Webinar:
What's New in
Simcenter 3D and
Simcenter Nastran
2019.1

Jonathan Hill, ATA Engineering

April 4th 2019

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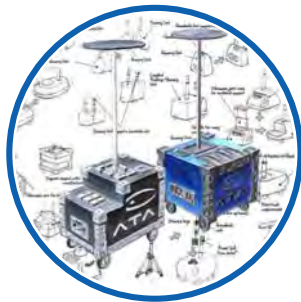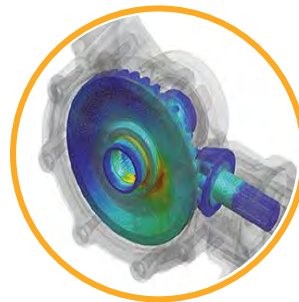
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  - ➢ Simcenter 3D
  - ➢ NX CAD & CAM
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- ➢ Contact the hotline at 877-ATA-4CAE or http://ata-plmsoftware.com/support
- ➢ Developer of the official Simcenter Nastran training materials
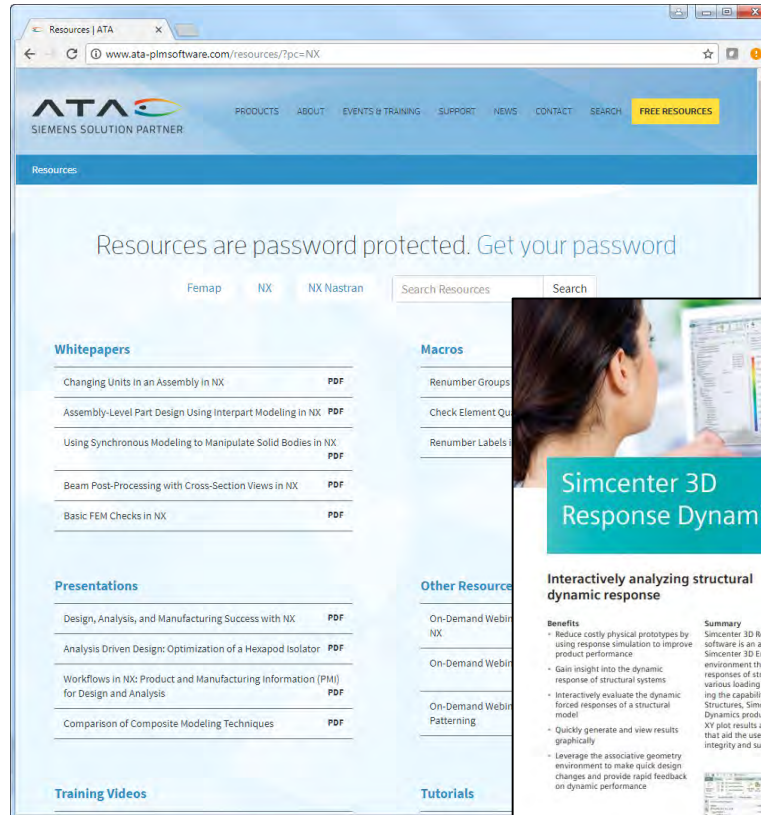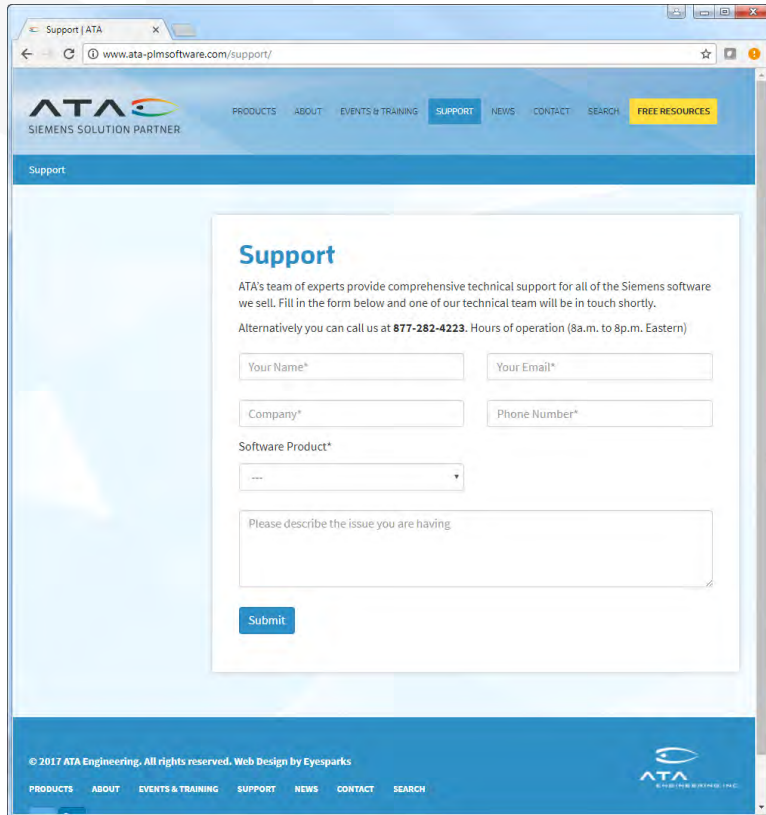- ➢ Preferred North American provider of Simcenter Nastran training
- ➢ Recognized as Smart Expert Partner with validated expertise in Femap and STAR-CCM+

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Outline

➢ New Names and Release Cadence

➢ User Interface Updates

➢ Pre-Processing Enhancements

  ➢ Geometry
  ➢ Meshing

➢ Post-Processing Enhancements

➢ Nastran Updates (SOL 401/402)

➢ Additional New Simcenter 3D Capabilities

➢ Summary and Q&A

What is Simcenter 3D?

