

## Integrated Motion and Stress Analysis



### OVERVIEW

Are you looking for an engineering tool that will resolve design problems, reduce failures and warranty costs, turn around designs faster, and work with your existing Windows® based 3D CAD system?

MSC.visualNastran 4D (MSC.vN4D) is for design and engineering professionals developing products involving assemblies of 3D parts. By simulating your assemblies in this unique, virtual environment, you will produce more creative, robust designs and reduce cycle time. It's Profit-Driven Design™. With MSC.vN4D, you can simulate the rigid body dynamics of an assembly, "size" components, determine part interferences and collision response, identify stresses induced by motion, produce physics-based animations, and test your control systems.

MSC.vN4D incorporates fully associative integration with the latest versions of popular CAD applications, including Autodesk Inventor® and Mechanical Desktop®, Pro/ENGINEER®, Solid Edge® and SolidWorks®. With MSC.vN4D, you can customize your MSC.vN4D toolbars and buttons to function as they do in your preferred CAD system.

Automatic Constraint Mapping (ACM) technology translates CAD parts, assemblies and assembly mate information.

Geometry from virtually every CAD system can be accessed using standard formats: ACIS, Parasolid, STEP (AP203), IGES, and STL. Geometry transfer from CAD to vN4D is complete and permits meshing for stress analysis and smooth collisions between bodies.

### GETTING STARTED

To get you started with MSC.vN4D, there is an interactive multimedia tour that guides new users through basic concepts of how to use MSC.vN4D and enables them to start their own projects. An interactive Welcome Screen provides access to the Getting Started CD content, demo filepreviews, and a tour of new features.

"MSC.visualNastran 4D provides break-through productivity enhancements, enabling a design engineer to pack 24 hours of work into eight hours"  
-Ken Henderson, Xerox

## PRODUCT FAMILY

MSC.visualNastran desktop™

## CAPABILITIES

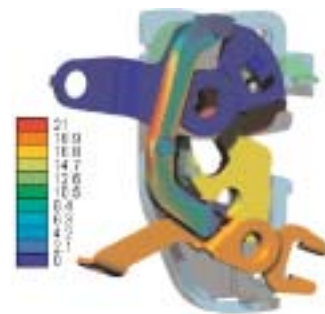
### COMPLETE SIMULATION SOLUTION

- Measure forces, torques, friction, velocity, and collisions
- Determine vibration modes, buckling, heat transfer!
- Automatically calculate loads and stresses throughout the assembly
- Render high quality, physics-based animations and images for proposals and presentations
- Test control systems with Simulink®

## BENEFITS

MSC.vN4D saves you time and money by increasing your productivity. In addition, MSC.vN4D can help you:

- Get to market faster
- Reduce the number of physical prototypes
- Decrease warranty costs
- Improve product quality



#### MEASURABLE PARAMETERS

- Velocities, accelerations and displacements
- Force and torque
- Friction force, collisions
- Interference detection and closest distance between bodies

#### MOTION DRIVERS

- Motors and actuators
- Point forces, torques, distributed forces, pressure
- Table input, sliders, Simulink® controls

#### FEA

- Stress, strain, deflection, vibration, buckling
- Heat transfer, h-adaptivity
- FEA results meter & factor of safety plots
- Advanced mesh control

#### CONSTRAINTS

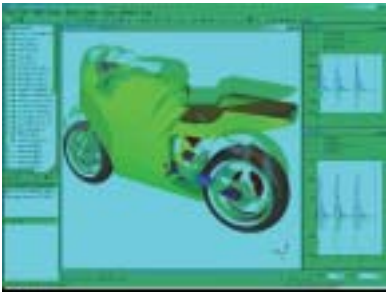
- Rigid, revolute, spherical, curved slot, planar
- Rods, ropes, springs, gears, belts
- Bushings,
- Generic (user-defined)

#### INTEGRATED MOTION & STRESS ANALYSIS

- Converts joint forces to distributed loads
- Transfers inertial information for stress analysis of parts
- Calculates stress and strain at every time step
- Utilizes finite element technology to solve redundantly constrained assemblies

#### ANNOTATION & DIMENSIONING

- Text and pointer annotations, vectors
- Distance and radii dimensions

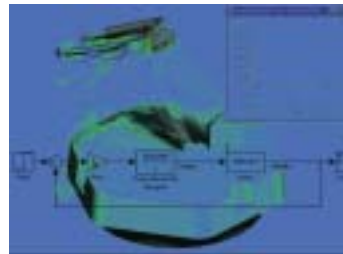


#### ANIMATION CAPABILITIES

- Flexible key framing & animate stress simulation results
- "Auto-Explode" for animations of exploded assemblies
- Shadows, surface rendering, and texture mapping
- Clipping Planes to "cut away" sections
- AVI video creation

#### OUTPUT

- Meter data from simulations in MS Excel® format
- Snapshot tool automatically creates JPEG, TIFF, and BMP image files
- MSC.Nastran™ input (DAT) files
- VRML & HTML files for web distribution
- Simulation Reports



#### EASE-OF-USE FEATURES

- Getting Started
- Online Tutorial Guide
- CAD Environment Emulation
- Transient Zoom
- File Open Preview
- Paint the Constraint"
- "What's This?" pop-up instant help

#### SOFTWARE SUPPORT

- Autodesk Inventor® R4, R5.0, R5.3
- Autodesk® Mechanical Desktop® R6.0
- CATIA® V4
- Pro/ENGINEER® 20, 2000i, 2000i2, 2001
- SolidWorks® 2000, 2001, 2001 Plus
- Solid Edge® V10.0, V11.0, V12.0
- MATLAB® 5, 6, 6.1; Simulink® 3, 4, 4.1

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