Ansys

CAPABILITIES

2020 R2

CONTENT

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ STRUCTURES	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA
GEOMETRIC IDEALIZATION					
Spring	●	●	▲	●	●
Mass	●	●	●	●	●
Damper	●	●		●	●
Spar	●	●	●		
Beam	●	●	●	●	●
Pipe/Elbow	●	●	●		
Shell - Thin	●	●	●	●	●
Layered Shell - Thin (Composite)	●	●		●	●
Shell - Thick (Solid Shell)	●	●	●		
Layered Shell - Thick (Solid Shell) (Composite)	●	●	●		
2D Plane / Axisymmetric	●	●	●	●	●
3D Solids	●	●	●	●	●
Layered 3D Solids (Composite)	●	●			
Infinite Domain	●	●	●	●	●
2.5D	●	●			
Reinforced	●	●		●	●
Coupled Field ROM Element Technology	●				
Substructuring / Matrix	●				

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RBD = Rigid Body Dynamics
Aqwa = Aqwa

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/ STRUCTURES

	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA
MODELING CAPABILITIES					
Contact - Linear	●	●	●	●	●
Contact - Nonlinear	●	●	●	●	●
Joints	●	●	●	●	●
Spot Welds	●	●	●	●	●
Element Birth and Death	●	●			
Gasket Elements	●				
Rezoning and Adaptive Remeshing	●			●	●
Inverse Analysis	●				
MATERIALS					
Basic Linear Materials (Linear, Anisotropic, Temperature Dependent)	●	●	●	●	●
Basic Nonlinear Materials (Hyper, Plasticity, Rate Independent,Isotropic, Concrete)	●	●	▲	●	●
Advanced Nonlinear Materials (Rate dependent, Anisotropic, Damage Models,Geomechanics Materials, Multiphysics)	●			●	●
Field Dependent	●	●		●	
Reactive Materials	●				
Fracture Mechanics and Crack Growth	●				
Material Designer	●				
GRANTA Materials Data for Simulation	■[7]	■[7]	■[7]		

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COMPOSITE MATERIALS					
Material Definitions	●	●		●	●
Layers Definitions	●	▲		●	●
Interface Plies	●				
Advanced Modeling Features	●				
Variable Material Data	●				
Solid Extrusion	●				
Lay-Up Mapping	●				
Draping	●				
Lay-Up Exchange Interfaces	●				
Advanced Failure Criteria Library	●				
First-Ply Failure	●	●			
Last-Ply failure	●				
Delamination	●			●	●
Composite Cure Simulation	■[9]				
STRUCTURAL SOLVER CAPABILITIES					
Linear Static	●	●	●		
Nonlinear Static	●	●	●		
Pre-Stress Effects, Linear Perturbation	●	●	●	▲	▲
Nonlinear Geometry	●	●	●	●	●

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	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA
STRUCTURAL SOLVER CAPABILITIES (CONTINUED)					
Buckling - Linear Eigenvalue	●	●	●		
Buckling - Nonlinear Post Buckling Behavior	●	●	●		●
Buckling - Nonlinear Post Buckling Behavior - Arc Length	●	●			
Steady State Analysis Applied to a Transient Condition	●				
Advanced Wave Loading	●				
TOPOLOGY OPTIMIZATION					
Structural Optimization	●	●	●		
Modal Optimization	●	●	●		
Thermal Loads	●	●	●		
Inertial Loads	●	●	●		
Optimized Design Validation	●	●	●		
Manufacturing Constraints	●	●	●		
Stress constraints	●	●	●		
Symmetry	●	●	●		
Lattice Optimization	■[8]				
Overhang/Additive Constraints	■[8]				

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MULTI ANALYSIS					
Submodeling	●	●	●		
Data Mapping	●	●	●		
Multiphysics Data Mapping	●	●	▲		
Initial State	●	●		●	●
Advanced Multi-Stage 2-D to 3-D Analysis	●	●			
VIBRATIONS					
Modal	●	●	●		
Modal - Pre-Stressed	●	●	●		
Modal - Damped/Unsymmetric	●	●			
Transient - Mode-Superposition	●	●			
Harmonic - Mode-Superposition	●	●			
Harmonic - Full	●	●			
Spectrum	●	●			
Random Vibration	●	●			
Mistuning	●	●			
Rotordynamics	●	●			
Modal Acoustic	●				
Harmonic Acoustic	●				

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NONLINEAR TRANSIENT DYNAMICS					
Rigid Body Mechanisms	●	●			
Rigid Body Dynamics with CMS L Components for Flexible Bodies	●				
Full Transient	●	●		●	●
CMS with Substructuring	●				
EXPLICIT DYNAMICS					
FE (Lagrange) Solver	●			●	●
Euler Solvers				●	
Meshless Solvers	●			●	
Implicit-Explicit Deformations	●			●	●
Implicit-Explicit Material States	●			●	
Fluid-Structure Interaction (FSI)	●			●	
Mass Scaling	●			●	●
Natural Fragmentation	●			●	
Erosion Based on Multiple Criteria	●			●	●
De-Zoning				●	●
Part Activation and Deactivation (Multi Stage Analysis)				●	
Remapping in Space				●	
Remapping Solution Methods				●	

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DURABILITY					
Stress-Life (SN)	●	●	●		
Strain-Life (EN)	●	●	●		
Dang Van	■[1]	■[1]	■[1]		
Safety Factor	●	●	●		
Adhesive Bond	■[1]	■[1]	■[1]		
Crack Growth Linear Fracture Mechanics	■[1]	■[1]	■[1]		
Seam Weld	■[1]	■[1]	■[1]		
Spot Weld	■[1]	■[1]	■[1]		
Thermo-Mechanical Fatigue	■[1]	■[1]	■[1]		
Vibration Fatigue	■[1]	■[1]	■[1]		
Virtual Strain Gauge Correlation	■[1]	■[1]	■[1]		
Python Scripting Customization	■[1]	■[1]	■[1]		
WAVE HYDRODYNAMICS					
Diffraction and Radiation	●				
Frequency & Time Domain Motions Analysis	●				
Moorings, Joints & Tethers	●				
Load Transfer to Structural Analysis	●				

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THERMAL					
Steady State Thermal	●	●	●		
Transient Thermal	●	●	●		
Conduction	●	●	●	●	●
Convection	●	●	●		
Radiation to Space	●	●	●		
Radiation - Surface to Surface	●	●	●		
Phase Change	●	●	●	●	●
Thermal Analysis of Layered Shells and Solids	●	●	●		
ADDITIONAL PHYSICS					
1-D Thermal-Flow	●	●	●		
1-D Coupled-Field Circuits	●				
1-D Electromechanical Transducer	●				
MEMS ROM	●				
Piezoelectric	●				
Piezoresistive	●				
Electroelastic	●				
Electromagnetic	●				
Vibro-Acoustics	●				
Electro-Migration	●				

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ADDITIONAL PHYSICS (CONTINUED)					
Diffusion-Pore-Fluid	●				
Diffusion-Thermal Structural-Electric	●				
Structural-Thermal-Electric-Magnetic	●				
1-Way Fluid-Structure Interaction	■[2]	■[2]	■[2]		
2-Way Fluid-Structure Interaction	■[2]				
OPTIMIZATION					
DesignXplorer Included	●	●	●	■[3]	■[3]
Parameters	●	●	●	●	●
Design Point Studies	●	●	●	●	●
Correlation Analysis	●	●	●	●	
Design of Experiments	●	●	●	●	
Sensitivity Analysis	●	●	●	●	
Goal Driven Optimization	●	●	●	●	
Six Sigma Analysis	●	●	●	●	
MISCELLANEOUS AND USABILITY					
ANSYS SpaceClaim	●	■[4]	■[4]	■[4]	■[4]
ANSYS Customization Suite (ACS)	●	■[5]	■[5]	■[5]	■[5]
Support ACT Extensions	●	●	●	●	●
Command Snippet Support	●	●	●		