➢The Simcenter portfolio includes best in class CAE simulation, system simulation, and testing solutions

  ➢This encompasses products such as Simcenter 3D, Simcenter Nastran, Femap, STAR-CCM+, HEEDS, and Teamcenter

➢Simcenter 3D is a unified multidiscipline 3D analysis tool based on the NX platform

  ➢Available as a stand-alone application or completely integrated with NX
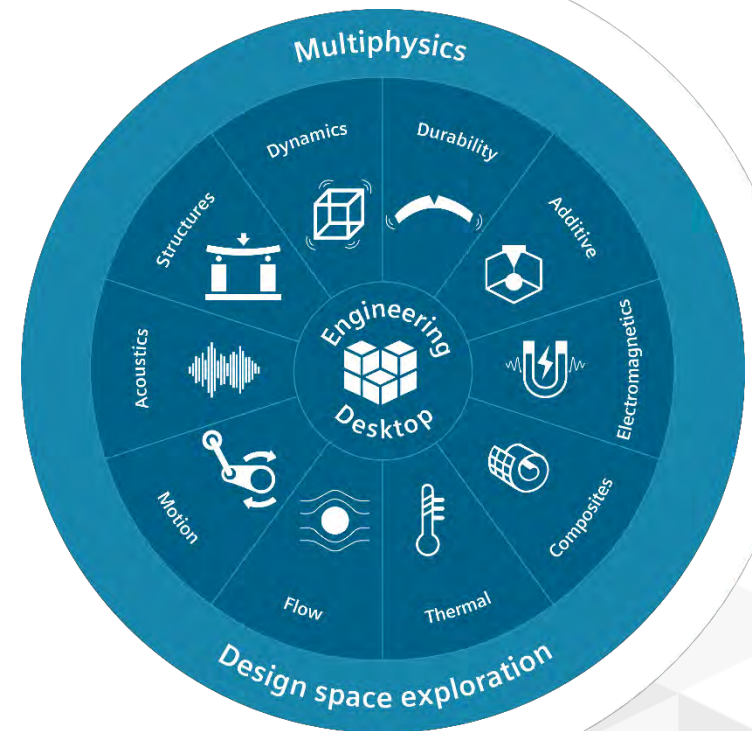
New Names;
Same Great Products

➢ New major releases were delivered in January 2019
- ➢ NX supersedes NX 12
 - ➢ Release number is dropped to remove focus on it as a perceived indication of quality and deployment readiness
  - ➢ Major release in June 2019 will be NX
- ➢ Simcenter 3D 2019.1 supersedes Simcenter 3D 12
  - ➢ Major release in June 2019 will be Simcenter 3D 2019.2
- ➢ Simcenter Nastran 2019.1 supersedes NX Nastran 12
  - ➢ Major release in June 2019 will be Simcenter Nastran 2019.2

➢ Version numbers are available for NX and Simcenter 3D at File > Help > About
- ➢ January 2019 release had a version number of 1847

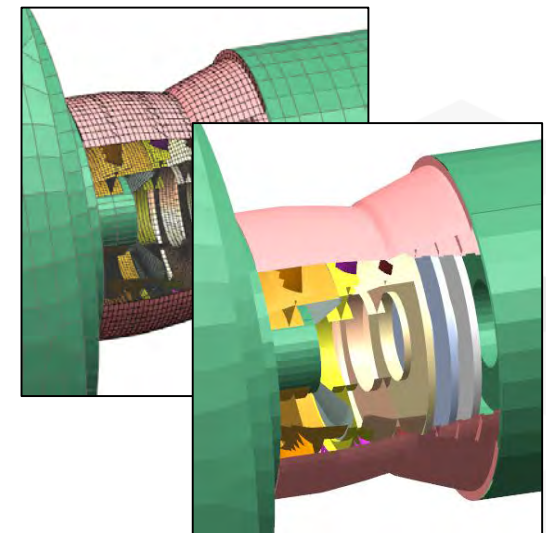➢ Download the latest version from GTAC: (https://download.industrysoftware.automation.siemens.com/)

New Release Cycle;
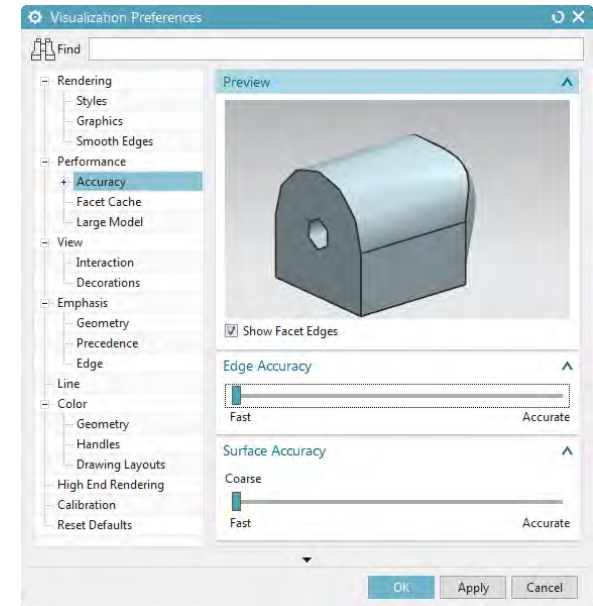# Same Great Products

➢Continuous Release for NX and Simcenter 3D

  ➢Major enhancement releases every 6 months with schema change

  ➢Monthly maintenance releases

➢Designed to reduce cost of deployment so users can leverage advancements without delay

