



Analysis Roundup Analysis Vendors Reference Guide

October 2006

A problem during the manufacturing phase can be a product designer's worst nightmare. A problem after the product has shipped and hit the market could be his employers' worst nightmare.

A thorough simulation and analysis phase before you go to manufacturing could save your company an enormous amount of time and money. It might even be the difference between whether your business succeeds or fails.

Which is why we here at ConnectPress are pleased to present our 2006 Roundup of Simulation and Analysis.

In the Special Reports section you will find In the Final Analysis: 2006 Overview of Simulation and Analysis, a summary of all the hottest business, technology and education trends in the industry.

Elsewhere industry expert Jack Thornton breaks down the world of simulation and analysis for those of us without a Ph.D. Finally, we have case studies from FLUENT, ABAQUS, Moldflow and MSC on some exciting ways to use simulation and analysis

All this plus this very handy vendor's guide which contains the most useful information on all the most exciting companies.

Questionnaire	MSC Software
Products or Services?	Both
Markets?	Enterprise simulation software, Simulation knowledge capture and reuse, CAD-Embedded Analysis, Controls/Hydraulics Data, Simulation Process Automation, Explicit Non-Linear (crash), Fatigue, FE Modeling, Mechanical, Motion, NVH, Non-Linear, Stress, Thermal, Linear, Structures
Main Type(s) of Analysis?	Motion, NVH, Non-Linear, Stress, Durability & Fatigue, Crash, Linear, Thermal
Product(s)?	SimManager, SimDesigner, SimXpert, MD Nastran, MD Patran, MSC Nastran, Adams, Patran, Marc, Dytran, Easy5
Type of Product(s)?	Complete Solution
How Many Solvers?	More than 6 including MD Nastran, MSC Nastran, Adams, Marc, Dytran, Easy5
How Many Different Element Types?	MSC offers a wide range of element types to support all different kind of analysis needs.
Integrated with any CAD?	CATIA, Pro/E, UGS NX, SolidWorks
Own Scripting Language?	Yes
Own Parametric Design Language?	Yes
File Size Limit?	None
Material Properties?	Alt, Enterprise Data Manager
Price?	Contact Company
Web Address	www.mscsoftware.com
Contact	N/A
Email	N/A
Phone	714-540-8900



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MSC  Software®



Questionnaire	Abaqus/Simulia	Algor
Products or Services?	Both	Both
Markets?	All	Automotive, Aerospace, Medical, Consumer Products, Military, Electric Power, Petroleum, Large Structures, MEMS and more
Main Type(s) of Analysis?	Static, Dynamic, Thermal, Non-Linear, Fluid Structure, Interaction,	Structural, Dynamics, Fatigue, Heat Transfer, Fluid Flow, Electrostatics, Multiphysics, Piping
Product(s)?	ABAQUS/Standard, ABAQUS/Explicit, ABAQUS/CAE, ABAQUS for CATIA V5	FEMPRO for NASTRAN, FEA, Mechanical event simulation, Pipepak, Piping Design and Analysis
Type of Product(s)?	Complete Solution	Complete Solution
How Many Solvers?	2 Fundamental (integrated implicit and explicit); Several solution techniques for each	11 (including sparse, iterative, skyline and banded for parallel and distributed computing)
How Many Different Element Types?	Well over 100	370
Integrated with any CAD?	Full integration with CATIA; Direct geometry transfer with other major MCAD systems	Alibre, Inventor, Innovate, IronCAD, KeyCreator, Mechanical Desktop, Pro/E, Rhinoceros, Solid Edge, SolidWorks, ACIS, IGES, STEP, STL, 2 & 3D Wireframe
Own Scripting Language?	Yes, both scripting and GUI customization	Yes
Own Parametric Design Language?	Yes (its scripting language); ABAQUS/CAE is a parametric geometry modeler.	Yes
File Size Limit?	None	None
Material Properties?	All popular metals, plastics; many composites. Material customization allowed	Any including Composites. Built-in Library with MatWeb and Customization
Price?	Contact company	\$5,950US to \$29,950US
Web Address	www.abaqus.com	www.algor.com
Contact	Sales	Sales
Email	info@abaqus.com	info@algor.com
Phone	401-727-4200	412-967-2700