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MISCELLANEOUS AND USABILITY (CONTINUED)					
Batch run capability	●	●	●	●	●
Read/Write 3rd Party Matrix CAE Data	●	●		●	●
CDB and 3rd party FE Model Import	●	●	●		●
Nastran Bulk File Export	●	●	●		
HPC - STRUCTURES					
Default Number of Cores	4 (DMP + SMP) MAPDL 4 for Explicit 4 for RBD MAPDL 4 for AQWA	4 (DMP + SMP)	4 (DMP + SMP)	1	1
Parallel Solving on Local PC	●	●	●	●	●
Parallel Solving on Cluster	●	●	●	●	●
GPU Acceleration	MAPDL - ■ 6 Explicit - No RBD - No AQWA - No	■6	■6		
Parallel Solving with ANSYS Cloud Launched from Desktop	MAPDL - Yes Explicit - No RBD - No AQWA - No	MAPDL - Yes RBD - No	MAPDL - Yes		●

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/ FLUIDS

	CFD ENTERPRISE					
	CFD PREMIUM					
	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	CHEMKIN ENTERPRISE
GENERAL SOLVER CAPABILITIES						
Comprehensive Inlet and Outlet Conditions	●	●	●	●	●	●
Steady-State Flow	●	●	●	●	●	●
Transient Flow	●	●	●	●	●	●
2-D and 3-D Flow	●	▲	▲	●	●	▲
Reduced Order Models (ROM)	●					●
Time Dependent Boundary Conditions	●	●	●	●	●	●
Customizable Materials Library	●	●	●	●	●	●
GRANTA Materials Data for Simulation	●					
Fan Model	●	●			●	
Periodic Domains	●	●	●	●	●	●
Flow-Driven Solid Motion (6DOF)	●	●			●	
Pressure-Based Coupled Solver	●	●	●	●	●	●
Density-Based Coupled Solver	●	●				●
Dynamic/Moving-Deforming Mesh	●	●	●	●	●	●
Overset Mesh	●					
Immersed-Solid/MST Method for Moving Parts		●		●	●	
Automatic On-the-Fly Mesh Generation with Dynamic Refinement	●		●			●
Dynamic Solution-Adaptive Mesh Refinement	●	●	●		▲	●
Polyhedral Unstructured Solution-Adaptive Mesh Refinement	●					

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/ FLUIDS

	CFD ENTERPRISE					
	CFD PREMIUM					
	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	CHEMKIN ENTERPRISE
SINGLE PHASE, NON-REACTING FLOWS						
Incompressible Flow	●	●		●		●
Compressible Flow	●	●	●		●	●
Porous Media	●	●		●		
Non-Newtonian Viscosity	●	●		●		
Turbulence - Isotropic	●	●	●	●	●	●
Turbulence - Anisotropic (RSM)	●	●				
Turbulence - Unsteady (LES/SAS/DES)	●	●				●
Turbulence - Laminar/Turbulent Transition	●	●			●	●
Flow Pathlines (Massless)	●	●		●		
Acoustics (Source Export)	●	●			●	
Acoustics (Noise Prediction)	●	▲				
HEAT TRANSFER						
Natural Convection	●	●			●	●
Conduction & Conjugate Heat Transfer	●	●			●	●
Shell Conduction (Including Multi-Layer Model)	●					
Internal Radiation - Participating Media	●	●		●	●	●
Internal Radiation - Transparent Media	●	●				●
External Radiation	●	●				●

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	CFD ENTERPRISE					
	CFD PREMIUM					
	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	CHEMKIN ENTERPRISE
HEAT TRANSFER (CONTINUED)						
Solar Radiation & Load	●	●				
Simplified Heat Exchanger Model	●					
Non-Equilibrium Thermal Model	●					
Prorous Media	●					
PARTICLES FLOWS (MULTIPHASE)						
Coupled Discrete Phase Modeling including Thin Wall Films	●	●	●		●	●
Macroscopic Particle Model	●					
Inert Particle Tracking (With Mass)	●	●				
Liquid Droplet (Incl. Evaporation)	●	●	●		●	●
Combusting Particles	●	●	●		●	●
Multicomponent Droplets	●	●	●		●	●
Discrete Element Model (DEM)	●	●				
Break-Up And Coalescence	●	●	●		●	●
Erosion	●	●				
FREE SURFACE FLOWS (MULTIPHASE)						
Implicit VOF	●	●		●		
Explicit VOF	●	●		●		
Coupled Level Set/VOF	●	●			●	
Complex Multiphase Regime Transitions (AIAD and GENTOP Model)	●					

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	CFD PREMIUM					
	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	CHEMKIN ENTERPRISE
FREE SURFACE FLOWS (MULTIPHASE) (CONTINUED)						
VOF to DPM Spray Model	●					
Open Channel Flow and Wave	●	●				
Surface Tension	●	●	●		●	
Phase Change	●	●	●		●	
Cavitation	●	●	●		●	
Cavitation Where Multiple Fluids and Non-Condensing Gases are Present	●					
DISPERSED MULTIPHASE FLOWS (MULTIPHASE)						
Mixture Fraction	●	●				
Eulerian Model including Thin Wall Films	●	●	●		●	
Boiling Model	●	●	●			●
Surface Tension	●	●	●			●
Phase Change	●	●	●		●	●
Drag And Lift	●	●	●		●	●
Wall Lubrication	●	●	●			●
Heat And Mass Transfer	●	●	●		●	●
Population Balance	●	●	●			●
Reactions Between Phases	●	●	●			●
Granular Model for Dense Bed of Solids	●	●				
Dense Particulate Coupling (DDPM)	●	●				

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	CFD PREMIUM					
	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	CHEMKIN ENTERPRISE
REACTING FLOWS						
Species Transport	●	●	●	●		●
Non-Premixed Combustion	●	●	●			●
Premixed Combustion	●	●	●			●
Partially Premixed Combustion	●	●	●			●
Composition PDF Transport	●	●				
Finite Rate Chemistry	●	●	●	●		●
Pollutants and Soot Modeling	●	●	●			●
Sparse Chemistry Solver with Dynamic Cell Clustering and Dynamic Adaptive Chemistry	●		●			●
Ability to Use Model Fuel Library Mechanisms	●		●			●
Flame-speed from Fuel-Component Library	●		●			●
DPIK Spark-Ignition Model			●			●
Flame-Propagation Using Level-Set Method (G-Equation)			●			●
Internal Combustion Engine Specific Solution	●		●			●
0-D/1-D/2-D Reactor Models and Reactor Networks						●
Plasma Reactions						●
Comprehensive Surface-Kinetics	●					●
Chemical and Phase Equilibrium	●					●
Flamelet table generation	●					●

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	CFD PREMIUM					
	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	CHEMKIN ENTERPRISE
REACTING FLOWS (CONTINUED)						
Flamespeed and Ignition Table Generation						●
Reaction Sensitivity, Uncertainty and Path Analysis						●
Surrogate Blend Optimizer						●
Mechanism Reduction						●
Detailed Electrochemistry Model for Li-Ion Batteries	●					
TURBOMACHINERY						
MRF/Frozen-Rotor	●	●				
Sliding-Mesh/Stage	●	●				
Transient Blade Row		●				
Pitch Change		●				
Time Transformation		●				
Fourier Transformation		●				
Harmonic Analysis		●				
Blade Flutter Analysis		●				
Forced Response Analysis		●				
Flank Milled Blades		●				
Performance Maps		●				
IN-FLIGHT ICING						
Simulation of Standard Droplets, SLD, and Ice Crystals	●				●	
Inclusion of Vapor / Humidity Effects on Icing	●				●	