➢Optional Automatic Updates to Notify or Notify and Download new versions

➢Still possible to have multiple versions of software installed
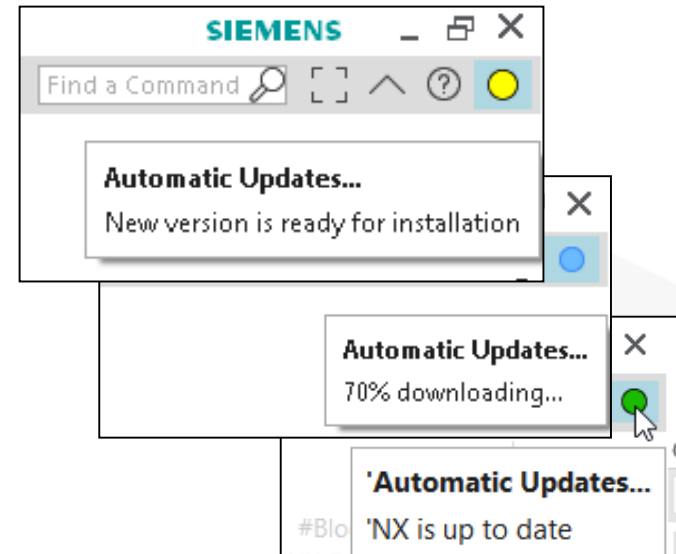
User Interface Updates

➤ Refreshed Icons provide clean modern look

➤ Visualization Preferences are simplified and consolidated

  ➤ Level-of-Detail can be automatically reduced when zooming out on a Large Model

➤ New Predictive UI **Toolbar 'learns' user** workflows and predicts the next most likely commands

➤ Part Navigator allows for easier show/hide and current feature selection

Geometry Updates

➢ A more robust Face from Mesh handles complex geometries better and adds new feature edge controls

➢ Imprint adds Snap Ends and Normal to Face options

➢ Split Face by facet edges

➢ Create or import Datum Planes in the FE model

➢ Split Body improvements create all mesh mating conditions as glue coincident

➢ New Edge Separation command converts shared edges into separate edges
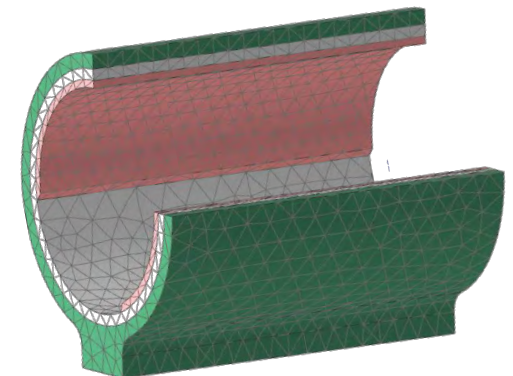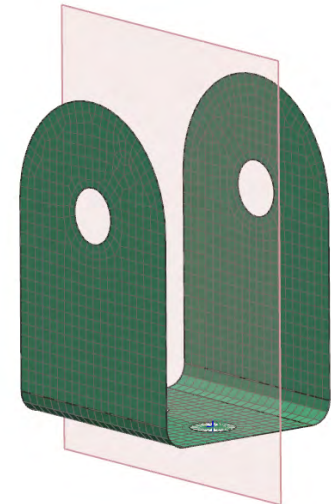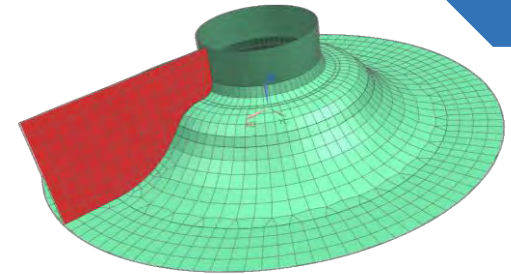
Surface Meshing Enhancements

> Improve overall mesh quality with:

>> Better preservation of features such as ridge lines, stamped depressions, and fillet chains

>> More regular, isotropic elements around holes (Paver method + Multi-Block)

