Ansys

2022/R1

Engineering What's Ahead.

/ CAPABILITIES

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/ STRUCTURES

STRUCTURES	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA	SHERLOCK	MOTION	FORMING PRO
VIBRATIONS								
Modal	●	●	●		●	●	●	
Modal - Pre-Stressed	●	●	●		●		●	
Modal - Pre-Damped/UnSymmetric	●	●					●	
Transient - Mode-Superposition	●	●			●	●		
Harmonic - Mode-Superposition	●	●			●	●		
Harmonic - Full	●	●			▲			
Spectrum	●	●			●			
Random Vibration	●	●			●	●		
Mistuning	●	●						
Multi-Stage Cyclic Symmetry	●							
Rotordynamics	●	●			●			
ACOUSTICS								
Modal Acoustics	●	●			●		●	
Harmonic Acoustics	●				●			
Transient Acoustics	●				●			
Boundary Element Method Acoustics					●			
Spectral Element Method Acoustics					●			
Statistical Energy Analysis Acoustics					●			
Piezoelectric Acoustics	●							
Generation of Acoustic Signature from Contact Regions	●				●		●	
Acoustics Element Library	●	●			●		●	
Acoustics Material Models	●	●			●			

1 = Ansys nCode DesignLife Products
2 = Ansys Fluent
3 = Ansys DesignXplorer
4 = Ansys SpaceClaim
5 = Ansys Customization Suite (ACS)
6 = Ansys HPC, ANSYS HPC Pack or Ansys HPC Workgroup
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13 = Ansys CFD Pro - Ansys Fluent with a reduced set of capabilities
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SMP = Shared-memory parallel
MAPDL = Mechanical APDL
Explicit = Autodyn
RBD = Rigid Body Dynamics
Aqwa = Aqwa

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

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STRUCTURES	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA	SHERLOCK	MOTION	FORMING PRO
WAVE HYDRODYNAMICS								
Diffraction and Radiation	●							
Frequency & Time Domain Motions Analysis	●							
Moorings, Joints & Tethers	●							
Internal Tanks	●							
Load Transfer to Structural Analysis	●							
ADDITIONAL PHYSICS								
1-D Thermal-Flow	●	●	●		●			
1-D Coupled-Field Circuits	●							
1-D Electromechanical Transducer	●							
MEMS ROM	●							
Piezoelectric	●				●			
Piezoresistive	●							
Electromagnetic	●							
Electro-Migration	●					●		
Diffusion-Pore-Fluid	●							
Diffusion-Thermal-Electric-Magnetic	●							
1-Way Fluid Structure Interaction	■[2]	■[2]	■[2]					
2-Way Fluid-Structure Interaction	■[2]			●	●			
Incompressible Fluid Dynamics (ICFD)					●			
Arbitrary Lagrangian Eulerian Method (ALE)					●			
Electromagnetics (EM) - Boundary Element Method (BEM)					●			
Multi-scale Modeling	●				●			
Conservation Element/Solution Element (CESE)					●			

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COMPOSITE MATERIALS	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA	SHERLOCK	MOTION	FORMING PRO
Material Definitions	●	●		●	●	●	●	
Ply Definitions	●	▲		●	●		●	
Interface Layers	●				●			
Advanced Ply-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]				▲			
Sandwich Modeling	●				●			
Automation / Run Scripts	●				●			
Short Fiber Composites	●				●			

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DURABILITY								
Stress-Life (SN)	●	●	●		●		●	
Strain-Life (EN)	●	●	●		●		●	
Dang Van	■[1]	■[1]	■[1]		■[1]			
Safety Factor	●	●	●		●		●	
Adhesive Bond	■[1]	■[1]	■[1]		■[1]			
Crack Growth Linear Fracture Mechanics	■[1]	■[1]	■[1]		■[1]			
Seam Weld	■[1]	■[1]	■[1]		■[1]			
Spot Weld	■[1]	■[1]	■[1]		■[1]			
Thermo-Mechanical Fatigue	■[1]	■[1]	■[1]		■[1]	▲		
Vibration Fatigue	■[1]	■[1]	■[1]		■[1]	●	●	
Virtual Strain Gauge Correlation	■[1]	■[1]	■[1]		■[1]			
Python Scripting Customization	■[1]	■[1]	■[1]		■[1]			
EXPLICIT DYNAMICS								
FE (Lagrange) Solver	●			●	●			
Euler Solvers				●	●			
Implicit-Explicit Material States	●			●	●			
Mass Scaling	●			●	●			
Natural Fragmentation	●			●	●			
Erosion Based on Multiple Criteria	●			●	●			
De-Zoning				●	●			
Part Activation and Deactivation (Multi Stage Analysis)				●	●			
Explicit Time Integration	●			●	●			

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IMPLICIT DYNAMICS								
Implicit Time Integration	●	●			●	●	●	
GEOMETRIC IDEALIZATION								
Spring	●	●	▲	●	●		●	
Mass	●	●	●	●	●		●	
Damper	●	●		●	●		●	
Spar	●	●	●		●			
Beam	●	●	●	●	●		●	
Cable	●	●	●		●			
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 Elements	●	●						
Reinforcement Elements	●	●		●	●	■		
Coupled Field ROM Element Technology	●	●						
Iso-Geometric Analysis (IGA)					●			
GEOMETRY AND STL FILE HANDLING								
SpaceClaim Direct Modeler	●							