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	CFD PREMIUM			POLYFLOW	FENSAP-ICE	
	FLUENT	CFX	FORTE			
IN-FLIGHT ICING (CONTINUED)						
Icing Environments of Appendices C, O (SLD), and D (Ice Crystals)	●				●	
Various Pre-Defined Droplet Size Distributions	●				●	
Simulation of Rime, Glaze, and Mixed Icing	●				●	
Single-and Multi-Shot Icing Simulations with Mesh Deformation for Prediction of Ice Accretion and Aerodynamic Performance Degradation	●				●	
Single-and Multi-Shot Icing Simulations with Automatic Re-Meshing for Prediction of Ice Accretion and Aerodynamic Performance Degradation					●	
Conjugate Heat Transfer (CHT) for Anti-and De-Icing Simulations		■			●	
Icing of Rotating Components of All Types: Rotors, Propellers, and Engines (Fan, Guide Vanes, and Any Number of Compressor Rows)					▲	
Ice Cracking					●	
Ice Shedding					●	
OPTIMIZATION						
Parameters	●	●		●		●
Design Point Studies	●	●		●		●
Correlation Analysis	●	●		●		
Design of Experiments	●	●		●		
Sensitivity Analysis	●	●		●		●
Goal Driven Optimization	●	●		●		

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	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	CHEMKIN ENTERPRISE
OPTIMIZATION (CONTINUED)						
Six Sigma Analysis	●	●		●		
Adjoint Solver for Shape Optimization	●					
Adjoint Solver Supports Rotating Reference Frames & Conjugate Heat Transfer	●					
Multi-Objective-Constrained Optimization	●					
Mesh Morphing (RBF Morph)	■					
HIGH RHEOLOGY MATERIAL						
Viscoelasticity				●		
Specialty Extrusion Models				●		
Specialty Blow Molding Models				●		
Specialty Fiber Spinning Models	●					
HPC - FLUIDS						
Parallel Solving On Local PC Option	●	●	●	●	●	●
Parallel Solving Over Network Option	●	●	●	●	●	
Parallel Solving Over Cloud Launched from Desktop	●					
GPU Support	●			●		
Parallel mesh generation	●					

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	CFD PREMIUM					
	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	CHEMKIN ENTERPRISE
PRE AND POST PROCESSING						
Photo Realistic Rendering	●	●	●	●	●	●
SpaceClaim Direct Modeler	●	●	●	●	●	●
Compare Multiple Runs, Datasets, Physics, Graphs in a Single Window	●	●	●	●	●	●
MULTIPHYSICS						
Advanced, Automated Data Exchange	●	●		●	●	
Accurate Data Interpolation Between Dissimilar Meshes	●	●			●	
Drag-n-Drop Multiphysics	●	●		●		
Direct Coupling Between Physics	●	●				
Collaborative Workflows	●	●				
Fully Managed Co-Simulation	●	●				
Flexible Solver Coupling Options	●	●			●	
FLUID-STRUCTURE INTERACTION						
Force Induced Motion/Deformation	■	■		●		
Fluid Thermal Deformation	■	■				
Intrinsic FSI	●					
ELECTRO-THERMAL INTERACTION						
Convection Cooled Electronics	●	●				
Conduction Cooled Electronics	●	●				
High Frequency Thermal Management	●	●				
Electromechanical Thermal Management	●	●				

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ FLUIDS

	CFD ENTERPRISE					CHEMKIN ENTERPRISE
	CFD PREMIUM					
	FLUENT	CFX	FORTE	POLYFLOW	FENSAP-ICE	
OTHER COUPLED INTERACTIONS						
Aero-Vibro Acoustics	●					
Acoustics-Structural	●	●				
Fluid Magnetohydrodynamics	●	●				
EASE OF USE AND PRODUCTIVITY						
Support ACT Simulation Apps	●					
Mosaic-Enabled Meshing Technology	●					
Task-Based Workflow - Watertight Geometries	●					
Task-Based Workflow - Fault Tolerant Geometries	●					
Directly Enter Expressions	●	●				
Parallel Solving with ANSYS Cloud Launched from Desktop	●					

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/ ELECTRONICS	Electronics Premium MAXWELL	Electronics Premium HFSS	Electronics Premium SIWAVE	Electronics Premium Q3D EXTRACTOR	Electronics Premium ICEPAK	Motor-CAD	Electronics Pro 2D	Electronics Enterprise	EMA3D Cable
LOW FREQUENCY ELECTROMAGNETICS									
Electrostatics	●						● (2D Only)	●	
AC Conduction	●						● (2D Only)	●	
DC Conduction	●						● (2D Only)	●	
Magnetostatics	●						● (2D Only)	●	
Adaptive Field Mesh	●						● (2D Only)	●	
AC Harmonic Magnetic	●						● (2D Only)	●	
Electric Transient	●						● (2D Only)	●	
MAGNETIC TRANSIENT									
Translational Motion	●						● (2D Only)	●	
Fully Automatic Symmetrical Mesh Generation	●						● (2D Only)	●	
Rotational Motion	●						● (2D Only)	●	
Non-Cylindrical Motion	●						● (2D Only)	●	
Advanced Embedded Circuit Coupling	●						●	●	
Circuit Coupling with Adaptive Time Stepping	●						●	●	
Direct and Iterative Matrix Solvers	●						●	●	
ADVANCED MAGNETIC MODELING									
Vector Hysteresis Modeling	●						●	●	
Hysteresis Modeling for Anisotropic Material	●						●	●	
Frequency Dependent Reduced Order Models	●						●	●	

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ADVANCED MAGNETIC MODELING (CONTINUED)									
Equivalent Model Extraction (Linear-Motion, Rotational-Motion, No- Motion)	●						●	●	
Functional Magnetization Direction	●						●	●	
Magnetization/De- Magnetization Modeling	●						●	●	
Manufacturing Dependent Core L Loss Models	●						●	●	
Noise – Vibration Modeling	■						■	■	
Temperature De- Magnetization Modeling	●						●	●	
Core Loss Computation	●						●	●	
Lamination Modeling	●						●	●	
Magnetostriction and Magnetoelastic Modeling	●						●	●	
Hardware in the Loop Modeling	●						●	●	
Integrated Motor Synthesis and Design Kit	●					●	●	●	
Integrated Planar Magnetics Synthesis and Design Kit	●						●	●	
Litz Wire Modeling	●						●	●	
CONCEPT DESIGN SOLUTION FOR ELECTRICAL MACHINE									
Template-Based Magnetic Topologies						●			
Template-Based Cooling Topologies						●			
Magnetic 2D FEA with Analytical Solution						●			
Thermal 2D FEA with Analytical Solution						●			

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CONCEPT DESIGN SOLUTION FOR ELECTRICAL MACHINE (CONTINUED)									
3D Thermal and Fluid Network						●			
Temperature Dependent Duty-Cycle Analysis						●			
Manufacturing Effects Due to Winding Impregnation and Housing Interfaces						●			
Linear Structural 2D FEA						●			
Electrothermal Reduced Order Model (FMU)						●			
HIGH FREQUENCY ELECTROMAGNETICS									
Fully Automated Adaptive Mesh Refinement		●						●	
Multi-Frequency Broadband Adaptive Meshing		●						●	
Frequency Domain Finite Element (FEM) Analysis		●						●	
Frequency Domain Integral Equation (MoM) Analysis		●						●	
Time Domain FEM Analysis		●						●	
FEM Eigenmode Analysis		●						●	
MoM Characteristic Mode Analysis		●						●	
Physical Optics (PO) Analysis		●						●	
Shooting and Bouncing Ray+ (SBR+) Analysis		●						●	
Physical Theory of Diffraction (PTD) Correction for SBR		●						●	
Uniform Theory of Diffraction (UTD) Correction for SBR		●						●	
Visual Ray Tracing for SBR+ Analysis		●						●	
SBR+ Creeping Wave Correction for RCS of Curved Obects		●						●	

