf Mod Envrmt (IPME)	2009		Mandrake10X, RedHat Ent	DES?,MC?	y , y , y , - , y , y , - , y , - , -	y , y , - , - , - , -
Integrated Perf Mod Envrmt (IPME)	2011		Mandrake10X, RedHat Ent Windows	DES?,MC?	y , - , y , - , y , y , - , y , - , -	y , - , - , - , - , -
Alion Sci & Tech MA&D Operation						
Integrated Perf Mod Envrmt (IPME)	2013		Windows, Red Hat Ent	DES?,MC?	- , - , y , - , y , y , - , y , y , -	y , y , - , - , - , -
Integrated Perf Mod Envrmt (IPME)	2015		Windows, Red Hat Ent, Linux	DES?,MC?	y , y , y , - , y , y , - , - , y , -	y , y , - , - , - , -
Alion Science						
JaamSim Ausenco	2015		Windows, Mac, Linux	DES, CS	y , y , y , - , y , y , y , y , - , y	y , y , y , y , y , y
LABAMS (ENGLISH) LABSAG (SPANISH) LABAMS	2011	2011	Windows	DES?	- , y , - , - , y , - , - , - , - , -	- , - , - , - , - , -
LogixSim Logic Design Inc	2015		Windows	DES, CS	- , - , y , - , - , - , - , y , - , y	y , y , - , y , y , y
MAST	2003		Windows	DES	y , y , y , n , y , n , y , -	y , y , n , n

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MAST	2005		Windows	DES	y,-,-,y,-,-,y,-	y,y,-,-,y
LeanMAST	2005		Windows	DES	y,-,-,y,-,-,-,-	y,y,-,-,y
MAST CMS Research Inc	2011	2011	Windows	DES	y,-,-,y,-,-,-,-	y,-,-,-,y
Lean-Modeler Visual8	2005	2005	Windows	DES	y,-,-,-,-,-,y,y,-	y,y,-,-,-,y
MedModel ProModel Solutions	2003	2003	Windows	DES	y,y,y,y,y,y,y,y	y,y,n,-
MedModel Optimization Suite	2011		Windows	DES, CS	y,y,y,y,y,y,y,y,y	y,y,-,-,y,y
MedModel Optimization Suite	2013		Windows	DES, CS	-,-,y,y,y,y,y,y,y	y,y,-,-,y,y
MedModel ProModel Corporation	2015		Windows	DES, CS	-,-,y,y,y,y,y,y,y	y,y,-,-,y,y
Micro Saint	2003		Windows	DES	y,y,y,n,y,n,y,n	y,y,n,n
Micro Saint Sharp Version 2.1 Micro Analysis & Design, Inc	2005	2005	Windows C#	DES	y,y,y,-,y,y,y,-,-	y,y,-,-,y,-
Micro Saint Sharp Alion Sci & Tech MA&D Operation	2009		Windows	DES	y,y,y,-,y,y,y,y,-	y,y,-,y,y,y
Micro Saint Sharp	2011		Windows Srvr, Windows	DES, CS	y,y,y,y,y,y,y,-,y	y,y,-,y,y,-
Micro Saint Sharp	2013		Windows Srvr, Windows	DES, CS	-,-,y,-,y,y,y,y,y	y,y,-,y,y,y
Micro Saint Sharp Alion Science and Technology	2015		Windows	DES, CS	y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
ModelRisk - Industrial Edition Vose Software BVBA	2015		Windows	MC	-,-,y,y,y,-,y,y,-,-	y,-,-,-,-,-
ModelRisk - Professional Edition Vose Software BVBA	2015		Windows	MC	-,-,y,y,-,y,y,y,-,-	y,-,-,-,-,-
mystrategy	2003		Windows	SD	y,n,n,n,n,n,n,n	n,y,n,-