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HPC - STRUCTURES								
Default Number of Cores	4 cores (DMP or SMP) MAPDL, 4 for Explicit, 4 for RBD, 4 for AQWA	4 cores (DMP or SMP) MAPDL, 4 for RBD	4 cores (DMP or SMP)	4 cores	1 core	Default Number of cores based on machine being used	1 core	4 cores
Parallel Solving on Local PC and Cluster	●	●	●	●	●	●	●	▲
MAPDL GPU Offload Acceleration	■[6]	■[6]	■[6]					
Ansys Cloud Support	MAPDL - Yes Explicit - No RBD - No AQWA - No	MAPDL - Yes RBD - No	MAPDL - Yes		●			
Hybrid Parallel	●	●	●					
MATERIALS								
Basic Linear Materials (Linear, Anisotropic, Temperature Dependent)	●	●	●	●	●		●	
Basic Nonlinear Materials (Hyperelastic, Plasticity, Rate Independent, Isotropic, Concrete, Viscoelasticity)	●	●	▲	●	●		●	
Advanced Nonlinear Materials (Rate dependent, Anisotropic, Damage Models, Geomaterials, Multiphysics, Acoustics)	●			●	●			
Specialty Materials (Glass, Foam, Kevlar, Fabric, Biomechanic, Paper, Cardboard)					●		●	
Field Dependent	●	●		●				
Reactive Materials (Equations of State, High Explosives, Propellants)				●	●			
User Defined Materials	●			●	●		●	
Fracture Mechanics and Crack Growth	●				▲			
Materials Multiscale Homogenization	●				●			
Materials Database	■[7]	■[7]	■[7]	■[7]	■[7]		■[7]	

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MISCELLANEOUS AND USABILITY	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA	SHERLOCK	MOTION	FORMING PRO
Ansys SpaceClaim	●	■[4]	■[4]	■[4]	■[4]		■[4]	
Ansys Customization Suite (ACS)	●							
Support ACT Extensions	●	●	●	●	●			
Journaling and Scripting	●	●	●		●	▲		
Command Snippet Support	●	●	●					
Batch run capability	●	●	●	●	●	●	●	
Read/Write 3rd Party Matrix CAE Data	●	●		●	●		●	
CDB and 3rd party FE Model Import	●	●	●		●		●	
Nastran Bulk File Export	●	●	●			●		
Direct Input of Nastran Bulk Data Files					●			
Pre-stressing from Nastran Linear Solution					●			
Global/Selective Mass Scaling	●			●	●			
Keyword Input	●	●	●		●			
Splitting of Input File into Subfiles	●	●	●					
User Subroutines	●			●	●		●	
Re-mapping	●			●	●			
Transmitting boundaries	●			●	●			
Dynamic Storage Allocation	●	●	●		●			
Extensive Output Data Controls (ascii/binary)	●	●	●		●			
Sense Switch Controls - Monitor Simulations Status	▲	▲	▲		●			
Interactive Real-Time Graphics	●	●	●	●	●			
Double Precision	●	●	●	●	●			

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STRUCTURES	MECHANICAL ENTERPRISE	MECHANICAL PREMIUM	MECHANICAL PRO	AUTODYN	LS-DYNA	SHERLOCK	MOTION	FORMING PRO
MODELING CAPABILITIES								
Contact - Linear	●	●	●	●	●		●	
Contact - Nonlinear	●	●	●	●	●		●	
Joints	●	●	●	●	●		●	
Seam Welds	●	●	●	●	●		●	
Spot Welds	●	●	●	●	●		●	
Element Birth and Death	●	●			●		●	
Gasket Elements	●				●			
Rezoning and Adaptive Remeshing	●				●			
Inverse Analysis	●							
MULTI ANALYSIS								
Submodeling	●	●	●		●	▲		
Data Mapping	●	●	●		●		●	
Multiphysics Data Mapping	●	●	▲				●	
Initial State	●	●		●	●		●	
Advanced Multi-Stage 2-D to 3-D Analysis	●	●						
NONLINEAR MULTI-BODY DYNAMICS								
Rigid Body Mechanisms	●	●			●		●	
Rigid Body Dynamics with CMS Components for Flexible Bodies	●						●	
Full Transient	●	●		●	●		●	
CMS with Substructuring	●						●	
Mixed Rigid - Flexible Systems	●	●	●	●	●		●	
Function Expression					●		●	
Drivetrain Creation							●	
Links							●	
Vehicle Dynamics					●		●	

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OPTIMIZATION								
DesignXplorer included	●	●	●	■3	■3			
Parameters	●	●	●	●	●		●	
Design Point Studies	●	●	●	●	●			
Correlation Analysis	●	●	●	●				
Design of Experiments	●	●	●	●			●	
Sensitivity Analysis	●	●	●	●				
Goal Drive Optimization	●	●	●	●				
Six Sigma Analysis	●	●	●	●				
STRUCTURAL SOLVER CAPABILITIES								
Linear Static	●	●	●		●	●	●	
Nonlinear Static	●	●	●		●		●	
Pre-Stress Effect, Linear Perturbation	●	●	●	▲	▲		●	
Nonlinear Geometry	●	●	●	●	●		●	
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	●							
THERMAL								
Steady State Thermal	●	●	●		●			
Transient Thermal	●	●	●		●		●	
Conduction	●	●	●	●	●		●	
Convection	●	●	●		●			
Radiation to Space	●	●	●		●			
Radiation - Surface to Surface	●	●	●		●			
Phase Change	●	●	●	●	●			
Thermal Analysis of Layered Shells and Solids	●	●	●		●			

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TOPOLOGY AND LATTICE OPTIMIZATION								
Structural Optimization	●	●	●					
Modal Optimization	●	●	●					
Thermal Loads	●	●	●					
Inertial Loads	●	●	●					
Optimized Design Validation	●	●	●					
Manufacturing Constraints	●	●	●					
Stress Constraints	●	●	●					
Symmetry	●	●	●					
Lattice Optimization	■[8]							
Overhang/Additive Constraints	■[8]							
PARTICLE METHODS								
Smooth Particle Hydrodynamics (SPH)				●	●			
Smooth Particle Galerkin (SPG)					●			
Corpuscular Particle Method (CPM)					●			
Discrete Element Method (DEM)					●			
AUTOMOTIVE								
Seat-belts - including modeling of accelerometer, pretensioner, retractor, sensor, and slip ring					●			
Inflator Models					●			
Airbag Fabric Constitutive Models					●			
Accelerometers					●			
Airbag Sensors					●			
Airbag Breakout					●			
Eulerian Deployment of Airbags					●			
Airbag Folder					●			
Unfolded Reference Geometry for Airbags					●			