Questionnaire	ANSYS/Fluent	AutoFEA Engineering Software Tech
Products or Services?	Both	Both
Markets?	All	All engineers and designers
Main Type(s) of Analysis?	CFD, Fluid Flow, CAD add-ins	Static, Frequency, Buckling, Dynamic, Response Spectrum, Thermal, Steady State and Transient, Boundary Conditions, Electric Seepage Non-Linear Static, Geometry, and Material Non-Linear
Product(s)?	FLUENT, FloWizard, GAMBIT, POLYFlow	JL Analyzer, Pro Edition, Engineers Edition, Lite Edition
Type of Product(s)?	Complete Solution	FEA Engineering Analysis Tool
How Many Solvers?	4	9 solvers
How Many Different Element Types?	Allows Arbitrary Polyhedral Elements	Beam, Truss, All 2D and 3D Elements
Integrated with any CAD?	CATIA V5, PTC-Pro/E, SolidWorks, UGS, Autodesk	Solid Edge, AutoCAD
Own Scripting Language?	Yes	English
Own Parametric Design Language?	Yes	C/C++, Fortran
File Size Limit?	None	150 MB
Material Properties?	Any	Linear and Non-Linear Materials
Price?	Starting at \$7,000	\$285US to \$2,485US
Web Address	www.fluent.com or www.ansys.com	www.autofea.com
Contact	Sales	Joseph Lana
Email	info@fluent.com	jlana@aol.com support@autofea.com
Phone	603-643-2600	562-868-0946

Questionnaire	CD-adapco	Concurrent Analysis
Products or Services?	Both	Products
Markets?	Acoustics, Chemistry, Flow, Thermal, Stress, Multiphysics	Aerospace, Auto mobile, Medical, and any markets using stress and heat analysis
Main Type(s) of Analysis?	CAD add-ins, CFD, FEA	Static, Normal Modes, Buckling, Dynamic, Harmonic Response, Response Spectrum, Steady State, Transient Heat Transfer
Product(s)?	CAD: STAR-CAD series CFD: STAR-CD, STAR-CCM+ CFD Expert System Tools	CAEFEM Finite Element Analysis Software
Type of Product(s)?	Complete Solution	Windows & Linux Based
How Many Solvers?	3 solvers	Sparse, Iterative
How Many Different Element Types?	N/A	More than 20 element types
Integrated with any CAD?	CATIA V5, Pro/E, SolidWorks, UGS NX, UGS 18	Imports a number of CAD formats
Own Scripting Language?	Yes	Based on Tickle & Python
Own Parametric Design Language?	Yes	N/A
File Size Limit?	None	None on model size. Uses 64 bit addressing
Material Properties?	Any	Isotropic, Orthotropic, Plasticity, Soil & Rubber Models
Price?	Contact Company	\$5,000US and up
Web Address	www.cd-adapco.com	www.caefem.com
Contact	Sales	Rao Singampalli
Email	info@cd-adapco.com	info@caefem.com
Phone	631-549-2300 N. America 44-(0)-207-471-6200 Europe	805-375-1060