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mystrategy Global Strategy Dynamics, Ltd	2005	2005	Windows	SD	y,-,-,-,-,-,-,-,-,-	-,-,-,-,-,-,-
NAG C Library Numerical Algorithms Group	2003	2003	Windows, Linux, Unix +	?	n,y,y,-,n,n,y,y,y	n,n,n,-
NAG SMP Library Numerical Algorithms Grp	2003	2003	Windows, Linux, Unix +	?	n,y,y,n,n,y,y,y	n,n,n,-
Oracle Crystal Ball Suite Oracle Americas Inc	2011		Windows	MC	-,y,y,y,y,-,y,y,-,y	y,y,-,-,-,-
Oracle Crystal Ball Suite	2013		Windows	MC	-,-,y,y,y,y,y,-,-,-	-,-,-,-,-,-
Oracle Crystal Ball Oracle Corporation	2015		Windows	MC	-,-,y,-,y,y,y,-,-,-	-,-,-,-,-,-
PASION Simulation System	2003		Windows	DES, CS	y,y,n,y,y,y,n,y	y,y,n,n
PSM++ Simulation System	2005		Windows +	DES, CS	y,y,-,-,y,y,-,y,-,y	y,-,-,-,-,-
PSM++ Stanislaw Raczynski	2009	2009	Windows	DES, CS	y,y,-,-,y,y,-,y,-,y	
Patient Flow Simulator	2011		Windows	DES	y,y,y,y,y,y,y,y,-	y,y,-,-,-,-
Patient Flow Simulator	2013		Windows	DES	-,-,y,y,y,y,y,y,y,-	y,y,-,-,-,-
Patient Flow RX ProModel Corporation	2015		Windows	DES?	-,-,y,y,y,y,y,y,y,-	y,y,-,-,-,-
Pedestrian Dynamics	2013		Windows	DES	y,y,y,y,y,y,-,y,-,-	y,y,y,-,y,y
Pedestrian Dynamics INCONTROL Simulation Solutions	2015		Windows	DES		
PIMSS MJC2 Limited	2003	2003	Windows, Unix, Linux	DES	y,y,y,y,y,-,y,y	y,y,y,-
PLCLogix Logic Design Inc	2015		Windows	DES?, CS?	-,-,y,-,-,-,-,y,-,y	y,y,-,y,y,y

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Polaris Booz Allen	2015		Windows	MC	-, -, -, y, -, -, y, y, y, y	-, y, -, -, -, -
Portfolio Simulator	2005		Windows	MC	y, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -
Portfolio Simulator	2009		Windows	MC	-, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -
Portfolio Simulator	2011		Windows	MC	-, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -
Portfolio Simulator ProModel Corporation	2013	2013	Windows	MC	-, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -
Process Simulator	2005		Windows	DES	y, y, y, y, y, y, y, y, y, -	y, y, -, -, -, y
Process Simulator	2009		Windows, MS Visio	DES	y, y, y, y, y, y, y, y, y, -	-, -, -, -, -, -
Process Simulator	2011		Windows, MS Visio	DES	y, y, y, y, y, y, y, y, y, -	y, y, -, -, -, y
Process Simulator	2013		Windows, MS Visio	DES	-, -, y, y, y, y, y, y, y, -	y, y, -, -, -, y
Process Simulator ProModel Corporation	2015		Windows	DES	-, -, y, y, y, y, y, y, y, -	y, y, -, -, -, y
ProcessModel	2003		Windows	DES	y, y, y, y, y, y, y, y, y	y, y, n, y
ProcessModel Version 5.1 ProcessModel Inc	2005	2005	Windows	DES	y, y, y, y, y, y, y, y, y, y	y, y, y, y, -, y
ProModel ProModel Solutions	2003	2003	Windows	DES	y, y, y, y, y, y, y, y, y	y, y, n, -
Project Simulator	2005		Windows	MC	y, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -
Project Simulator	2009		Windows, MS Project	MC	-, -, y, y, y, y, y, y, y, -	-, -, -, -, -, -
Project Simulator	2011		Windows, MS Project	MC	-, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -
Project Simulator ProModel Corporation	2013	2013	Windows, MS Project	MC	'-, -, -, y, y, y, y, y, y, -	-, -, -, -, -, -
ProModel Optimization Suite	2005		Windows	DES, CS	y, y, y, y, y, y, y, y, y, y	y, y, -, -, -, y, y
ProModel Optimization Suite	2009		Windows	DES, CS	y, y, y, y, y, y, y, y, y, y	y, y, -, -, -, y, y
ProModel	2011		Windows	DES, CS	y, y, y, y, y, y, y, y, y, y	y, y, -, -, -, y, y