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AUTOMOTIVE								
Dummy Positioner					●			
Side-Impact Dummy Special Damper					●			
Airbag Deployment					●			
METAL STAMPING								
Multi-Stage Forming Process Validation								●
Material Data Library and Management								●
Process Definition								●
Tool Setup and Preview								●
Drawbead Definition								●
Multiple Lancing Operation								●
Stamping Specific Post Processing (FLD, Formability Index, Wrinkling, Skidmark)								●

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/ ACOUSTICS SIMULATION

ACOUSTICS & SOUND QUALITY	ANSYS SOUND ENTERPRISE	ANSYS SOUND PREMIUM	ANSYS SOUND PRO
Listen and Modify Sound (SAS)	●	●	●
Perform Acoustic Analysis and Psychoacoustic Criteria Calculations (SAS)	●	●	●
Automatic Sound Component Detection and Separation (SAS)	●	●	●
Connect and Listen to Ansys Mechanical, LS-DYNA, Fluent and Motion CAE Simulations (SAS)	●	●	●
3D Sound for Listening Room and VR (VR Sound)	●	●	
Interactive Sound for Driving Simulator (Car Sound Simulator)	●	●	
Measure Sound Perception with Listening Test (Jury Listening Test)	●	●	
Engine Sound Design and Engine Sound Enhancement for ICE Vehicle (ASD)	●		
Active Sound Design for Electric Vehicles (ASD for EV)	●		
Combine Test and Simulation Data to Assess Sound Quality	●	●	●

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/ ADDITIVE MANUFACTURING

ADDITIVE MANUFACTURING	ADDITIVE PRINT	ADDITIVE SUITE
ADDITIVE PREP		
Define Build Envelope	■	■
Multiple Parts	■	■
Optimize Part Orientation Based upon Distortion Tendency, Build Time and Supports	■	■
Support Region Detection and Manual Modification	■	■
Created 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	■	■
WORKBENCH ADDITIVE		
Nonlinear and Temperature Dependent Material Properties		●
Thermo-Mechanical Coupled Strain Solution		●
Native Mechanical Environment		●
Part Distortion and Residual Stress after Baseplate Cut-Off and/or Support Removal		●
Directional Part and Support Removal		●
Recoater Interference Detection		●
Identification of High Strain (Crack) Locations		●
Layer by Layer Stress and Distortion Visualizations		●
Option to Output Only the Last Layer of the Build or Every Nth Layer		●
Distortion Compensation		■

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/ ADDITIVE MANUFACTURING

	ADDITIVE PRINT	ADDITIVE SUITE
WORKBENCH ADDITIVE		
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		●
Wizards to Transfer Results from Additive Print to Workbench Additive		●
Calibration setup in AM Wizard		●
AM Bond Implementation		●
Layer End Temperature Output		●
Process Simulation for Directed Energy Deposition		●
Direct Energy Deposition - Wizard		●
Direct Energy Deposition - G-Code Clustering		●
Direct Energy Deposition - Manual Clustering		●
Distortion Compensation		■
ADDITIVE PRINT		
Nonlinear and Temperature Dependent Material Properties	●	●
Uniform Assumed Isotropic Strain	●	●
Scan Pattern Based Anisotropic Strain	●	●
Thermal Ratcheting Based Anisotropic Strain	●	●
Stress-Based Automatically Generated Supports	●	●
Part Distortion and Residual Stress (as-built)	●	●
Directional Part and Support Removal	●	●

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/ ADDITIVE MANUFACTURING

ADDITIVE MANUFACTURING	ADDITIVE PRINT	ADDITIVE SUITE
ADDITIVE PRINT		
Part Distortion and Residual Stress after Baseplate Cut-Off and/or Support Removal	●	●
Distortion Compensation	●	●
Recoater Interference Detection	●	●
Identification of High Strain (Crack) Locations	●	●
Input Strain Hardening Factor	●	●
Import of STL Supports	●	●
Subvoxel Material Density Assignment	●	●
Layer by Layer Stress, Distortion and 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		▲
% Lack of Fusion Porosity		●
Sensor Measurement Predictions		▲
Ability for Add User-Defined Materials		●
Material Tuning Wizard		▲
Microstructure Prediction		●
Parallel Solving of 2D Microstructure		●

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MATERIALS DATA MANAGEMENT	GRANTA MI ENTERPRISE	GRANTA MI PRO	GRANTA SELECTOR	GRANTA EDUPACK	MATERIALS DATA FOR SIMULATION
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	●	●			
Favorites List: Personal, Public	●	●	▲	▲	
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, Additive Manufacturing	●				
Template for Simulation		●			
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	●				
Export Data to Excel and Third Party Software	●	▲	●	●	
Personalize System Homepages and User Profiles	●				
Configure Web App UI for Specific User Groups	●				
Private Cloud with Azure	●	●			
Single Sign On	●	●			

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MATERIALS DATA ANALYSIS					
Interactive Plotting of Data: Scatter, Contour, Error Bar, Surface, Plotyy, Semilogx, Semilogy, Loglog	●				
Custom Curve Fitting	●				
Cross-Table Comparisons of Materials Data	●				
Scripting Toolkit for Python	●				
DATA FLOW MANAGEMENT					
Design and develop material data flow	●				
Execute material data flows - Processes, Approvals, Notifications	●				
INTEGRATION WITH CAD, CAE, PLM					
Ansys Workbench	●	●	▲	▲	■
Ansys Discovery	●	●	▲	▲	■
Ansys Minerva	●				
Abaqus	●	●			
ANSA	●				
HyperMesh	●	●			
Creo	●	●			
NX	●	●			
Windchill	●				
Teamcenter	●				
Material Card Connect - Automated File Export	●	▲			
File Export (CATIA v5, SOLIDWORKS, and others)	●	▲	▲	▲	
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 Complaince for a BoM	▲				
Run Reports Across Multiple BoMs	▲				
Integrate Restricted Substance Reporting with PLM, CAD	▲				