>> More gradual element size transitions across triangular meshes

>> Aspect Ratio and Min/Max Included Angle options in Mesh Quality Options

>> Create a separate mesh for each face
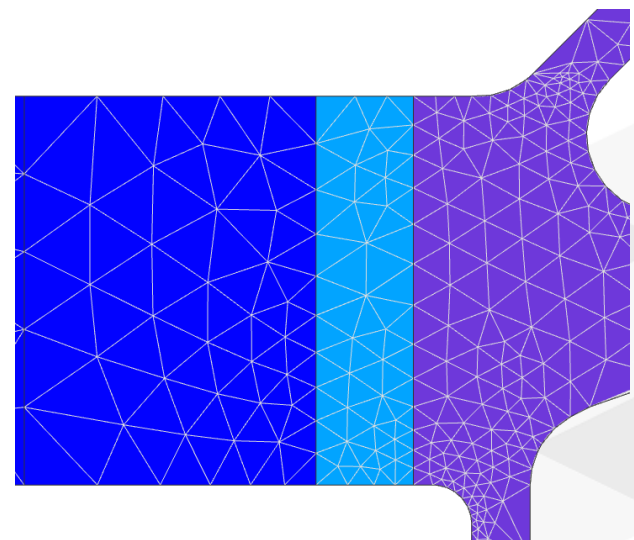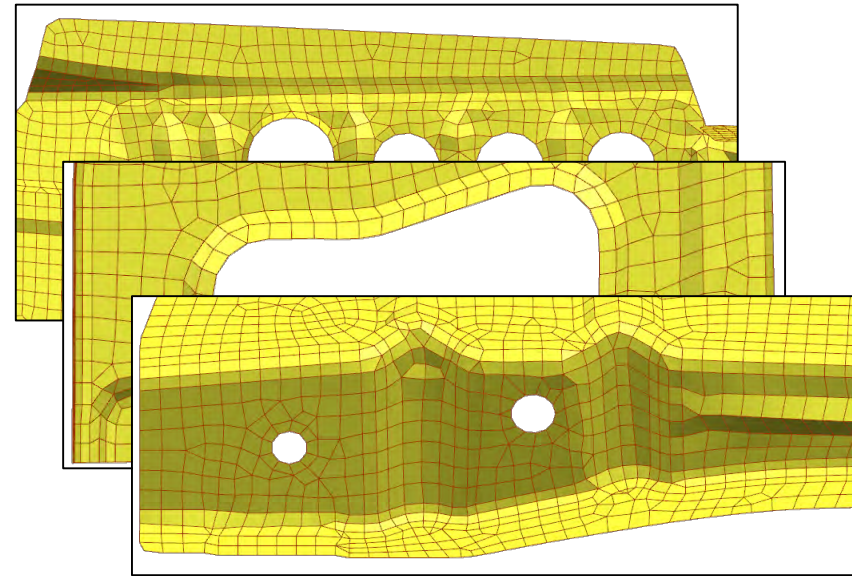
Additional Meshing Enhancements

- ➤ Mesh Naming – specify meaningful names, and name 3D meshes after their polygon bodies

- ➤ Edge Mesh Control Improvements:
  - ➤ Distribute on Edges option handles connected edges as a single continuous edge
  - ➤ Biasing on Edge uses the first edge selected as a seed to determine direction of other selected edges

- ➤ New Remesh command can refine or coarsen an existing 2D mesh

- ➤ 2D Mesh from Facets generates a surface mesh on complex convergent or faceted geometry

- ➤ 1D mesh is automatically created for Lattice bodies from NX CAD
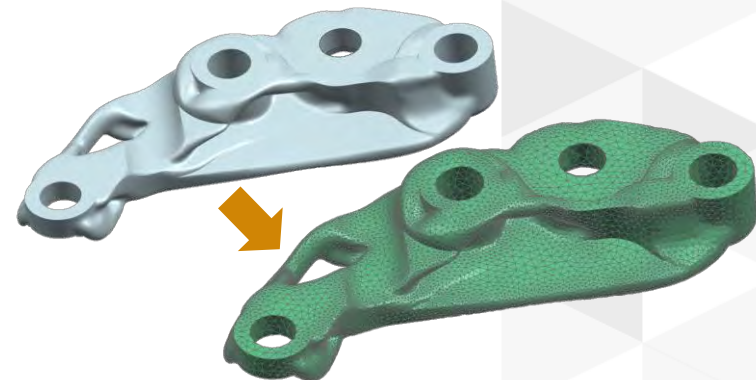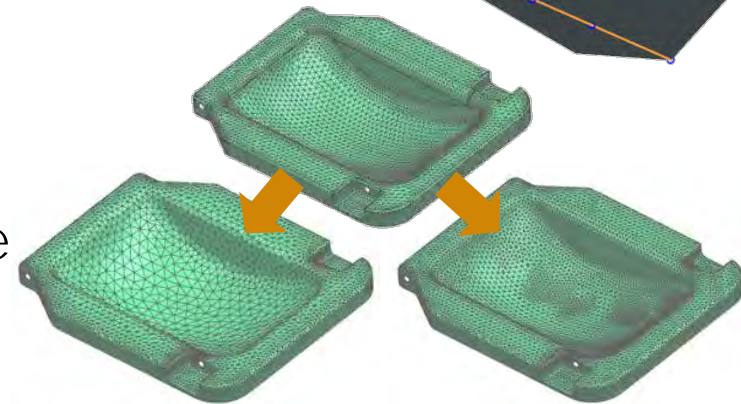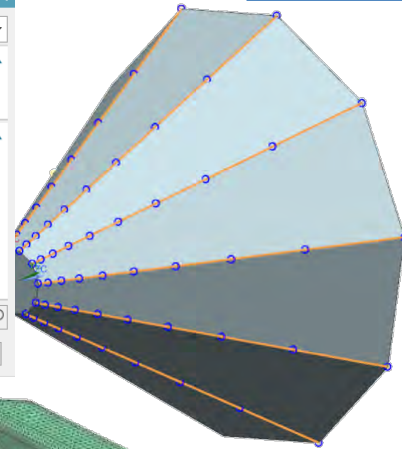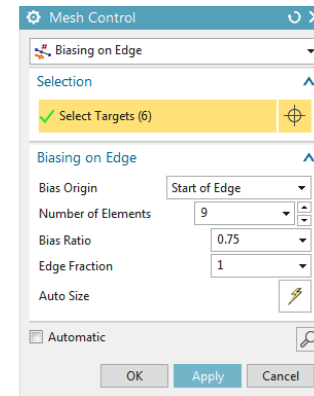
Pre-Processing Enhancements