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Optimization Suite							
ProModel Optimization Suite	2013		Windows	DES, CS	-,-,y,y,y,y,y,y,y,y	y,y,-,-,y,y	
ProModel Optimization Suite	2015		Windows	DES, CS	-,-,y,y,y,y,y,-,y,y	y,y,-,-,y,y	
ProModel Corporation							
Proof 3D	2009		Windows	Auxiliary	-,-,y,-,-,-,y,-,-	y,y,y,-,y,y	
Proof 3D Wolverine Software Corporation	2011	2011	Windows	Auxiliary (3D Animation)	-,-,-,-,-,-,-,-,-	y,-,-,-,y,y	
Proof 5	2009		Windows	Auxiliary (2D Animation)	-,-,y,-,-,-,-,y,-,-	y,y,y,-,y,y	
Proof 5 (2D Animation) Wolverine Software Corporation	2011	2011	Windows	Auxiliary (2D Animation)	-,-,y,-,-,-,-,-,-,-	y,y,y,-,-,y	
Proof Animation - P3D (3D) & P5 (2D)	2013		Windows	Auxiliary (Animation)	-,-,y,-,-,-,-,-,-,-	y,y,y,-,y,y	
Proof Animation - P3D (3D) & P5 (2D) Wolverine Software	2015		Windows	Auxiliary (Animation)	-,-,y,-,-,-,-,-,-,-	y,y,y,-,y,y	
Proplanner Mfg Process Mgt Software Proplanner	2003	2003	?	?	y,n,n,n,y,n,y,y	n,n,n,n	
ProVision Proforma Corporation	2003	2003	Windows	DES	y,n,-,y,y,y,y,y	y,y,n,n	
Quantitative Methods Software (QMS)	2005		Windows, Mac, Linux, Unix	EDUC	-,-,-,y,y,-,-,-,-,y	-,y,-,-,-,-	
QMS	2009		Web Browser Access	EDUC	-,-,-,y,y,-,y,-,y,y	-,-,-,-,-	
QMS (Quantitative Methods for Mgt) QuantMethods	2011	2011	Web Browser Access	EDUC	-,-,-,y,-,-,-,-,-	-,-,-,-,-	

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RASON Analytics API Frontline Systems Inc	2015		Cloud (any OS)	MC	-y,-y,y,-y,y,y,y	-,-,-,-,-
REACT MJC2	2009	2009	Windows, Linux, Unix, +	DES	y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Resource Manager User Solutions Inc	2003	2003	Windows	DES	n,y,y,n,y,y,y,y	n,n,-,-
Resque Resque Corporation	2009	2009	Windows	DES	y,y,y,-y,y,-y,-y	y,-,-,-,-
Risk Solver Frontline Systems Inc	2009	2009	Windows	MC	y,y,y,y,y,-,-,-y	-,-,-,-,-
Risk Solver Platform	2009		Windows	MC	y,y,y,y,y,-y,-,-y	-,-,-,-,-
Risk Solver Pro / Platform Frontline Systems Inc	2015		Windows	MC	-y,-y,y,y,-y,-y,y	-,-,-,-,-
Risk Solver Premium Frontline Systems Inc	2009	2009	Windows	MC	y,y,y,y,y,-y,-,-y	-,-,-,-,-
RoboLogix Logic Design Inc	2015		Windows	?	-,-,-,-,-,-y,-,-	y,y,-,-y,-
SAIL	2003		Windows	?	y,y,y,n,y,y,y,n	y,y,n,-
SAIL	2005		Windows	?	y,-,-,-,-,-,-,-	y,y,-,-,-y
SAIL CMS Research Inc	2011	2011	Windows	?	-,-,-,-,-,-,-,-	-,-,-,-,-
SansGUI Mod & Sim Environment ProtoDesign, Inc	2003	2003	Windows	DES	y,y,y,n,y,y,n,y	y,y,n,n
SAS Software	2003		Windows, Unix +	DES	y,n,y,y,y,n,n,y	y,y,n,-
SAS Software SAS Institute Inc	2005	2005	Windows, Unix, Linux	DES	y,-y,y,y,y,-,-y,-,-	y,y,-,-,-,-
SAS Simulation Studio	2011		Windows	DES	y,-y,y,y,y,y,y,-,-	y,y,-,-,-,-
SAS Simulation	2013		Windows	DES	y,-y,y,y,y,y,y,y,-	y,y,-,-,-,-

