



Sandia
National
Laboratories

Next Generation Simulation (NGS)

DoD/SNL ModSim workshop
June 29, 2020

PRESENTED BY

The NGS Team

June 29, 2020



COMP SIM
TOOLKIT

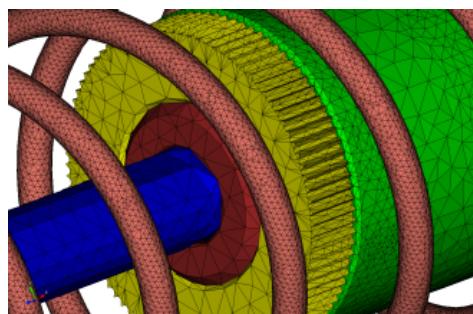
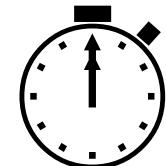
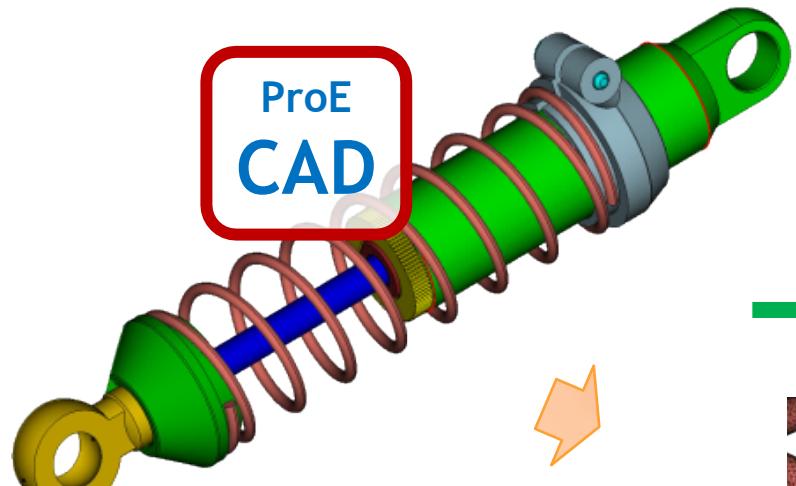
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Next Generation Simulation (NGS)

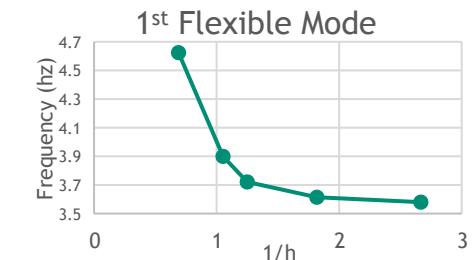
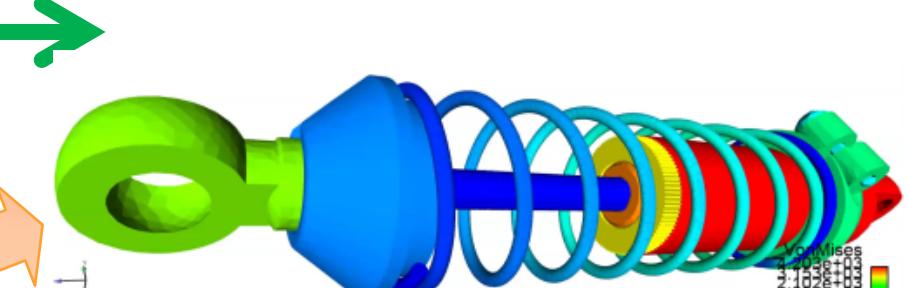
Lab goal: reduce LEP cycle [10 → 3 years]