➢ New Universal Connection types: Crimp, Clinch, Lumped Mass, Kinematic Joint, and Rivet

➢ Accelerated assembly checks and updates with Component Sub-Assembly Label Conflicts and Component Update Pending

➢ Clean up a Simulation File with Delete Unreferenced Entities

➢ Element Add/Remove defines entities to add or remove during SOL 401 at a pre-defined time or strain

➢ Bolt Preload: Define axial displacement of a bolt and use 1D bolt preloads in SOL 401
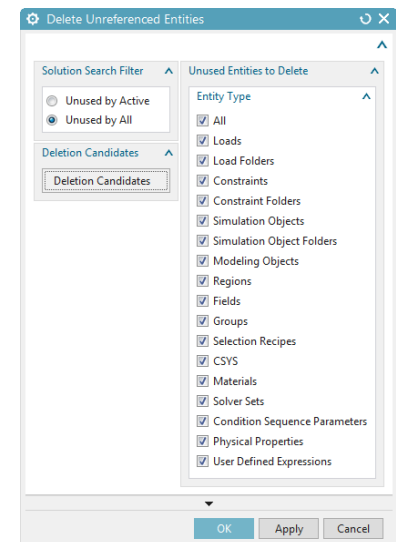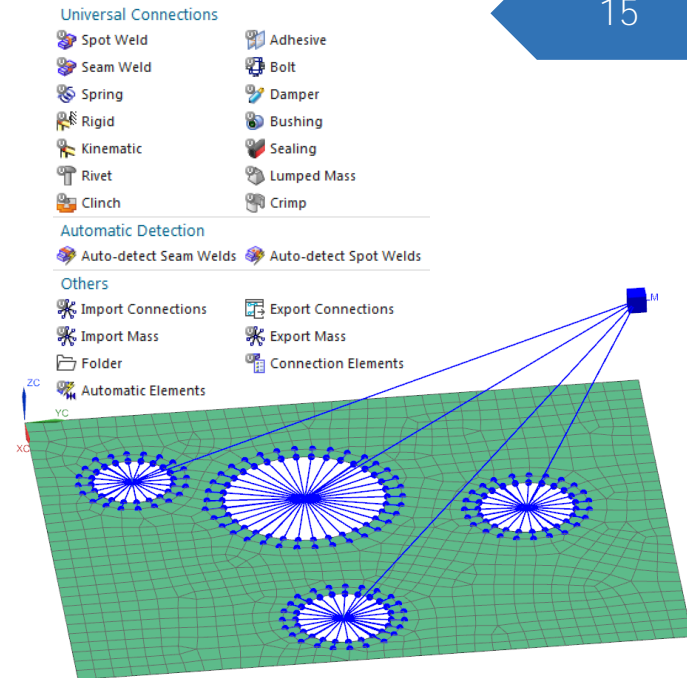
Post-Processing Enhancements
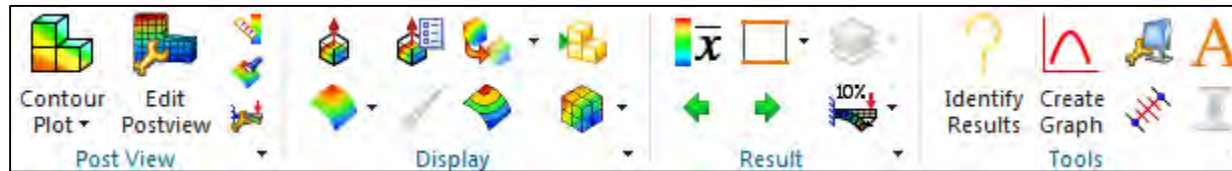
➢ Measure Deformed Distances in Post View

➢ Position the Cutting Plane with a reference node

➢ More customizable Post View Headers

➢ Legend Level Spacing:
  - ➢ Equally Spaced
  - ➢ Round Off
  - ➢ Level Increment
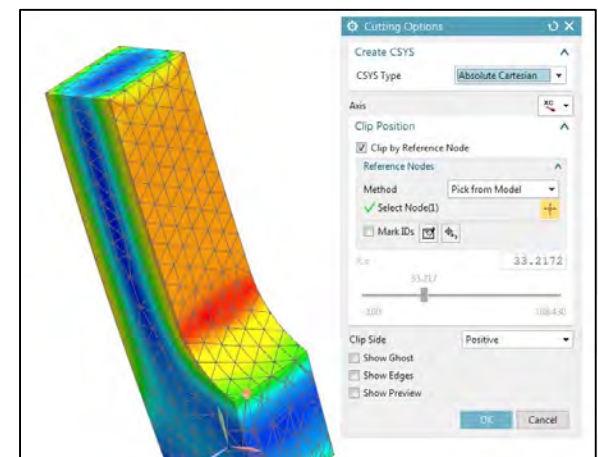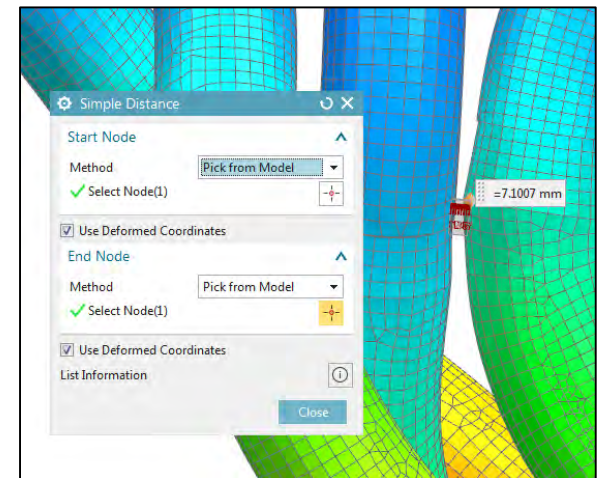
Post-Processing Enhancements (cont.)