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MATERIALS SELECTION & RELATED TOOLS	GRANTA MI ENTERPRISE	GRANTA MI PRO	GRANTA SELECTOR	GRANTA EDUPACK	MATERIALS DATA FOR SIMULATION
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	●	●	●	●	
Flitter Materials Based on Links to Other Materials / Processes / Objects	▲		●	●	
Materials Substitution and Equivalency - 'Find Similar'			●	●	
Performance Index Finder			●	●	
Engineering Solver - Convert Engineering Requirements to Materials Properties			●	●	
Synthesizer - Predict Properties of Hybrid Materials			●	●	
Part Cost Estimator			●	●	
Selection Reports and Export of Charts for Presentations			●	●	
Eco Audit for a Product or Conceptual Design			●	●	
Early stage batter pack design, configuration and performance evaluation - incl. battery cells database			●	●	
DATA LIBRARY FOR INDUSTRY					
Core MaterialUniverse™ Data	●	▲	●		▲
Core JAHM Curve Data	●		●		
Advanced Metals Data	■		■		
Advanced Polymers Data	■		■		
Advanced Composites Data	■		■		
Advanced Medical Data	■		■		
Advanced Aero Data	■		■		
Advanced ESDU Aero Alloys	■		■		
Advanced Additive Manufacturing Data	■		■		
Advanced Eco Design	■		■		
Advanced Electromagnetic Data					●

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	GRANTA MI ENTERPRISE	GRANTA MI PRO	GRANTA SELECTOR	GRANTA EDUPACK	MATERIALS DATA FOR SIMULATION
TEACHING RESOURCES					
Granta EduPack Level 1-3 Teaching Databases				●	
The Elements Teaching Database				●	
Materials Science and 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				●	
Medical Devices Teaching Database				●	
Design Teaching Database				●	
GRANTA MI - ADDITIVE					
Traceability and Capture of Additive Manufacturing Data	●				
AM Data Analytics	●				
Integration with CAD CAE and PLM Systems	●				

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/ FLUIDS

	FLUENT*13	FLUENT	CFX	CHEMKIN-PRO	FORTE	POLYFLOW	FENSAP-ICE
GENERAL SOLVER CAPABILITIES							
Comprehensive Inlet and Outlet Conditions	●	●	●	●	●	●	●
Steady-State Flow	●	●	●	●	●	●	●
Transient Flow		●	●	●	●	●	●
2-D and 3-D Flow	●	●	▲	▲	▲	●	●
Time Dependent Boundary Conditions		●	●	●	●	●	●
Customizable Materials Library	●	●	●	●	●	●	●
Granta Materials Data for Simulation	■[7]	■[7]					
Fan Model	●	●	●				●
Periodic Domains		●	●	●	●	●	●
Flow-Drive Solid Motion (6DOF)		●	●		▲		●
Presuure-Based Coupled Solver	●	●	●			●	●
Density-Based Coupled Solver		●					
Dymanic/Moving-Deforming Mesh		●	●		●	●	●
Oveset Mesh		●					
Immersed-Soild/MST Method for Moving Parts			●			●	●
Automatic On-the-fly Mesh Generation with Dynamic Refinement					●		
Dynamic Solution-Adaptive Mesh Refinement		●	▲	▲	●		▲
Polyhedral Unstructured Solution-Adpative Mesh Refinement		●					
SINGLE PHASE, NON-REACTING FLOWS							
Incompressible Flow	●	●	●	●		●	
Compressible Flow	●	●	●	●	●		●
Porous Media	●	●	●	▲		●	▲
Non-Newtoniam Viscosity	●	●	●			●	
Turbulence -Isotropic	●	●	●		●	●	●
Turbulence - Anisotropic (RSM)		●	●				

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/ FLUIDS

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SINGLE PHASE, NON-REACTING FLOWS							
Turbulence - Unsteady (LES/SAS/DES)		●	●				●
Turbulence - Laminar/Turbulent Transition		●	●	●			●
Flow Pathlines (Massless)	●	●	●			●	
Acoustics (Source Expert)		●	●				●
Acoustics (Noise Prediction)		●	▲				
HEAT TRANSFER							
Natural Convection	●	●	●	●	●		●
Conduction & Conjugate Heat Transfer	●	●	●	●			●
Shell Conduction (inlcuding Multi-Layer Model)		●					
Internal Radiation - Participating Media		●	●	●		●	●
Internal Radiation - Transparent Media		●	●	●	●		
External Radiation		●	●				
Solare Radiation & Load		●	●				
Simplified Heat Exchange Model		●					
Non- Equilibrium Thermal Model		●	●				
Porous Media	●	●	●				
PARTICLES FLOWS (MULTIPHASE)							
Coupled Discrete Phase Modeling including Thin Wall Films		●	▲	▲	●		●
Macroscopic Particle Model		●					
Inert Particle Tracking (with Mass)		●	●				
Liquid Droplet (including Evaporation)		●	●	▲	●		●
Combusting Particles		●	●	●	●		●
Multicomponent Droplets		●	●	▲	●		●
Discrete Element Model (DEM)		●					
Break-Up and Coalescence		●	●	▲	●		●
Erosion		●	●				