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HIGH FREQUENCY ELECTROMAGNETICS (CONTINUED)									
Range Doppler Plots for Radar Scenario Analyses								●	
Accelerated Doppler Processing (ADP) for SBR+ Range Doppler Analyses								●	
Domain Decomposition Method (DDM) for Frequency Domain FEM Analysis		●						●	
Hybrid Finite Element/ Integral Equation Analysis		●						●	
UI Coupled Finite Element and/or IE with SBR+ Analysis		●						●	
Modal Wave Port Excitation		●						●	
Terminal Wave Port Excitations		●						●	
Lumped, Voltage and Current Excitations		●						●	
Circuit Port Excitations		●						●	
Parametric Antenna Excitations for SBR+		●						●	
Floquet Excitations		●						●	
Incident Wave Excitation		●						●	
Magnetic Ferrite Bias Excitation		●						●	
Perfect Electric and Magnetic Boundary		●						●	
Finite Conductivity Boundary		●						●	
Lumped RLC Boundary		●						●	
Symmetry Boundary		●						●	
Periodic Boundary		●						●	

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HIGH FREQUENCY ELECTROMAGNETICS (CONTINUED)									
Frequency Dependant Materials		●						●	
Spatial XYZ Material Properties Via Dataset		●						●	
Higher and Mixed Order Elements		●						●	
Curvilinear Element Mesh Correction		●						●	
S,Y,Z Matrix Results		●						●	
E, H, J, P Field Results		●						●	
Direct and Iterative Matrix Solvers		●						●	
Antenna Parameter Calculation		●						●	
Infinite and Finite Antenna Array Calculations		●						●	
Radar Cross Section Calculation		●						●	
FSS, EBG and Metamaterial Calculation		●						●	
Specific Absorption Rate Calculation		●						●	
EMI/EMC Calculation		●						●	
System Level EMI and RFI Analysis		●					●	●	
Linear Circuit Analysis with EM Dynamic link		●						●	
Integrated Antenna Synthesis and Design Kit		●						●	
5G SAR Standards Toolkit		●						●	
Power Density and CDF		●						●	
Radar Prep/Post Simulation Wizards		●						●	
3D Component Libraries with User Controled Parametrics		●						●	
3D Component with Encryption Creation		●						●	

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HIGH FREQUENCY ELECTROMAGNETICS (CONTINUED)									
3D Component with Encryption Utilization		●						●	
Mutlipaction Solver		●						●	
Accelerated Doppler Processing (ADP) for SBR+ Range-Doppler Analysis								●	
POWER AND SIGNAL INTEGRITY BOARD SIMULATION CAPABILITIES									
Electronics Desktop 3D Layout GUI		●	●		●			●	
ECAD Translation (Altium, Cadence, Mentor, Pulsonix, & Zuken)		●	●	●	●			●	
MCAD (.sat) Generation from ECAD		●	●					●	
Lead Frame Editor		●	●					●	
DC Voltage, Current and Power Analysis for PKG/PCB			●					●	
DC Joule Heating with Ansys Icepak			●	●	●			●	
Passive Excitation Plane Resonance Analysis			●					●	
Driven Excitation Plane Resonance Analysis			●					●	
Automated Decoupling Analysis			●					●	
Capacitor Loop Inductance Analysis			●					●	
AC SYZ Analysis - PI, SI, & EMI			●					●	
Dynamically Linked Electromagnetic Field Solvers			●					●	
Chip, Package, PCB Analysis (CPM)		●	●					●	
Near-Field EMI Analysis			●					●	
Far-Field EMI Analysis			●					●	
EMI/EMC Full Board Scan								●	

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POWER AND SIGNAL INTEGRITY BOARD SIMULATION CAPABILITIES (CONTINUED)									
Characteristic Impedance (Zo) L PKG/PCB Scan			●					●	
Full PCB/PKG Cross-Talk Scanning			●					●	
TDR Analysis		●	●	●			●	●	
Transient IBIS Circuit Analysis		●	●					●	
Signal Net Analyzer								●	
SerDes IBIS-AMI Circuit Analysis			●					●	
Macro-Modeling (Network Data Explorer)	●	●	●	●				●	
Steady State AC (LNA) Analysis			●					●	
Virtual Compliance - DDRx, GDDRx, & LPDDRx			●					●	
SPISIM Com and USB-C Compliance								●	
SPISIM IBIS AMI Generation								●	
Synopsys HSPICE Integration			●					●	
Cadence PSPICE Support			●					●	
Electromagnetically Circuit Driven Field Solvers		●	●					●	
RLCG PARASITIC EXTRACTION									
DCRL, ACRL & CG Solver				●			●	●	
IC Packaging RLCG IBIS Extraction for Signals & Power				●				●	
Touchpanel RLCG Unit Cell Extraction				●				●	
Adaptive Meshing for Accurate Extraction				●			●	●	
Bus Bar RLCG Extraction	●			●			●	●	
Power Inverter & Converter Component Extraction				●				●	
3D Component Library				●				●	

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RLCG PARASITIC EXTRACTION (CONTINUED)									
Reduced RLCG Matrix Operations				●				●	
SPICE Equivalent Modeling Export				●			●	●	
DCRL & ACRL Joule Heating Analysis with Icepak				●				●	
Macro-Modeling (Network Data Explorer)				●				●	
2D Cable Modeling Toolkit				●				●	
ELECTRONICS COOLING									
Multi-Mode Heat Transfer					●			●	
Steady-State and Transient					●			●	
CFD Analysis					●			●	
Turbulent Heat Transfer					●			●	
Multiple-Fluid Analysis					●			●	
Species Transport					●			●	
Solar Loading					●			●	
Reduced Order Flow and Thermal					●			●	
Joule Heating Analysis	■	■	■	■	●			●	
Thermo-Electric Cooler Modeling					●			●	
Thermostat Modeling					●			●	
Package Characterization					●			●	
Data Center Modeling					●			●	

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CABLE MODELING									
Finite Difference Time Domain Analysis									●
Multi-Conductor Transmission Line Analysis	●	●	●	●	●		●	●	●
Two-Way Coupling FDTD and Transmission Line Solver		▲						▲	●
Twisted Conductors									●
Seam Impedance									●
Cable Junctions									●
Braided Shield Support									●
Pin Voltage, Current Density, Plane Wave Excitations		●						●	●
Multi-Conductor and Multi-Shield Support									●
Uses SpaceClaim Design Modeler UI									●
Thin Surface and Thin Wire Algorithms									●
HPC FOR ELECTRONICS									
GPU Support	■	■							
HPC Accelerated Frequency Sweeps	●	●	●						
HPC Distributed Hybrid Solving		●							
HPC Enabled Domain Decomposition Method	●	●							
HPC Time Decomposition Method	●						●		
HPC Enabled Multi-port Excitation Acceleration		●							
HPC Acceleration for DCRL, ACRL and CG				●					
HPC Enabled Parallel Processing	●	●		●	●		●		