Element size			
Number of tet elements created	75,940		
Number of nodes created	23,635		
Volume Error Upper Bound	0.02786		
Tet Quality Metric			
Average	0.11	Min	0.000427
Volume	8.38e-05	4.08e-07	0.000427
Scaled Jacobian	0.579	0.0154	1
Condition Number	1.41	1	18.2
Aspect Ratio	1.73	1	18
Mean Ratio	0.773	0.184	1
+ Potential Meshing Issues			
Location	Details		
Boundary face not in solvent (0)			
Mesh deviates from geometry (0/37)			
Mesh does not capture geometry (14)			
Overlapping Volumes (0/552)			
Potential Geometry Simplifications (18)			
Curve 1407			
Curve 318			
Surface 643			

Key Strategy:

- User Interface Design
 - Separate User intent from tedious steps of executing it
- Fast Model Creation
 - Automated Geometry Defeaturing
 - Robust Automated Meshing
 - Material Application
 - And More
- Embedded V&V
 - for solution credibility



intuitive, insightful and accessible M&S capability, fast TAT



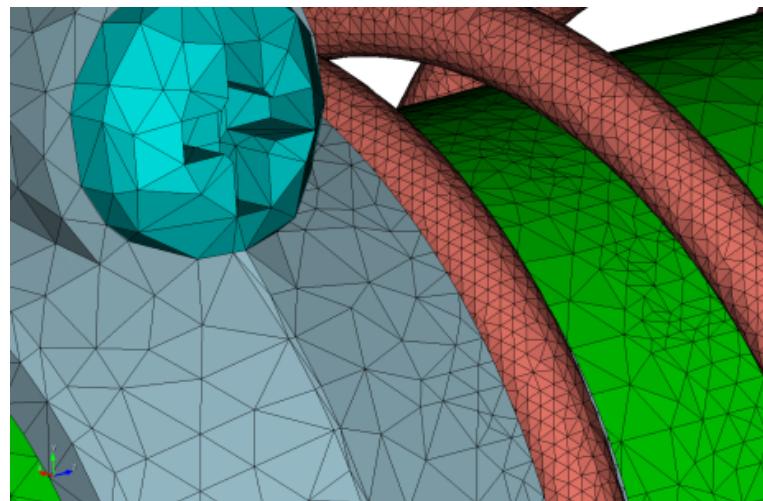
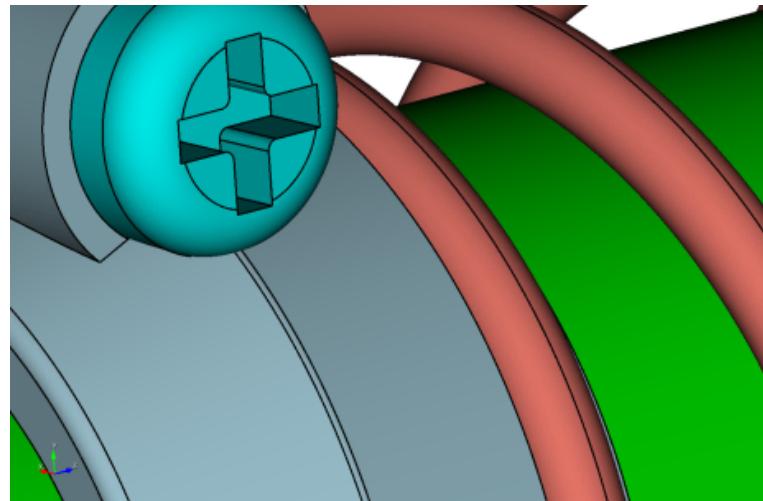
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New in FY20

- **User Control Over Automatic Geometry Defeaturing**
- **Mesh Adaptation to User Features of Interest**
- **Integration With the SGM Solid Modeling Engine**



Planned for FY21

- **Solution-Based Adaptivity**
 - Underlying Mesh Support
 - UI/UX
- **STL Model Support**
 - Scanned Models to Mesh
- **Continued UI/UX Development with Cubit as Underlying Engine**
 - Geometry Overlay Detection & Resolution
 - Features of Interest