➢ Display shell results in Projected CSYS and Multiple Tensor Components simultaneously

➢ Display CBUSH results as arrows

➢ Display elements that are added or removed

➢ Cache Results to improve efficiency of working with them, especially for large result sets

➢ Lumped masses are displayed as contours based on node
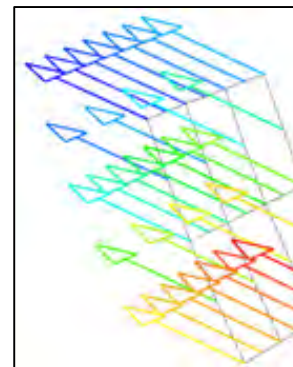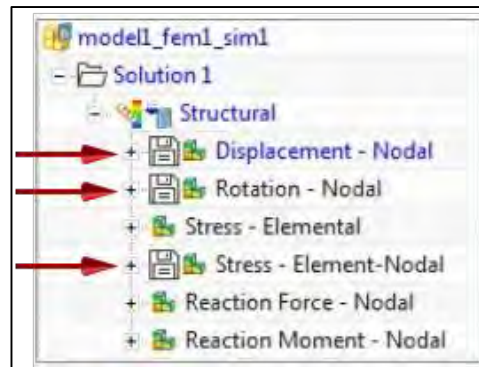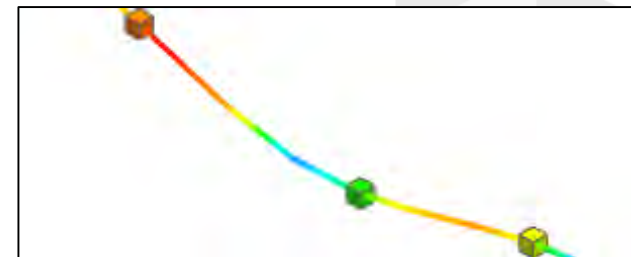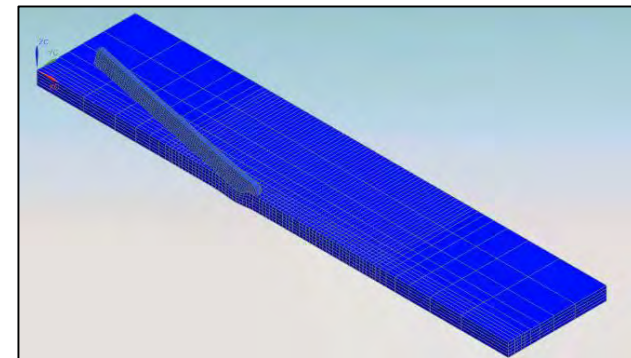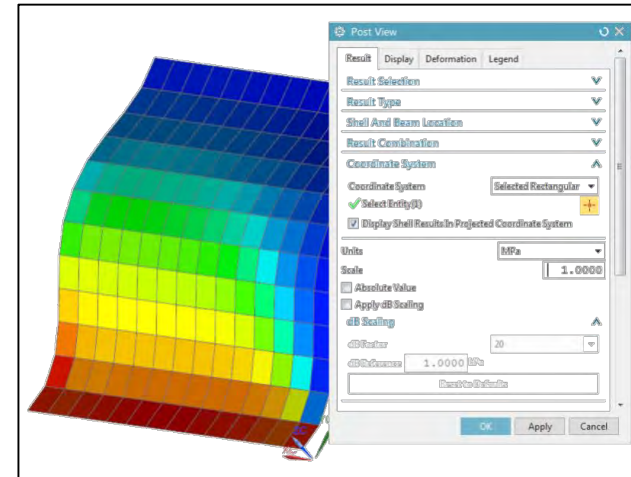
Nastran Enhancements

➢ Restarts and user-defined materials are now supported in SOL 401 & SOL 402

SOL 401

➢ New dynamic transient subcase
➢ Contact improvements to help reach convergence:
  ➢ Adaptive penalty stiffness
  ➢ Gap / Penetration adjustment
➢ Element extensions:
  ➢ Beam plasticity and creep
  ➢ Add/remove capability
  ➢ Mid-node thickness and pressure definitions for plane stress elements
  ➢ **Chocking support in "linear" solutions**
➢ Bolt Preload extensions:
  ➢ 1D beam elements as bolts
 ➢ Intermediate results output for preload subcases

SOL 402

➢ Facilitate nonlinear solutions with flexible and kinematic displacements
  ➢ Kinematic Joint elements simulate mechanisms like hinges and sliders
➢ Nonlinear gasket and strain-rate dependent materials
➢ New complex modal subcase
  ➢ Captures nonsymmetric stiffness from contact

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Enhanced Topology Optimization and Additive Manufacturing Process Simulation

➢ Topology Optimization is more robust:

   ➢ Added design objectives and constraints related to critical loads including buckling

   ➢ Manufacturing constraint improvements produce results with better convergence and accuracy.