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SYSTEMS MODELING - ELECTRONICS PRODUCTS									
SYSTEM MODELING FOR POWER ELECTRONICS									
Circuit Simulation	●	●	●	●	●		●	●	
Block Diagram Simulation	●	●	●	●	●		●	●	
State Machine Simulation	●	●	●	●	●		●	●	
VHDL-AMS Simulation	●	●	●	●	●		●	●	
Integrated Graphical Modeling Environment	●	●	●	●	●		●	●	
Power Electronics Component Libraries	●	●	●	●	●		●	●	
Reduced Order Modeling	●	●	●	●	●		●	●	
Power Electronic Device and Module Characterization	●	●	●	●	●		●	●	
Co-Simulation with Low Frequency Electromagnetics	●						●	●	
Co-Simulation with MathWorks Simulink	●	●	●	●	●		●	●	
SYSTEM MODELING FOR RF/MICROWAVE									
Radio Frequency Interference (RFI) System Solver		●					●	●	
Electromagnetic Interference System Solver		●					●	●	
RF Link Budget Analysis		●					●	●	
RF Co-Site and Antenna Coexistence Analysis		●					●	●	
Automated Diagnostics for Rapid Root-Cause Analysis		●					●	●	
RF Component Library		●					●	●	
Wireless Propagation Models		●					●	●	
Multi-Fidelity Parametric Radio Models		●					●	●	

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SYSTEM MODELING FOR SI/PI									
SerDes Channel Modeling - IBIS-AMI, QuickEye and VerifEye		▲	●					●	
Multi-Drop & Parallel Bus Modeling - IBIS, HSPICE, Spectre, PSPICE, and Nexxim Transient		▲	●					●	
Network Data Exploration	●	●	●	●				●	
TDR analysis		●	●					●	
Steady State AC (LNA) Analysis		●	●					●	
Virtual Compliance - DDRx, GDDRx, & LPDDRx		●	●					●	
MULTIPHYSICS									
PLATFORM TECHNOLOGIES									
Advanced, Automated Data Exchange	●	●	●	●	●			●	
Drag-n-Drop Multiphysics	●	●	●	●	●			●	
Direct Coupling Between Physics	●	●	●	●	●			●	
Collaborative Workflows	●	●	●	●	●			●	
Fully Managed Co-Simulation	●	●	●	●	●			●	
Flexible Solver Coupling Options	●	●	●	●	●			●	

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ELECTRO-THERMAL INTERACTION									
Convection Cooled Electronics		●			●			●	
Conduction Cooled Electronics		●			●			●	
High Frequency Thermal Management		●		●	●			●	
Electromechanical Thermal Management	●			●	●			●	
MATERIALS DATABASE FOR ELECTRONICS									
GRANTA Materials Data for Simulation	■	■			■		■	■	
MISCELLANEOUS									
Integrated Windows HPC Support	●	●	●	●	●				
Integrated IBM Spectrum LSF Support	●	●	●	●	●				
Customizable 3rd Party Scheduler Support	●	●	●	●	●				
Support ACT Extensions	▲	▲	▲	▲	▲			▲	
Parallel Solving with Ansys Cloud Launched from Desktop	●	●	●	●	●				

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/ SYSTEMS & EMBEDDED SOFTWARE	TWIN BUILDER	MEDINI ANALYZE	MEDINI ANALYZE FOR CYBERSECURITY	SCADE ARCHITECT	SCADE SUITE	SCADE DISPLAY	SCADE VISION	VRXPERIENCE FOR AV/ADAS	VRXEPERIENCE HMI	VRXEPERIENCE PERCEIVED QUALITY	VRXEPERIENCE SOUND
SYSTEM SIMULATION, VALIDATION AND DIGITAL TWINS											
Integrated Graphical Modeling Environment	●										
Standard Modeling Languages and Exchange Formats	●										
Multi-domain Systems Modeler	●										
Extensive 0D Application-Specific Libraries	●										
3rd Party (1D) Tool Integrations	●										
3D ROM	●										
Embedded Software Integration	●										
Multi-Domain System Simulation	●										
Rapid HMI Prototyping	●										
System Optimization	●										
XIL Integration	●										
IIoT Connectivity	●										
Digital Twin Runtime Deployment	●										
FUNCTIONAL SAFETY ANALYSIS											
Safety Concept Modelling		●									
Model Based Safety Analysis		●									
Reliability Prediction and Analysis		●									
Traceability and Validation Teamwork		●									
Integration into Engineering Environment		●									

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FUNCTIONAL SAFETY ANALYSIS (CONTINUED)											
Customization and Process Adaption		●									
ANSYS Product Integration		●									
Reporting and Documentation		●									
Safety of Intended Functionality Analysis		●									
CYBERSECURITY ANALYSIS											
Analysis Context Establishment and Asset Identification			●								
Threat Identification			●								
Attack Trees and Attack Collections			●								
Threat Assessment and Treatment			●								
Requirement Analysis and Management			●								
Rich Traceability			●								
Teamwork and Integrated Task Management			●								
Reporting and Customization			●								
MODEL-BASED SYSTEMS ENGINEERING											
Model-Based System Design				▲	▲						
Functional Decomposition				▲	▲						
Architecture Decomposition				●	●						
Allocation Of Functions To Components				●	●						
Model Checks				●	●						
Model Diff/Merge				●	●						
System / Software Bi-Directional Sync				●	●						
Model Sharing And IP Protection				●	●						

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MODEL-BASED SYSTEMS ENGINEERING (CONTINUED)											
Model-Based Interface Control Document Production				●	●						
Configurable For Industry Standards (IMA, AUTOSAR, Etc.)				●	●						
Product Configuration for Automotive Developers				●	●						
EMBEDDED CONTROL SOFTWARE											
Data Flow and State Machine Design and Simulation Capabilities					●						
Extensive Set of Libraries Delivered as Design Examples					●						
Simulation Capabilities					●						
Record and Playback Scenarios					●						
Plant Model Co-Simulation Including FMI					●						
Coverage Analysis for Requirements Based Tests					●						
Formal Verification					●						
Timing and Stack Optimization					●						
Worst Case Execution Time Estimates on Target					●						
Verification of Stack Space Requirements					●						
Certified Code Generation for DO-178C, EN 50128, ISO 26262, IEC 61508					●						
Certification Kits for DO-178C, EN50128, ISO 26262, IEC 61508					●						

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/ SYSTEMS & EMBEDDED SOFTWARE	TWIN BUILDER	MEDINI ANALYZE	MEDINI ANALYZE FOR CYBERSECURITY	SCADE ARCHITECT	SCADE SUITE	SCADE DISPLAY	SCADE VISION	VRXPERIENCE FOR AV/ADAS	VRXEPERIENCE HMI	VRXEPERIENCE PERCEIVED QUALITY	VRXEPERIENCE SOUND
MAN-MADE INTERFACE SOFTWARE											
Model-Based Prototyping And Specification Of MMIs						●					
Support Of OpenGL, OpenGL SC and OpenGL ES						●					
Font Management						●					
Optimization Of Graphical Specifications						●					
Plant Model Co-Simulation Including FMI						●					
Automatic Generation of iOS and Android Projects						●					
Certified Code Generation For DO-178C, EN 50128, ISO 26262, IEC 61508						●					
Certification Kits for DO-178C, EN50128, ISO 26262, IEC 61508						●					
Solutions for ARINC 661						●					
Testing Capabilities						●					
AV PERCEPTION SOFTWARE TESTING											
Perception Software Robustness Testing							●				
Triggering Conditions Identification							●				
Automatic Safety Report Generation							●				
VRXPERIENCE											
HUMAN VISION											
Glare Simulation								●			