Questionnaire	COSMOSWorks	Dynamic Design Solutions
Products or Services?	Both	Both
Markets?	Machine Design, Consumer, Medical, Electronics, Industrial, Automotive, Aerospace, Defense, Transportation, Civil, Educational, Electrical, Power	Mechanical Structural, NVH, Dynamics
Main Type(s) of Analysis?	Static, Stress, Thermal, Temperature, Frequency, Resonance, Drop Test, Non-Linear, Fatigue, Optimization, Heat Transfer, Fluid Flow, Advance Dynamics, Buckling, Electromagnetics	Analytical Model Analysis, Model Updating, Probabilistic Analysis, Sensitivity Analysis, Linear
Product(s)?	COSMOSWorks, COSMOSFloWorks, COSMOSMotion, COSMOSEMS	FEMtools Correlation, Framework, Pretest, Updating, Optimization
Type of Product(s)?	FEA, Rigid Body Dynamics & Kinetics, CFD	Complete Solution
How Many Solvers?	2 Direct Sparse FFEPlus	4
How Many Different Element Types?	16	All for Structural Analysis
Integrated with any CAD?	SolidWorks	No
Own Scripting Language?	API available for COSMOSMotion	Yes
Own Parametric Design Language?	N/A as fully integrated with SolidWorks	No
File Size Limit?	N/A	None
Material Properties?	Isotropic, Orthotropic, Plastics, Rubber, Non-Linear Composites, Linear, Metals, Non-Metals	All linear material models
Price?	\$3,500US to \$11,000US	\$10,000US to \$25,000US
Web Address	www.solidworks.com/pages/products/analysis.html	www.femtools.com
Contact	N/A	Eddy Dascotte
Email	info@solidworks.com	info@femtools.com
Phone	800-693-9000 Canada 978-371-5011	32-16-40-23-00

Questionnaire	Field Precision LLC.	INTES
Products or Services?	Both	Both
Markets?	International sales to universities, National laboratories, Physicists, Electrical Engineers, Biomedical Engineers	N/A
Main Type(s) of Analysis?	FEA programs for Electromagnetic fields, Charged particle devices, thermal & radiation transport in matter	Static, Dynamic, Acoustic, Thermal, Electrodynamical, Optimization
Product(s)?	Contact company for complete list	PERMAS
Type of Product(s)?	Self-contained software suites for electromagnetics, Charged particle devices, Radiation transport in matter	Complete solution or Analysis
How Many Solvers?	12 Standard application packages	Many
How Many Different Element Types?	2D- Conformal Triangles, 3D – Conformal Hexahedrons	180
Integrated with any CAD?	DXF Import, 3D Import from SolidWorks/COSMOSWorks	By Preprocessors like MEDINA, HyperMesh, I-DEAS, Patran
Own Scripting Language?	Yes	Yes
Own Parametric Design Language?	Yes	Yes
File Size Limit?	No file size limit, Solutions limited by installed memory	None
Material Properties?	N/A	All Metals, Plastics, Composites, Fluids
Price?	\$580US to \$7,235US	Contact Company
Web Address	www.fielddp.com	www.intes.de
Contact	Stanley Humphries	Reinhard Helfrich
Email	humphriess@fielddp.com	info@intes.de
Phone	505-220-3975	49-711-784-990

Questionnaire	LISA, Finite Element Tech	Moldflow Corp.
Products or Services?	Both	Both
Markets?	Consultants, R&D, Colleges	Automotive, Industrial & Consumer Electronics, Medical Device, Appliances, Contract Manufacturing, Materials
Main Type(s) of Analysis?	Linear Static, Eigenvalue, Dynamic Response, Fluid, Thermal, Electromagnetic, Acoustic	Plastics Injection Molding Simulation-Flow, Cool, Warp, Stress
Product(s)?	One	Moldflow Plastics Insight®, Moldflow Plastics Advisor®
Type of Product(s)?	As Listed above	FEA/CAE Software
How Many Solvers?	Static, Fluid, Thermal, Eigen, Dynamic Response, Coleski, Rayleigh-ritz Subspace Iteration, Cyclic Jacobi, Mode Superposition	10+
How Many Different Element Types?	2D Membrane, 3D Hexahedron, Tetrahedron, Beam, Truss, Axisymmetric, Fins, Shell, Plate, Steady/Unsteady Heat Transfer, Porous Fluid Flow, Newtonian, & Non-Newtonian Fluids, Navier Stokes	2- Triangular shell & Tetrahedral Solid
Integrated with any CAD?	No Native tools provided	SolidWorks, Pro/E, Inventor, Solid Edge
Own Scripting Language?	No	Yes (API Supported)
Own Parametric Design Language?	No	No
File Size Limit?	Limited by computers RAM	None
Material Properties?	Isotropic, Anisotropic, Sandwich, Composite	Database provided with 7,500+ grades of plastic
Price?	Single - \$1,019US University - \$1,102US Two- \$1,593US All - \$2,549US	\$5,000US and up
Web Address	www.lisa-fet.com	www.moldflow.com
Contact	Karl Hariraj	David Kagan
Email	info@lisa-fet.com	David.Kagan@moldflow.com
Phone	416-433-5081	508-358-5848 x285