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Studio SAS Simulation Studio SAS	2015		Windows	DES	y,-,y,y,y,y,y,y,-,-	y,y,-,-,-,-
SCIMOD, Techno (software modules) Techno Software International	2005	2005	Windows, DOS	?	y,y,y,-,y,y,y,-,-,y	-,,-,-,-,-,-
ServiceModel ProModel Solutions	2003	2003	Windows	DES	y,y,y,y,y,y,y,y,y	y,y,n,-
ServiceModel Optimization Suite	2005		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,-,-,y,y
ServiceModel Optimization Suite	2009		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,-,-,y,y
ServiceModel Optimization Suite	2011		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,-,-,y,y
ServiceModel Optimization Suite ProModel Corporation	2013	2013	Windows	DES, CS	-,-,y,y,y,y,y,y,y,y	y,y,-,-,y,y
ShowFlow	2003		Windows	DES	y,y,y,y,y,y,y,y	y,y,n,y
ShowFlow 2	2005		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,-,-,y,y
ShowFlow	2009		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,-,-,y,y
ShowFlow Webb Systems Limited	2011	2011	Windows	DES	-,-,y,y,y,y,y,y,y,y	y,-,-,-,y,y
SIGMA	2003		Windows	DES	y,y,y,y,y,y,y,y	y,y,y,y
SIGMA Custom Simulations	2005	2005	Windows	DES	y,y,y,y,y,y,y,y,-,y	y,y,y,y,-,-,
SimCAD Pro	2003		Windows	DES	y,y,y,y,y,y,y,y	y,y,n,-
Simcad Pro	2005		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,-,-,y,y
Simcad PRO Pat Dyn Process Simulator	2009		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,-,-,y,y
Simcad Pro CreateASoft, Inc	2011	2011	Windows	DES	y,y,y,-,y,y,y,y,y,y	y,y,y,y,y,y
SimcastOnline CreateASoft,In	2011	2011	Web enabled device	DES	-,-,y,-,y,y,y,y,y,y	y,y,y,y,y,y



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Simio Express Edition	2011		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Simio Express	2013		Windows	DES, CS	y,y,y,y,y,y,-,y,y,y	y,y,y,y,y,y
Simio Express	2015		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Simio LLC						
Simio Design/Team Edition	2011		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Simio Design/Team	2013		Windows	DES, CS	y,y,y,y,y,y,-,y,y,y	y,y,y,y,y,y
Simio Design/Team	2015		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Simio LLC						
Simio Enterprise	2013		Windows	DES, CS, MC	y,y,y,y,y,y,-,y,y,y	y,y,y,y,y,y
Simio Enterprise	2015		Windows	DES, CS, MC	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Simio Enterprise						
Simio LLC						
Simio Portal Edition	2015		Any Web browser	DES, CS, MC	-, -, -, -, y,y,y,y,y,y	-, -, -, -, -
Simio LLC						
Simio Scheduling/ Risk Analysis	2011	2011	Windows	DES, CS, MC?	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Simio LLC						
SIMPROCESS	2003		Windows, (Unix next)	DES	y,y,n,y,y,y,y,y	y,y,y,-
SIMPROCESS CACI Products Company	2011		Windows, Linux	DES	y,y,-,y,y,y,y,y,y,-	y,y,-,-,-,-
SIMPROCESS	2013		Windows, Linux	DES	y,-,-,y,y,y,y,y,y,-	y,y,-,-,-,-
SIMPROCESS CACI	2015		Windows, Linux	DES	y,-,y,y,y,y,y,-,y,-	y,y,-,-,-,-
SIMSCRIPT III	2011		Windows, Linux	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
SIMSCRIPT III CACI	2013	2013	Windows, Linux, Solaris	DES, CS	y,y,y,y,y,y,y,y,-,y	y,y,y,y,y,y
SimTrack Real time visibility & analysis CreateASoft, Inc	2011	2011	Windows	DES, CS, MC?	y,y,y,-,y,-,y,y,y,y	y,y,y,y,y,y
SIMUL8 Professional	2003		Windows	DES	y,y,y,y,y,y,y,y	y,y,n,n
SIMUL8 Professional	2005		Windows	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,-,-,y,y
SIMUL8	2009		Windows, Mac,	DES, CS	y,y,y,y,y,y,y,y,y,y	y,y,-,y,y,y