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FLUIDS	FLUENT*13	FLUENT	CFX	CHEMKIN-PRO	FORTE	POLYFLOW	FENSAP-ICE
FREE SURFACE FLOWS (MULTIPHASE)							
Implicit VOF		●				●	
Explicit VOF		●	●			●	
Coupled Level Set/VOF							●
Complex Multiphase Regime Transitions (AIAD and GENTOP Model)		●					
VOF to DPM Spray Model		●					
DPM to VOF Model		●					
Open Channel Flow and Wave		●	●				
Surface Tension		●	●		●		●
Phase Change		●	●		●		●
Cavitation		●	●		●		●
Cavitation Where Mulitple 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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FLUIDS	FLUENT*13	FLUENT	CFX	CHEMKIN-PRO	FORTE	POLYFLOW	FENSAP-ICE
REACTING FLOWS							
Species Transport		●	●	●	●	●	
Non-Premixed Combustion		●	●	●	●		
Premixed Combustion		●	●	●	●		
Partially Premixed Combustion		●	●	●	●		
Composition PDF Transport		●	●				
Finite Rate Chemistry		●	●	●	●	●	
Pollutants and Soot Modelig		●	●	●	●		
Sparse Chemistry Solver with Dynamic Cell Clustering and Dynamic Adaptive Chemistry		●		●	●		
Ability to Use Model Fuel Library Mechansisms		●		●	●		
Flame-speed from Fuel-Component Library		●		●	●		
DPIK Spark-Ignition Model				●	●		
Flame-Propogation 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		●		●			
Flamespeed and Ignition Table Generation				●			
Reaction Sensitivity, Uncertainty and Path Analysis				●			
Surrogate Blend Formulation and Optimization				●			
Mechanism Reduction				●			
Detailed Electrochemistry Model for Li-ion Batteries		●		●			

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FLUIDS	FLUENT*13	FLUENT	CFX	CHEMKIN-PRO	FORTE	POLYFLOW	FENSAP-ICE
TURBOMACHINERY							
MRF/Frozen-Rotor	●	●	●				
Sliding-Mesh/Stage		●	●				
Transient Blade Row			●				
Pitch Change		●	●				
Time Transformation			●				
Fourier Transformation			●				
Harmonic Analysis			●				
Blade Flutter Analysis			●				
Performance Maps			●				
IN-FLIGHT ICING							
Simulation of Standard Droplets, SLD and Ice Crystals		●					●
Inclusion of Vapor/Humidity Effects on Icing		●					●
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 Accredtion and Aerodynamic Performance Degradation		●					●
Single and Multi-Shot Icing Simulations with Automatic Re-Meshing for Prediction of Ice Accredtion and Aerodynamic Performance Degradation							●
Conjugate Heat Transfer (CHT) for Anti and De-Icing Simulations			■				▲
Ice Cracking							●
Ice Shedding							●
OPTIMIZATION							
Parameters		●	●	●	■	●	
Design Point Studies		●	●	●	■	●	
Correlation Analysis		●	●			●	
Design of Experiments		●	●	■	■	●	

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OPTIMIZATION							
Sensitivity Analysis		●	●	●		●	
Goal Drive Optimization		●	●			●	
Six Sigma Analysis		●	●			●	
Adjoint Solver for Shape Optimization		●					
Adjoint Solver Supports Rotating Reference Frames and Conjugate Heat Transfer		●					
Mulit-Objective Constrained Optimization		●					
Mesh Morphing (RBF Morph)		■					
HIGH RHEOLOGY MATERIAL							
Viscoelasticity						●	
Specialty Extrusion Models						●	
Specialty Blow Molding Models						●	
Speciality 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		●					
PRE AND POST PROCESSING							
Compare Multiple Runs, Datasets, Physics, Graphs in a Single Window		●	●	●	●	●	●
Simulation Reports	●	●	●				
Advanced, Automated Data Exchange		●	●			●	●
Accurate Data Interpolation between Dissimilar Meshes		●	●				●

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/ FLUIDS

FLUIDS	FLUENT*13	FLUENT	CFX	CHEMKIN-PRO	FORTE	POLYFLOW	FENSAP-ICE
MULTIPHYSICS							
Drag-n-Drop Multiphysics		●	●			●	
Direct Coupling between Physics		●	●	●			
Collaborative Workflows		●	●				
Fully Managed Co-Simulation		●	●				
Flexiable Solver Coupling Options		●	●				●
Functional Mock Up Unit (FMU) Coupling		●	●				
Force Induced Motion/Deformation		■	■				
Fluid Thermal Deformation		■	■			●	
FLUID-STRUCTURE INTERACTION							
Intrinsic FSI		●			●		
Thermo-elasticity		●					
Convection Cooled Electronics		●	●				
Conduction Cooled Electronics		●	●				
ELECTRO-THERMAL INTERACTION							
High Frequency Thermal Management		●	●				
Electromechanical Thermal Management		●	●				
Aero-Vibro Acoustics		●					
Acoustic-Structural		●	●				
OTHER COUPLED INTERACTIONS							
Fluid Magnetohydrodynamics		●	●				
Support ACT Simulation Apps		●					
Mosaic-Enabled Meshing Technology	●	●					
EASE OF USE AND PRODUCTIVITY							
Task-Based Workflow - Watertight Geometries	●	●					
Task-Based Workflow - Fault Tolerant Geometries		●					
Directly Enter Expressions	●	●	●				
Parallel Solving with Ansys Cloud Launched from Desktop		●					
Parallel Solving with Ansys Cloud Launched from VDI	●	●	●			●	

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/ AUTONOMOUS VEHICLE SIMULATION