➢ New Additive Manufacturing Process Simulation

   ➢ Simulate a powder bed fusion process to predict and avoid re-coater collisions, distortion, and shrinkage during printing

   ➢ Calculated distortions can be used to compensate the geometric model
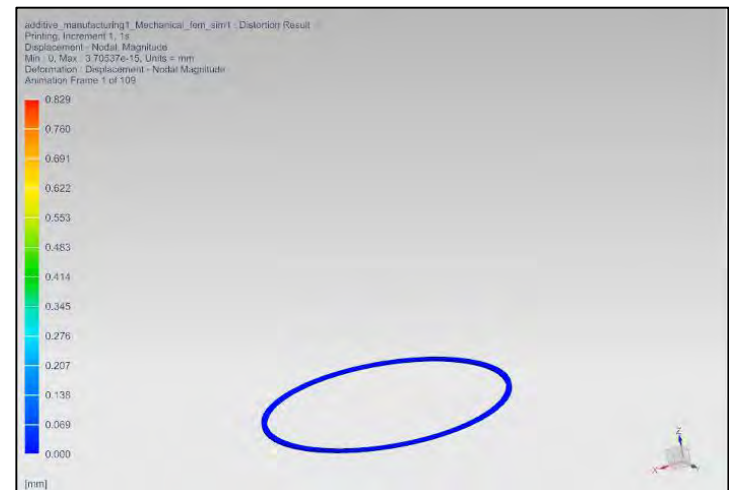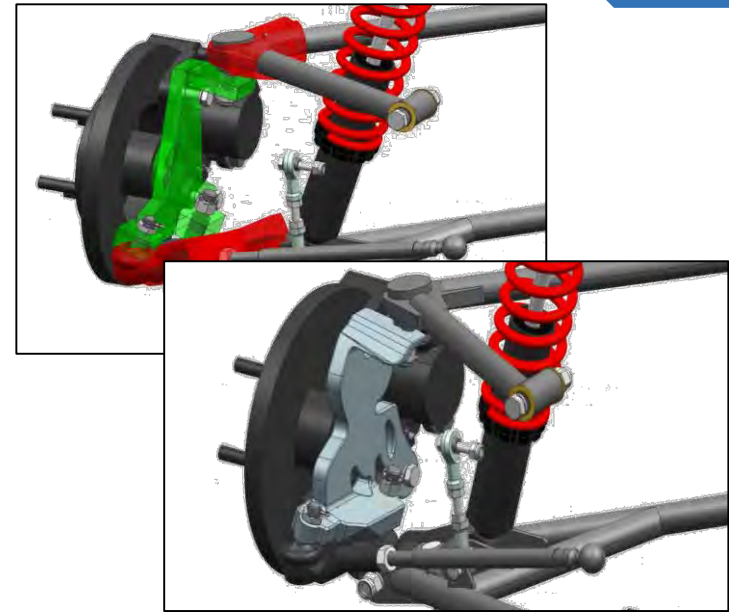
Transmission Builder, Aerostructures with Composites, and Coupling with STAR-CCM+

➢ New Transmission Builder automates the creation and simulation of transmission motion simulation models

 ➢ Extremely fast gear simulation and as accurate as FE

  ➢ Combine with Simcenter 3D Acoustics for gear whine analyses

➢ Simcenter 3D Aerostructures adds support for composite structures

➢ 1-way coupling with STAR-CCM+ and Simcenter 3D for aero-acoustics
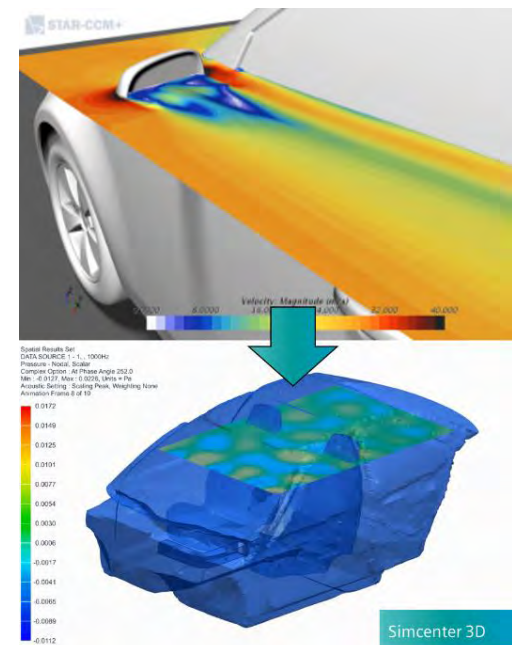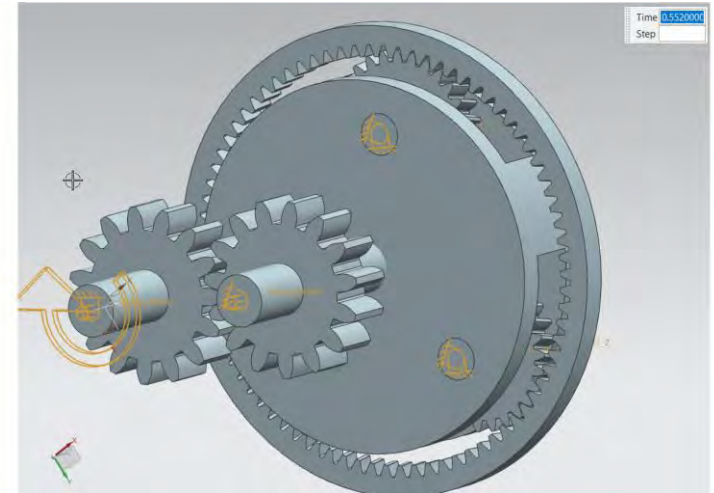
Flexible Pipe, Specialist Durability, and Correlation