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Professional SIMUL8	2011		Linux Windows, Mac,	DES, CS	-, -, y, y, y, y, y, y, y, y	y, y, -, y, y, y
Professional SIMUL8	2013		Linux Windows	DES, CS	y, y, y, y, y, y, y, y, y, y	y, y, -, -, y, y
Professional SIMUL8	2015		Windows	DES, CS	y, y, y, y, -, y, y, y, y, y	y, y, -, -, y, y
Professional SIMUL8 Corporation						
SIMUL8 Standard	2003		Windows	DES	y, y, y, y, y, y, y, y, y	y, y, n, n
SIMUL8 Standard	2005		Windows	DES	y, y, y, y, y, y, y, y, y, y	y, y, -, -, y, y
SIMUL8 Standard	2009		Windows, Mac, Linux	DES	y, y, y, y, y, y, y, -, y, y	y, y, -, y, -, y
SIMUL8 Standard	2011	2011	Windows, Mac, Linux	DES	-, -, y, y, y, y, y, -, y, y	y, y, -, y, -, y
SIMUL8 Corporation						
SIMUL8 Web SIMUL8 Corporation	2011	2011	All Operating Systems	DES, CS, MC	-, -, -, y, y, y, -, y, y, y	y, y, -, y, -, y
SIPmaker™ ProbabilityMan agement.org	2015		Windows	MC	-, -, -, -, -, -, -, -, -, -	-, -, -, -, -, -
SIPmath™ Modeler Tools ProbabilityMan agement.org	2015		Windows, Mac	MC	-, -, -, -, y, -, y, -, -, -	-, y, -, -, -, -
SLIM MJC2 Limited	2003		Windows, Unix, Linux	?	y, y, y, y, y, -, y, y	y, y, y, -
SLIM MJC Limited	2005		Windows, Unix	DES, CS	y, y, y, c, c, c, c, y, y, y	y, y, -, -, -, -
SLIM	2009		Windows, Unix, Linux, +	DES, CS	y, y, y, y, y, y, y, y, y, y	y, y, y, y, y, y
SLIM	2011		Most supported	DES, CS	y, y, y, y, y, y, y, y, y, y	y, y, y, y, y, -
SLIM	2013		Most supported	DES, CS	y, -, y, y, y, y, y, -, y, y	y, y, y, -, y, -
SLIM MJC2	2015		Windows, Unix, Linux	DES, CS	y, y, -, -, y, y, y, y, y, y	y, y, y, -, -, -
SLX	2009		Windows	DES	-, y, y, -, -, -, -, y, -, -	y, y, y, y, y, y
SLX	2011		Windows	DES	-, y, y, -, -, -, -, y, -, -	-, -, -, -, -, -
SLX	2013		Windows	DES	-, -, y, -, -, y, -, y, -, -	-, -, -, -, -, -
SLX	2015		Windows	DES	-, -, y, -, -, y, -, y, -, -	y, y, y, y, y, y
Wolverine Software Corporation						
Solver SDK Pro / Platform Frontline Systems Inc	2015		Windows, Linux, Azure, AWS	MC	-, y, y, y, y, -, y, y, y, y	-, -, -, -, -, -