AUTONOMOUS VEHICLE SIMULATION	AVxcelerate for Headlamp	AVxcelerate for Sensors
HUMAN VISION		
Glare Simulation	●	
HEADLAMP SIMULATION		
Advanced Lighting System	●	●
Lamp Control	●	●
Virtual Measurement	●	
Glaring Simulation	●	
IIHS / C-IASI Regulation Validation	●	
SENSORS SIMULATION		
Ground-Truth Sensor	▲	▲
Optical Camera Sensor		●
LiDAR Sensor		●
Radar Sensor		●
Multi Sensors		●
ENVIRONMENT SIMULATION		
Basic Driving Scenario	●	■
Advanced Driving Scenario	■	■
Advanced Vehicle Dynamic	■	■
MiL/SiL Connectivity	●	●
HiL Connectivity		●
PREPARATION		
Environment Preparation		●
Headlamp Preparation	●	
Sensor Models Preparation		●
Libraries of Assets	●	●

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/ DIGITAL TWIN

	TWIN BUILDER
SYSTEM SIMULATION, VALIDATION AND DIGITAL TWINS	
Integrated Graphical Modeling Environment	●
Standard Modeling Languages and Exchange Formats	●
Mulit-domain Systems Modeler	●
Extensive 0D Application-Specific Libraries	●
3rd Party Tool Integrations	●
3D ROM	●
Embedded Software Integration	●
Mulit-Domain System Simulation	●
Rapid HMI Prorotyping	●
System Optimization	●
XIL Integration	●
IIOT Connectivity (Microsoft® Azure® IoT, Microsoft Azure Digital Twins , PTC ThingWorx®, SAP Predictive Asset Insights, Rockwell Automation Emulate 3D and Rockwell Studio 5000)	●
Digital Twin Runtime Deployment	●
Hybrid Analytics	●

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/ EMBEDDED SOFTWARE

EMBEDDED SOFTWARE	SCADE Architect	SCADE Suite	SCADE Display	SCADE Test	SCADE Lifecycle	SCADE for A661 Applications	SCADE Vision
MODEL-BASED SYSTEMS ENGINEERING							
Systems Requirements Analysis	▲	▲					
System & Software Architecture Design	●	●					
SysML Models Import	●	●					
Collaborative Work through Libraries and Model Synchronizations	●	●					
Model Checks	●	●					
Model Diff/Merge	●	●					
System/Software Bi-Directional Sync	●	●					
Model Sharing and IP Protection	●	●					
Model-Based Interface Control Document Production	●	●					
Configurable for Industry Standards (IMA, AUTOSAR, etc.)	●	●					
Product Configuration for Automotive Developers	●	●					
EMBEDDED CONTROL & HMI SOFTWARE							
Traceability with Requirement Management Tools	●	●	●	●	●	●	
Automatic Document Generation	●	●	●	●	●	●	
Data Flow and State Machine Design and Simulation Capabilities		●				●	
Extensive Set of Libraries		●	●	●		●	
Record and Playback Scenarios		●	●	●			
Plant Model co-Simulation including FMI		●	●	●		●	
On Host and on Target Testing		●	●	●			
Model and Code Structural Coverage		●	●	●		●	
AUTOSAR-Compliant Code Generation		●					
Formal Verification		●					
Timing and Stack Optimization		●					
Worst Case Execution Time Estimates on Target		●					
Integration with Real-Time Operating Systems		●					

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/Ansys

/ EMBEDDED SOFTWARE

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EMBEDDED CONTROL & HMI SOFTWARE							
Certified Code Generation for DO-178C, EN 50128, ISO26262, IEC 61508		●	●				
Certification Kits for DO-178C, EN50128, ISO 26262, IEC 61508		●	●	●	●	●	
Model-Based Prototyping and Specification of HMIs			●			●	
Support of OpenGL, OpenGL SC and OpenGL ES			●			●	
Font Management			●			●	
Optimization of Graphical Specifications			●				
Solutions for ARINC 661		●	●			●	
PERCEPTION SOFTWARE TESTING							
Preception Software Robustness Testing							●
Triggering Conditions Identification							●

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/ CONNECT

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LICENSING AND INSTALLATION							
Upgrade to Aras SP14		●					
Elastic Licensing	●						
DATA MANAGEMENT							
Data and Project Comparison		●					
Enhanced Branching		●					
Custom Digital Thread Configurability		●					
Automatic file conversion		●					
New folder widget, saved search for details list		●					
Added file support for metadata extraction		●					
Query Builder		●					
Metadata Extraction		●					
3D Viewer with Rich Exploration Options		●					
PROCESS MANAGEMENT							
Work Request History Report		●					
New Voting Dialog		●					
Enhanced Gantt Chart		●					
Change Notice Comparison		●					
Task Completion		●					
Simulation Task Review		●					
APPLICATION MANAGEMENT							
New Applications Page Layout		●					
Publish and Deploy Apps (optiSLang supported out-of-the-box)		●					
Ansys LS-Dyna Batch Job Template		●					
Job Submission to Ansys HPC Cluster or Ansys Cloud		●					
Access Local Applications		●					
Run Apps without Input Files		●					

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Ansys

CONNECT	Ansys Cloud	Minerva	optiSLang Premium	optiSLang Enterprise	ModelCenter Pro	ModelCenter Premium	ModelCenter Enterprise
INTEGRATIONS							
Ansys Electronics Desktop Add-In		●					
Integration with Ansys Workbench			●	●			
Integration with Ansys Materials Product Family		●					
Two-Way Integration with ModelCenter			●	●			
WORKFLOW MANAGEMENT							
Completely Secure Workflows	●						
Enhanced File Management	●						
TOOL INTEROPERABILITY							
Ability to submit HPC jobs from desktop apps to Ansys Cloud	●						
Supported running Ansys Cloud In browser interactively	●						
Support of HPC Solver Licenses	●		●	●			
Improved submission in AEDT	●						
ORCHESTRATION AND AUTOMATION							
Build and Automate Workflows			●	●			
Integrate 3rd Party Tools			●	●			
App Generation Wizard				●			
Test-Run and Desktop App			●	●			
PRODUCT IMPROVEMENT							
Scalar Meta-Modeling (including test data)			●	●			
Signal/Field Meta-Modeling (including sensor & 3D scan data)				●			
Modeling of Imperfect Surfaces for UQ				●			
AI for Metamodeling (including algorithms from Probaligence)				●			
Optimization & Sensitivity Analysis			●	●			
Model Calibration			●	●			
Concurrent Design Point Variations			●	●			
Linux Support for DesignXplorer Algorithms			●	●			