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/ SYSTEMS & EMBEDDED SOFTWARE	TWIN BUILDER	MEDINI ANALYZE	MEDINI ANALYZE FOR CYBERSECURITY	SCADE ARCHITECT	SCADE SUITE	SCADE DISPLAY	SCADE VISION	VRXPERIENCE FOR AV/ADAS	VRXEPERIENCE HMI	VRXEPERIENCE PERCEIVED QUALITY	VRXEPERIENCE SOUND
HEADLAMP SIMULATION											
Virtual Measurement								●			
Lamp Control								●	▲	▲	
IIHS Test								●			
SYSTEM SIMULATION											
Ground-Truth Sensor								●			
Camera Sensor								●	▲	▲	
LiDAR Sensor								●			
Radar Sensor								●			
Virtual Display Prototype									●		
Display software in the Loop (SCADE)									●		
HUD									●	●	
Advanced Lighting Component										●	
CONTEXT SIMULATION											
Basic Driving Scenario								●	▲	▲	
Advanced Driving Scenario								■	■		
Advanced Vehicle Dynamic								■	■		
Environement Creation								■	●	●	
Trigger & Animation									●	●	
MiL/SiL Connectivity								●	●		
HiL Connectivity								●			
Virtual Display & Actuators Interaction									●		

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/ SYSTEMS & EMBEDDED SOFTWARE	TWIN BUILDER	MEDINI ANALYZE	MEDINI ANALYZE FOR CYBERSECURITY	SCADE ARCHITECT	SCADE SUITE	SCADE DISPLAY	SCADE VISION	VRXPERIENCE FOR AV/ADAS	VRXEPERIENCE HMI	VRXEPERIENCE PERCEIVED QUALITY	VRXEPERIENCE SOUND
VRXPERIENCE (CONTINUED)											
RENDERING ENGINE											
Real-Time Physics-Based Lighting								●	●	●	
Advanced Raytraced Lighting									●	●	
Full Physics GPU Lighting										●	
VR											
HMD									●	●	
CAVE, Powerwall									●	●	
Finger Tracking									●		
SOLVER											
Tolerance Variation Engine										●	
ACOUSTICS & SOUND QUALITY											
Analyze, Listen & Modify											●
Psychoacoustics, Automatic Detection and Separation, Play 3D Sound											●
Engine Sound Design and Engine Sound Enhancement											●
Active Sound Design for Electric Vehicles											●
3D Sound for Listening Room and VR											●
Interactive Sound for Driving Simulator											●
Measure Sound Perception with Listening Test											●
Listen to Ansys Mechanical, Fluent, LSDyna and Motion Simulations											●
Generate, Filter and Mix Acoustic Measurements and CAE Simulations											●

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/ GEOMETRY	DESIGN MODELER	SPACECLAIM
Direct Modeling Technology		●
Feature Based Modeling Technology	●	
Open Data from All Major CAD Systems	●	●
Export Data to Neutral File Formats	●	●
Modify Imported Geometry	●	●
Defeaturing and Simplification Tools	●	●
Model Repair	●	●
Add Parameters for Design Exploration	●	●
Extract Mid-Surfaces/Shells and Beams	●	●
Extract Volumes & Create Inner Fluid Domains	●	●
Extract Outer Air Enclosures	●	●
Shared Topology for Conformal Meshing	●	●
Booleans and Slicing	●	●
Create Weld Bodies	●	●
Boundary Condition Mapping	●	●
Scripting	●	●
Sketching and Editing Tools	●	●
3D Comparison Tools		●
Repair and Edit Faceted Data		●
Icepak Integration	●	●
Reverse Engineering Faceted Data		●

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ DESIGN TOOLS	DISCOVERY
STRUCTURAL	
Static Structural Analysis	●
Modal Analysis	●
Pre-Stressed Modal Analysis	■
Point Masses	●
Nonlinear Contact & Joints	■
Pre-Tension Bolts	■
Large Deformation	■
Topology Optimization	●
FLUID	
Steady-state Flow	●
Transient Flow	●
Incompressible Flow	●
Compressible Flow	▲
THERMAL	
Steady-state Thermal	●
Transient Thermal	●
Conduction	●
Convection	●
ELECTROMAGNETICS	
DC Conduction	●
MULTIPHYSICS	
Thermal-Stress	●
Thermal-Electric	●
Thermal-Electric-Stress	●

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ DESIGN TOOLS	DISCOVERY
DESIGN & CONCEPT MODELING	
Concept Modeling or Detail Design	●
Part/Assembly Creation or Import	●
Large Assembly Import	●
Geometric Parameterization	●
3D PRINTING	
Import, Repair, Edit Faceted Data	●
Shelling and Infills	●
Thickness Detection	●
REVERSE ENGINEERING	
Autosurface of Scanned Data	●
Build Solid/Surfaces on Scanned Data	●
INTERFACES AND ADD-ONS	
Transfer to Mechanical	●
Transfer to Fluent	●
Algoryx Momentum	■
MATERIALS DATA FOR DESIGNERS AND SIMULATION	
Materials Data for Simulation	●

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ ADDITIVE SOLUTIONS	ADDITIVE PREP	ADDITIVE PRINT	ADDITIVE SUITE*	MECHANICAL ENTERPRISE
ADDITIVE PREP				
Define Build Envelope	●	■	●	
Multiple Parts	●	■	●	
Optimize Part Orientation Based Upon Distortion Tendency, Build Time, & Supports	●	■	●	
Support Region Detection and Manual Modification	●	●	●	
Create Multiple Support Types in One Region	●	●	●	
Control of Support Parameters	●	●	●	
Multiple Support Types	●	●	●	
Angled Supports	●	■	●	
Perforations, Tooth Patterns, Intrusion, Sizing and Distribution of Support Walls	●	■	●	
Automatic Support Generation	●	●	●	
Export of STL and SpaceClaim files	●	●	●	
Export of Additive Manufacturing Equipment (OEM) Build Files	●	●	●	
Cost Estimation	●	●	●	
Layer/Scan Vector Visualization	●	●	●	
TOPOLOGY AND LATICE OPTIMIZATION				
Structural Optimization				●
Modal Optimization				●
Thermal Loads				●
Inertial Loads				●

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ ADDITIVE SOLUTIONS	ADDITIVE PREP	ADDITIVE PRINT	ADDITIVE SUITE*	MECHANICAL ENTERPRISE
TOPOLOGY AND LATICE OPTIMIZATION (CONTINUED)				
Optimized Design Validation				●
Manufacturing Constraints				●
Stress Constraints				●
Symmetry				●
Lattice Optimization			●	■
Overhang / Additive Constraints			●	■
GEOMETRY AND STL FILE HANDLING				
SpaceClaim Direct Modeler		●	●	●
WORKBENCH ADDITIVE				
Nonlinear and Temperature Dependent Material Properties			●	
Thermo-Mechanical Coupled Strain Solution			●	
Native Mechanical Environment			●	
Stress-Based Automatically Generated Supports			●	
Part Distortion & Residual Stress (As-Built)			●	
Part Distortion & Residual Stress After Support Removal			●	
Blade Crash Detection			▲	
Identification of High Strain (Crack) Locations			●	
Layer by Layer Stress & Distortion Visualizations			●	
Option to Output Only the Last Layer of the Build or Every Nth Layer			●	