Questionnaire	Motivated Design & Analysis	Noran Engineering
Products or Services?	Services	Both
Markets?	Manufacturers, Inventors	Auto, Aero, Marine, Petro Chemical, Turbomachinery, Consumer, Medical, Power Generation, Industrial, Electronics, Military
Main Type(s) of Analysis?	Motion, Flow, FEA, Dynamic, Non-Linear, Contact	Structural, Dynamic, Modal, Shock, Vibration, Crash, Drop, Thermal, Motion, Fluid Dynamics, 3D Contact, Fatigue, Aeroelasticity, Multiphysics, Optimization, Event Simulation, Animation
Product(s)?	Complete line of COSMOSWorks, FloWorks, COSMOSMotion, GeoSTAR, DesignSTAR, FEMAP	NEi Nastran for all major CADs, NEi Fluid Dynamics, Aeroelasticity, Advanced Thermal, Optimization, Fatigue, Motion, Acoustic, Laminate
Type of Product(s)?	CAD Solutions, CAD embedded FEA tools, GeoSTAR, MathCAD	Complete solutions for Windows, UNIX, Linux. Stand alone and Network
How Many Solvers?	6 – Direct Sparse, PCG, Skyline, FFE, FFE Plus, Nastran NX	5 – Advanced Dynamics, Linear Static & Steady State Heat Transfer, Modal, Buckling, Pre-Stress, Non-Linear Transient Heat Transfer
How Many Different Element Types?	4 Point, 18 Line, 14 Area, 8 Volume	36 including some unique industry specifics
Integrated with any CAD?	SolidWorks, Solid Edge, Rhino	NEiWorks (SolidWorks), NEiNastran (all CADs)
Own Scripting Language?	GeoSTAR's Macro language	Yes
Own Parametric Design Language?	GeoSTAR's Macro language	No
File Size Limit?	No effective limit	None
Material Properties?	2 general purpose libraries linking with MatWeb	Alloys, Metals, Composites, Plastics, Wood, Bio
Price?	Contact Company	Solvers - \$1,500US to \$3,000US Modelers - \$4,290US to \$9,990US
Web Address	www.motov8d.co.nz	www.nenastran.com
Contact	Greg Morehouse	Sales
Email	Greg@motov8d.co.nz	info@noraneng.com
Phone	64-3-382-5282	714-899-1220 or 877-NASTRAN

Questionnaire	Pointwise Inc.	Ternion Corp.
Products or Services?	Both	Both (Services only support Ternion products)
Markets?	CFD	Government Contractors/Military, Air Traffic Control, Gaming – US & International
Main Type(s) of Analysis?	CFD	Battlefield Analysis for the Military
Product(s)?	Gridgen	FLAMES® (Flexible Analysis Modeling and Exercise System)
Type of Product(s)?	Preprocessor	Constructive Simulation Framework for constructive simulations & interface to live, virtual and other constructive simulations
How Many Solvers?	N/A	N/A
How Many Different Element Types?	6 – Triangle, Quadrilateral, Tetrahedral, Prism/Wedge, Hexahedron, Pyramid	N/A
Integrated with any CAD?	No; Direct import of CATIA V4 & V5, Pro/E, UGS NX, STEP	No
Own Scripting Language?	Yes	Yes
Own Parametric Design Language?	Yes	No
File Size Limit?	2 GB	None
Material Properties?	N/A	COTS Software by Ternion. Source code is only given away to example models
Price?	Full- \$9,500US Academics- \$2,000US	Contact Company
Web Address	www.pointwise.com	www.ternion.com
Contact	Rick Matus	Barlow Blake
Email	sales@pointwise.com	Flames_sales@ternion.com
Phone	888-GRIDGEN	256-881-9933