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PRODUCT ROBUSTNESS							
Robust Design & Reliability Analysis			●	●			
Reliability Importance			●	●			
Poisson Distribution for Stochastic Parameters			●	●			
DASHBOARDS AND REPORTS							
Dashboard 2.0		●					
Custom Widget Framework		●					
AUTOMATE ANY MODELING AND SIMULATION TOOL							
Automate File I/O tools					●	●	●
Scripting with VBScript, JScript, Java, Perl, and Python					●	●	●
Integration with 3rd Party Tools					●	●	●
AUTHOR ENGINEERING WORKFLOWS							
Sequence					●	●	●
Loop					●	●	●
If-Then Branch					●	●	●
Parallel Branch					●	●	●
Link Editor					●	●	●
AUTOMATICALLY EXECUTE THE WORKFLOW							
Single Execution					●	●	●
Multi-Run Trade Studies					●	●	●
Run in Parallel					●	●	●
SHARE AUTOMATED ANALYSES AND WORKFLOWS							
Remote Execution					●	●	●
Protect Intellectual Property					●	●	●
GAIN INSIGHT TO THE DESIGN PROBLEM							
Trade Study: Parametric Study						●	●
Trade Study: Design of Experiments (DOE)						●	●
Trade Study: Adaptive Design of Experiments						●	●
Sensitivity Analysis						●	●

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| Ansys

/ CONNECT

	Ansys Cloud	Minerva	optiSLang Premium	optiSLang Enterprise	ModelCenter Pro	ModelCenter Premium	ModelCenter Enterprise
VISUALIZE THE DESIGN SPACE							
2D Bar Plot						●	●
2D Line Plot						●	●
2D Scatter Plot						●	●
3D Scatter Plot						●	●
Carpet Plot						●	●
Contour Plot						●	●
Histogram Plot						●	●
Interaction Effects Plot						●	●
Main Effects Plot						●	●
Main Effects Summary Plot						●	●
Parallel Coordinates						●	●
Prediction Profiler Contour Plot						●	●
Prediction Profiler XY Plot						●	●
Scatter Matrix						●	●
Variable Importance Plot						●	●
Variable Importance Summary Plot						●	●
PROBABILISTIC ANALYSIS							
Monte Carlo Analysis						●	●
SURROGATE MODELING (COMMON)							
Polynomial						●	●
SURROGATE MODELING (NORTH AMERICA ONLY)							
Noesis Kriging						●	●
Noesis Lightweight Neural Net						●	●
Noesis Deep Neural Net						●	●
Noesis AIC RSM						●	●
Noesis Best Model						●	●
Noesis Ensemble						●	●

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SURROGATE MODELING (NORTH AMERICA ONLY)							
Noesis Optimal RSM						●	●
Noesis Radial Basis Function (RBF) RSM						●	●
Noesis RFR RSM						●	●
Noesis RVR RSM						●	●
Noesis Taylor Polynomial						●	●
Noesis User Defined Terms						●	●
SURROGATE MODELING (GLOBAL)							
Design Explorer Kriging						●	●
DESIGN OPTIMIZATION (COMMON)							
Broyden Algorithm						●	●
DAKOTA Asynchronous Parallel Pattern Search						●	●
DAKOTA Coliny DIRECT						●	●
DAKOTA Coliny Evolutionary Search						●	●
DAKOTA Coliny Pattern Search						●	●
DAKOTA Coliny Solis-Wets						●	●
DAKOTA CONMIN Methods						●	●
DAKOTA Multiobjective Genetic Algorithm (MOGA)						●	●
DAKOTA NCSU DIRECT						●	●
DAKOTA OPT++ Finite Differences Newton						●	●
DAKOTA OPT++ Parallel Direct Search						●	●
DAKOTA OPT++ Polak-Ribiere Conjugate Gradient						●	●
DAKOTA OPT++ Quasi Newton						●	●
Darwin Algorithm						●	●
EVOLVE						●	●
Hooke-Jeeves Algorithm						●	●
Nelder-Mead Algorithm with Bounded Variables						●	●
NSGA II – Non-dominated Sorting Genetic Algorithm II						●	●

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CONNECT	Ansys Cloud	Minerva	optiSLang Premium	optiSLang Enterprise	ModelCenter Pro	ModelCenter Premium	ModelCenter Enterprise
DESIGN OPTIMIZATION (NORTH AMERICA ONLY)							
Noesis Adaptive Region Model						●	●
Noesis Covariance Matrix Adaption Evolution Strategy Algorithm						●	●
Noesis Differential Evolution						●	●
Noesis Global Optimization						●	●
Noesis Generalized Reduced Gradient						●	●
Noesis Global Criterion Method						●	●
Noesis Hierarchical Optimization Method						●	●
Noesis Method of Distance Functions						●	●
Noesis Min Max Optimum						●	●
Noesis Mixed Integer Programming						●	●
Noesis MPSO Algorithm						●	●
Noesis NAVIRUN						●	●
Noesis Normal Boundary Intersection Method						●	●
Noesis NSEA+						●	●
Noesis Self Adaptive Evolution						●	●
Noesis Sequential Quadratic Programming						●	●
Noesis Simulated Annealing						●	●
Noesis SOMBAS Algorithm						●	●
Noesis SPSO						●	●
Noesis TradeOff Method						●	●
Noesis Weight Objective Method						●	●
Noesis Weighted Tchebycheff Method						●	●
DESIGN OPTIMIZATION (GLOBAL)							
Design Explorer						●	●
OPTLIB Gradient Optimizer						●	●