➢ With Simcenter 3D Flexible Pipe, study how an electrical wire harness will bend and move within your assembly

  ➢ Import stocks from NX Routing

  ➢ Model interaction between cables, external taping, contact, and section distribution changes

➢ Simcenter 3D Specialist Durability brings functionality from LMS Virtual.Lab durability solvers, including the analysis of welds and composite materials

➢ Simcenter 3D Correlation compares and correlates simulation results with physical modal test results captured in Simcenter Test.Lab
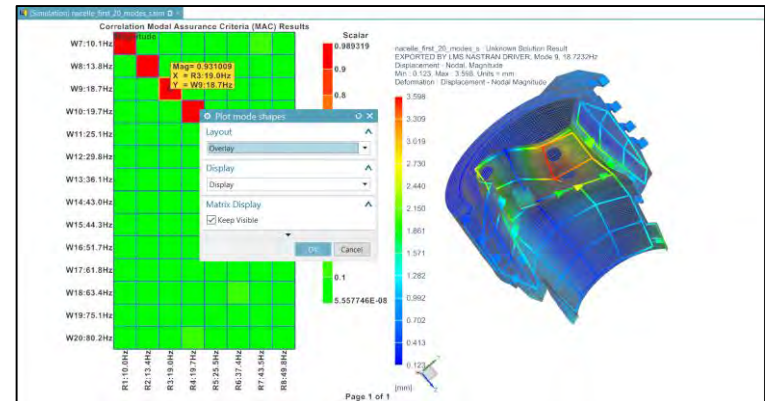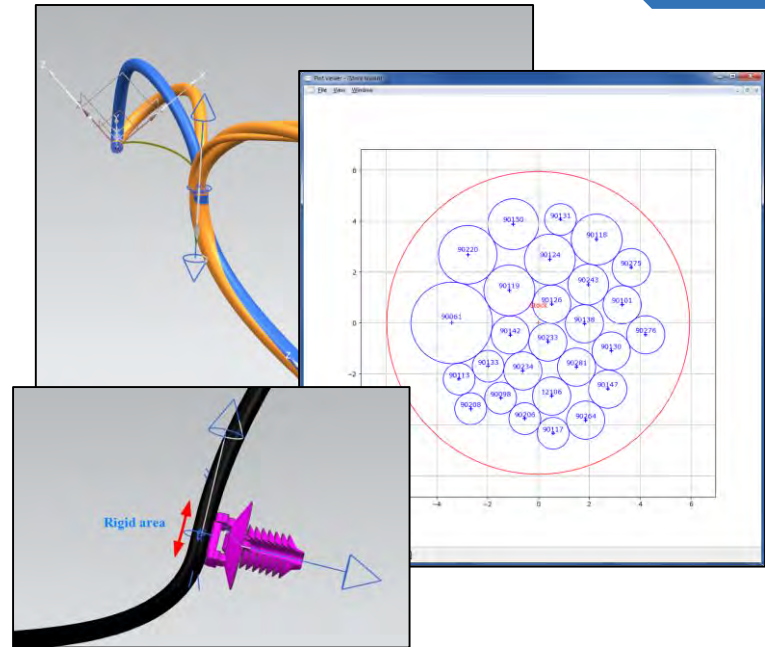
Summary

➢ Simcenter 3D 2019.1 begins a new continuous release cadence with major enhancements every 6 months

➢ Pre-Processing sees improved robustness in geometry manipulation, surface meshing, and mesh control

➢ Post-Processing allows for measuring deformed distances and provides greater control over the legend, header, and cutting plane

➢ SOL 401 and 402 support restarts in addition to element and material extensions

➢ Additive manufacturing process simulation and the transmission builder extend Simcenter 3D capabilities

➢ This is just the beginning! Read more at the Siemens Documentation Center
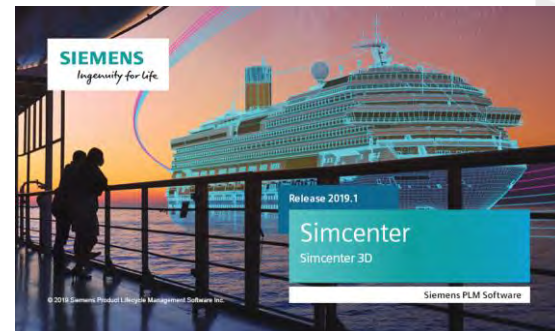
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