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Stat:Fit	2009		Windows	Auxiliary	-,-,y,y,-,y,-,-	-,-,-,-,-
Stat:Fit	2013		PC/Windows	Auxiliary	-,-,y,-,-,-,-,-	-,-,-,-,-
Stat:Fit	2015		PC/Windows	Auxiliary	-,-,y,-,-,-,-,-	-,-,-,-,-
Geer Mountain Software Corporation				(Stat Dist Modeling)		
Supply Chain Builder	2003		Windows	DES	y,y,y,y,y,y,y,y	y,y,n,n
Supply Chain Builder Simulation Dynamics	2005	2005	Windows	DES?	y,-,y,-,-,y,y,y,-,-	-,y,-,-,-,-
Systemflow 3D Animator Systemflow Simulations Inc	2005	2005	Windows	Auxiliary	-,-,-,-,-,-,-,-,-,-	y,-,y,y,y,y
TARGIT Decision Suite 2013 TARGIT	2013	2013	Windows	MC?	y,-,-,-,-,-,-,-,-,-	-,y,y,-,-,-
Tecnomatix Plant Simulation	2009		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Tecnomatix Plant Simulation Siemens PLM Software	2015		Windows	DES	y,y,y,y,y,y,y,y,y,y	y,y,y,y,y,y
Transportation Logistics Simulator (TLS) Ausenco	2015		Windows, Linux, Mac	MC	y,y,y,-,y,y,y,y,-,y	y,y,y,y,y,y
Vanguard Business Analytics Suite	2009		Windows	MC	y,y,y,y,y,y,y,y,y,y	-,-,-,-,-
Vanguard Business Analytics Suite	2011		Windows	MC	y,y,y,y,y,-,y,y,y,-	-,y,-,-,-,-
Vanguard Business Analytics Suite Vanguard Software	2013	2013	Windows	MC	-,-,y,-,y,-,y,y,y,-	y,-,-,-,-,-
Vanguard Strategic Forecasting Suite	2009	2009	Windows	MC	y,y,y,y,y,y,y,y,y,y	-,-,-,-,-

Vanguard Software						
Vanguard System	2009		-	MC,DES?CS?	y,y,y,y,y,y,y,y,y,y	-,-,-,-,-,-
Vanguard System	2011		Windows, Web	MC,DES?CS?	y,y,y,y,y,-,y,y,y,y	-,y,-,-,-,-
Vanguard System	2013	2013	Windows, Web	MC	-,y,y,y,y,-,y,y,-,-	y,y,-,y,-,-
Vanguard Software						
Vector Economics Platform	2011	2011	Web Browser		y,y,-,-,y,-,-,y,-,-	-,-,-,-,-,-
Vector Economics Inc						
VisSim Visual Solutions	2003	2003	Windows, Solaris	DES, MC	y,y,y,y,y,y,y,y	y,y,y,-
Visual Simulation Environment	2003		Windows	DES	y,y,y,n,y,y,n,y	y,y,n,n
Visual Simulation Environment (VSE)	2005	2005	Windows	DES	y,y,y,-,y,y,-,y,-,-	y,-,-,-,-,-
Orca Computer Inc						
WebGPSS (micro-GPSS) FLUX Software Engineering	2003		Windows	DES	y,y,y,n,y,n,y,n	y,n,n,y
WebGPSS (micro-GPSS) AcobiaFlux AB	2005		Windows	DES	y,y,y,-,y,-,y,-,-,-	y,-,-,-,-,-
WebGPSS Beliber AB	2009	2009	Windows	DES	y,y,y,-,y,-,y,-,-,-	-,-,-,-,-,-
Witness 2006	2005		Windows	DES	y,y,y,-,y,y,y,y,y,y	y,y,y,y,y,y
WITNESS	2015		Windows	DES	-,y,-,y,y,y,y,y,y	y,y,y,y,y,y
Lanner Group						
XLSim	2005		Windows	MC	-,-,y,-,y,-,-,-,-	-,-,-,-,-,-
XLSim 3.0	2009	2009	Windows/Excel	MC	-,-,y,-,y,-,-,-,-	-,y,-,-,-,-
AnalyCorp Inc						

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