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ ADDITIVE SOLUTIONS	ADDITIVE PREP	ADDITIVE PRINT	ADDITIVE SUITE*	MECHANICAL ENTERPRISE
WORKBENCH ADDITIVE (CONTINUED)				
User-Defined Step Option as 1st or Last Sequence Step			●	
Layered Tetrahedral Meshing			●	
Post Build Heat Treatment			●	
Import of STL Supports			●	
Inherent Strain Isotropic and Anisotropic released			●	
Strain Scaling Factor for Thermal and Structural Analyses			●	
STL Files Can Be Exported from STL Supports			●	
Voxel Mesh Generation			●	
Wizard to transfer Results from Additive Print to Workbench Additive			●	
ADDITIVE PRINT				
Nonlinear and Temperature Dependent Material Properties		●	●	
Uniform Assumed Isotropic Strain		●	●	
Scan Pattern Based Anisotropic Strain		●	●	
Thermal Ratcheting Based Anisotropic Strain		●	●	
Desktop & Cloud Stand-Alone Environments		●	●	
Stress-Based Automatically Generated Supports		●	●	
Part Distortion & Residual Stress (As-Built)		●	●	
Part Distortion & Residual Stress After Support Removal		●	●	
Distortion Compensation		●	●	
Blade Crash Detection		●	●	
Identification of High Strain (Crack) Locations		●	●	

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/ ADDITIVE SOLUTIONS	ADDITIVE PREP	ADDITIVE PRINT	ADDITIVE SUITE*	MECHANICAL ENTERPRISE	GRANTA MI
ADDITIVE PRINT (CONTINUED)					
Input Strain Hardening Factor		●	●		
Import of STL Supports		●	●		
Subvoxel Material Density Assignment		●	●		
Layer by Layer Stress, Distortion & Blade Crash Visualizations		●	●		
Build File Readers for Multiple AM Machines		●	●		
Auto Queue Multiple Successive Simulations		●	●		
Additive Print to Workbench Additive Transfer for Post Processing		●	●		
ADDITIVE SCIENCE					
Meltpool Dimensions			●		
Detailed Thermal History			▲		
% Porosity			●		
Sensor Measurement Predictions			▲		
Ability for add User-Defined Materials			●		
Material Tuning Wizard			●		
Morphology Prediction			●		
Microstructure Prediction			▲		
GRANTA MI- ADDITIVE					
Traceability and Capture of Additive Manufacturing Data					●
AM Data Analytics					●
Integration with CAD CAE and PLM Systems					●

* Additive Suite requires a Mechanical Enterprise license

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ OPTICAL

	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN & ANALYSIS	SPEOS FAR INFRARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER (1)
	PrepPOST PACKAGE			ADD-ONS				
ANSYS PRODUCTS EMBEDED								
Ansys SpaceClaim Direct Modeler	●	●	●					
ANSYS SpaceClaim Catia V5 Interface	●	●	●					
ANSYS DesignXplorer	●	●	●					
ANSYS License Manager	●	●	●					
GENERAL SOLVER CAPABILITIES								
Monte-Carlo Forward Ray Tracing	●	●	●					
Monte-Carlo Backward Ray Tracing		●	●					
Deterministic Simulation	▲	●	●					
Spectral Propagation	●	●	●					
Polarisation propagation	●	●	●					
Dispersion	●	●	●					
Surface Diffusion	●	●	●					
Volumic Diffusion	●	●	●					
Ambiant Material	●	●	●					
SPEOS Live Preview (GPU Acceleration)		●(2)	●(2)					
Virtual BSDF			●(1)					
PHOTOMETRY / RADIOMETRY								
Intensity	●	●	●					
Illuminance	●	●	●					
3D Illuminance	●	●	●					

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ OPTICAL

	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN & ANALYSIS	SPEOS FAR INFRARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER (1)
	PrepPOST PACKAGE			ADD-ONS				
PHOTOMETRY / RADIOMETRY (CONTINUED)								
Luminance	▲	●	●					
3D Energy Density		●	●					
360° View - Observer		●	●					
360° View - Immersive		●	●					
HUMAN VISION								
Dynamic Adaptation			●					
Glare Simulation			●					
High Dynamic Range Screen support			●					
WAVELENGTH RANGE								
Visible (360nm - 830nm)	●	●	●					
UV (100nm-360 nm)		●	●					
Near IR (830nm - 2.5µm)		●	●					
Far Infra-Red (2.5µm -100µm)							●	
OPTICAL DESIGN								
Parabolic Surface	●(3)	● (3)	● (3)					
TIR Lens	● (3)	● (3)	● (3)					
Projection Lens	● (3)	● (3)	● (3)					
Optical Lens				●				
Optical Surface				●				
Light Guide				●				

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ OPTICAL	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN & ANALYSIS	SPEOS FAR INFRARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER (1)
	PrepPOST PACKAGE			ADD-ONS				
OPTICAL DESIGN (CONTINUED)								
Sharp Cut-Off Reflector				●				
Poly-Ellipsoidal Surface				●				
Micro Optical Stripes				●				
Freeform Lens				●(2)				
Honeycomb Lens				●				
OPTICAL SENSORS								
Field Of View					●			
Export Sensor Grid as Geometry					●			
Camera Sensor					●			
Camera Raw Signal Export					●			
SPEOS Lens System Importer (ZEMAX OpticStudio)					●			
LiDAR Sensor					●			
Camera Sensor Post Processing					●			
HEAD-UP DISPLAY								
HUD Optical Analysis						●		
HUD Optical Design						●		
HUD Visualisation						●		
HPC - SPEOS								
Default Number of Cores	4	4	4					
Parallel Solving on Local PC	●	●	●					

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ OPTICAL

	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN & ANALYSIS	SPEOS FAR INFRARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER (1)
	PrepPOST PACKAGE			ADD-ONS				
HPC - SPEOS (CONTINUED)								
Parallel Solving on Cluster	●	●	●					
ANSYS RSM Compatibility	●	●	●					
SIMULATION PREPARATION								
Source Group	●(1)	●(1)	●(1)					
Geometry Group	●(1)	●(1)	●(1)					
Local Meshing	●(1)	●(1)	●(1)					
3D Textures		●	●					
Polarisation Plate		●(1)	●(1)					
Fluorescent Converter		●	●					
Texture Mapping (Bump, Multi-Layer)		●	●					
Uniform Ambiant Source	●	●	●					
HDRI Source	●	●	●					
CIE Sky Source		●	●					
Natural Light Source		●	●					
Near Infrared Extended Ambient Source		●	●					
Thermic Source							●	
Earth Atmosphere Model							■	
POST PROCESSING								
Virtual Lighting Controller		●	●					
Photometric Numerical Certification	●	●	●					
Colorimetric Analysis	●	●	●					

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/ OPTICAL	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN & ANALYSIS	SPEOS FAR INFRARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER (1)
	PrepPOST PACKAGE			ADD-ONS				
POST PROCESSING (CONTINUED)								
Spectral Analysis		●	●					
Light Expert	●	●	●					
Layer by Source		●	●					
Layer by Face		●	●					
Layer by Sequence		●	●					
Stray Light Analysis		●	●					
Layer by Polarisation		●	●					
Visibility & Legibility			●					
Night Vision Goggle							●	
Script Automation	●	●	●					
OPTIMIZATION								
Parameters	●	●	●					
Design of Experiment	●	●	●					
Design Optimisation (1)								●
Design Optimisation through ANSYS DesignXplorer (2)	●	●	●					
Ansys optiSLang Interface(2)	■	■	■					

Notes:

(1) Not available for ANSYS SPEOS

(2) Only for ANSYS SPEOS

(3) Not available for SPEOS for CREO Parametric

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ OPTICAL	OMD PRO	OMD PREMIUM	OMD ENTERPRISE
OPTICAL MEASUREMENT DEVICE			
INCLUDED			
OMS2 Hardware	●		
OMS4 Gardware		●	●
Broadband Visible White Source Addon			●
Portable OMD Software	●		
Laboratory OMD Software		●	●
Labs Viewers	Included	Included	Included
MEASUREMENT CAPABILITY			
BRDF	●	●	●
BTDF		●	●
Reflective & Transmission spectrum (380-1000nm)		●	●
Roughness (Unpolished)		●	●
Volume Absorption		●	●
Volume Diffusion		●	●
Wavelength Range 380-725nm	RGB - Interpolate	Pectrum - Interpolate	Full Acquisition
Max Measurement Time	1min	4hours	32hours
Min Measurement Time	1min	5min	5min
Target Dynamic Range	10^6	10^8	10^8
Angular Optical Resolution (FWHM)	0.5°	0.1°	0.1° (or 0.5°)
Max Dimension	30cm	2.2m	2.2m

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ OPTICAL	OMD PRO	OMD PREMIUM	OMD ENTERPRISE
MEASUREMENT CAPABILITY (CONTINUED)			
White Led Light Sources	●		
Laser Light Source		●	●
USE CASES			
Light Modelling & Photometrical Simulations		●	●
Visual Ergonomics & Style Studies	●	●	●
POST PROCESSING			
Interpolation Enhancement	Automated	Tunable	Tunable
Effective Anisotropy Reconstruction from 2 Measures	●	●	●
Labs Viewer & Editor	Included	Included	Included
Theoretical Peak Reconstruction	●	●	●
BRDF Visualisation & Processing	●	●	●

/ MATERIALS	GRANTA MI ENTERPRISE	GRANTA MI PRO	GRANTA SELECTOR	GRANTA EDUPACK	PLATFORM (optiSLang, Minerva, Cloud)
MATERIALS DATA MANAGEMENT					
GRANTA MI Database - 'Gold Source' System to Store Corporate Materials Information	●	●			
Manage Specialist Materials Data Types	●	●			
Manage Meta-Data and Context for Materials	●				
Traceability for All Materials Data	●	●			
Access Control	●	▲			
Version Control	●				
Multiple Unit System Support	●	●	●	●	
Admin UI to Setup and Configure Database	●	●			
Template Data Structures for Key Materials Use Cases: Metals, Composites, AM, Restricted Substances	●				
Toolbox for Import, Export, Manipulation of Materials Data	●				
Web App for Fast Upload of Materials Data	●	●			
Browse Materials Data	●	●	●	●	
Edit and Update Materials Data	●	●	▲	▲	
Search and Query Materials Data	●	●	●	●	
Represent Property Data in Interactive Charts	●	▲	●	●	
Comparison Tables and Comparison Charts	●	▲	●	●	
Generate Reports on Selected Materials Records	●				

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ MATERIALS	GRANTA MI ENTERPRISE	GRANTA MI PRO	GRANTA SELECTOR	GRANTA EDUPACK	PLATFORM (optiSLang, Minerva, Cloud)
MATERIALS DATA MANAGEMENT (CONTINUED)					
Export Data to Excel and Third-Party Software	●	▲	●	●	
Personalize System Homepages and User Profiles	●				
Configure Web App UI for Specific User Groups	●				
MATERIALS DATA ANALYSIS					
Interactive Plotting of Data: Scatter, Contour, Error Bar, Surface, Plotyy, Semilogx, Semilogy, Loglog	●				
Curve Fitting	●				
Cross-Table Comparisons of Materials Data	●				
Scripting Toolkit for Python and MATLAB	●				
WORKFLOW MANAGEMENT					
Design and Develop Workflows	●				
Execute Workflows - Processes, Approvals, Notifications	●				
INTEGRATION WITH CAD, CAE, PLM					
ANSYS	●	●			
Abaqus	●				
ANSA	●				
HyperMesh	●				
Creo	●				
NX	●	●			
CATIA v5	●				

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/ MATERIALS	GRANTA MI ENTERPRISE	GRANTA MI PRO	GRANTA SELECTOR	GRANTA EDUPACK	PLATFORM (optiSLang, Minerva, Cloud)
INTEGRATION WITH CAD, CAE, PLM (CONTINUED)					
Windchill	●				
Teamcenter	●				
3DEXPERIENCE	●				
File Export	●	▲	●	●	
RESTRICTED SUBSTANCES					
Data structures to Support Restricted Substance Analytics: Store Specs, Materials, Legislations, Substances, Parts	●				
Report on Restricted Substance Risk for Materials and Process Portfolio	●				
Build and Edit Bills of Materials within a Web App	●				
At-a-Glance Restricted Substance Compliance for a BoM	▲				
Run Reports Across Multiple BoMs	▲				
Integrate Restricted Substance Reporting with PLM, CAD	▲				
MATERIALS SELECTION & RELATED TOOLS					
Reference Data for Materials Selection on PC/Laptop			●	●	
Interactive 'Ashby Charts' of Materials Property Space	▲	▲	●	●	
Systematic Materials Selection Methodology			▲	●	
Filter Materials Based on Property Profile	●	●	●	●	

/ MATERIALS	GRANTA MI ENTERPRISE	GRANTA MI PRO	GRANTA SELECTOR	GRANTA EDUPACK	PLATFORM (optiSLang, Minerva, Cloud)
MATERIALS SELECTION & RELATED TOOLS (CONTINUED)					
Filter Materials Based on Links to Other Materials / Processes / Objects	▲	▲	●	●	
Materials Substitution & Equivalency - 'Find Similar'			●		
Performance Index Finder			●	●	
Engineering Solver - Convert Engineering Requirements to Materials Properties			●		
Hybrid Synthesizer - Predict Properties of Hybrid Materials			●	●	
Part Cost Estimator			●	●	
Selection Reports & Export of Charts for Presentations			●	●	
Eco Audit for a Product or Conceptual Design			●	●	
Edit a GRANTA Selector Database			●		
DATA LIBRARY FOR INDUSTRY					
MaterialUniverse Generic Data for Selection	●		●		
MI Pro Simulation Data		●			
JAHM Curve Data for Simulation	●		●		
Metals Data Bundle	●		●		
Polymers Data Bundle	●		●		
Composites Data Bundle	●		●		
Medical Data Bundle	●				
Aero Data Bundle	●		●		
Additive Data Bundle	●		●		
ESDU MMDH Aero Alloys	●				
UL Yellow Cards	●				

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/ MATERIALS	GRANTA MI ENTERPRISE	GRANTA MI PRO	GRANTA SELECTOR	GRANTA EDUPACK	PLATFORM (optiSLang, Minerva, Cloud)
TEACHING RESOURCES					
GRANTA EduPack Level 1-3 Teaching Databases				●	
The Elements Teaching Database				●	
Materials Science & Engineering Teaching Database				●	
Sustainability Teaching Database				●	
Bioengineering Teaching Database				●	
Architecture Teaching Database				●	
Lecture Units				●	
Student Exercises				●	
Videos				●	
Micro-Projects				●	
White Papers				●	
Case Studies				●	
Active Learning Toolkits				●	
Data Booklets				●	
Sample Project Files				●	
Phase Diagram Tool				●	

● Full Support ▲ Limited Capability ■ Requires more than 1 product

/ PLATFORM	optiSLang	Minerva
Process Integration	●	
Simulation Workflows & Process Automation	●	
Design & Data Exploration	●	
Reduced-Order Modeling	●	
Design Optimization & Parameter Identification (Calibration)	●	
Robust Design & Reliability	●	
Simulation Process & Data Management		●
Hybrid Deployment and Simulations Apps		●
Interoperability		●
Multiphysics Process Integration & Robust Design		●
Integration with Ansys GRANTA MI Materials Data Management		●

● Full Support ▲ Limited Capability ■ Requires more than 1 product