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DESIGN OF EXPERIMENTS (COMMON)							
Box-Behnken						●	●
Custom						●	●
Central Composite						●	●
Eighth Fractional Factorial						●	●
Face Centered Central Composite						●	●
Foldover						●	●
Franklin-Bailey 2 Level Fractional Factorial						●	●
Full Factorial						●	●
Half Factorial						●	●
Latin-Hypercube						●	●
Parameter Scan						●	●
Plackett-Buman						●	●
Selected 2 Level Fractional Factorial						●	●
Sixteenth Factional Factorial						●	●
Taguchi 2 Level Orthogonal Array						●	●
DESIGN OF EXPERIMENTS (NORTH AMERICA ONLY)							
Noesis Adaptive DOE						●	●
Noesis Space Filing DOE						●	●
DESIGN OF EXPERIMENTS (GLOBAL)							
Design Explorer Orthogonal Array						●	●
Design Explorer Orthogonal Array + LHS						●	●
CONNECT ANY ENGINEERING ANALYSIS TO SYSTEMS ARCHITECTURE MODEL							
NoMagic MagicDraw® / Cameo®					●	●	●
IBM Rhapsody®					●	●	●
PTC Windchill Modeler®					●	●	●
Vitech (Zuken) GENESYS®					●	●	●

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SIMULATE COMPLEX SYSTEM BEHAVIOR							
Execute State Machine Diagrams (Cameo®)							●
VERIFY REQUIREMENTS							
Physical Requirements					●	●	●
Behavioral Requirements (Cameo® and Windchill Modeler®)					●	●	●

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/ SAFETY ANALYSIS

	medini analyze	medini analyze for Semiconductors	medini analyze for Cybersecurity	Digital Safety Manager			
FUNCTIONAL SAFETY ANALYSIS							
Safety Concept Modeling	●	●					
Model Based Safety Analysis	●	●					
Reliability Prediction and Analysis	●	●					
Traceability and Validation Teamwork	●	●					
Integration into Engineering Environment	●	●					
Customization and Process Adaption	●	●					
Ansys Product Integration	●	●					
Reporting and Documentation	●	●					
Safety of Intended Functional Analysis	●	●					
CYBERSECURITY ANALYSIS							
Analysis Contect Establishment and Asset Identification			●				
Systems Vulnerability Analysis			●				
Threat Identification			●				
Attack Trees, Attack Path Calculation and Attack Collections			●				
Threat Assessment and Treatment			●				
Requirement Analysis and Management			●				
Rich Traceability			●				
Teamwork and Integrated Task Management			●				
Reporting and Customization			●				
SAFETY MANAGEMENT							
Tool Guided Safety Planning				●			
Assignment & Assested Reuse of Analysis Results for Safety Activities				●			
Task Based Safety Plan Execution				●			
Dashboard with KPI Monitoring and Reporting				●			

1 = Ansys nCode DesignLife Products
2 = Ansys Fluent
3 = Ansys DesignXplorer
4 = Ansys SpaceClaim
5 = Ansys Customization Suite (ACS)
6 = Ansys HPC, ANSYS HPC Pack or Ansys HPC Workgroup
7 = Ansys Granta Materials Data for Simulation
8 = Ansys Additive Suite
9 = Ansys Composite Cure Simulation
10 = Ansys SPEOS for NX & ANSYS SPEOS for Creo Parametric
11 = Ansys SPEOS
12 = Ansys SPEOS & Ansys SPEOS for NX
13 = Ansys CFD Pro - Ansys Fluent with a reduced set of capabilities
DMP = Distributed-memory parallel
SMP = Shared-memory parallel
MAPDL = Mechanical APDL
Explicit = Autodyn
RBD = Rigid Body Dynamics
Aqwa = Aqwa

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

OPTICS AND VR	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN AND ANALYSIS	SPEOS FAR INFARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER	VRXPERIENCE PERCEIVED QUALITY	VRXPERIENCE LIGHT SIMULATION	VRXPERIENCE HMI
ANSYS PRODUCTS EMBEDDED											
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	●	●	●								
Dispersion	●	●	●								
Surface Diffusion	●	●	●								
Volumic Diffusion	●	●	●								
Ambiant Material	●	●	●								
Non-Homogeneous Materials	●	●	●								
SPEOS Live Preview (GPU Acceleration)		●[12]	●[12]								
Virtual BSDF			●[10]								
PHOTOMETRY / RADIOMETRY											
Intensity	●	●	●								
Illuminance	●	●	●								
3D Illuminance	●	●	●								
Luminance	▲	●	●								
3D Energy Density		●	●								
360 View - Observer		●	●								
360 View - Immersive		●	●								

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

/ OPTICS AND VR

	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN AND ANALYSIS	SPEOS FAR INFARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER	VRXPERIENCE PERCEIVED QUALITY	VRXPERIENCE LIGHT SIMULATION	VRXPERIENCE HMI
HUMAN VISION											
Dynamic Adaption			●								
Glare Simulation			●								
HDR10 Screen Support			●								
WAVELENGTH RANGE											
Visible (360nm - 830nm)	●	●	●								
UV (100nm - 360 nm)		●	●								
Near IR (830nm - 2.5um)		●	●								
Far Infra-Red (2.5um - 100um)							●				
OPTICAL DESIGN											
Parabolic Surface	●[12]	●[12]	●[12]								
TIR Lens	●[12]	●[12]	●[12]								
Projection Lens	●[12]	●[12]	●[12]								
Optical Lens				●							
Optical Surface				●							
Light Guide				●							
Sharp Cut-Off Reflector				●							
Poly-Ellipsoidal Surface				●							
Micro Optical Stripes				●							
Freeform Lens				●[11]							
Honeycomb Lens				●							
OPTICAL SENSOR											
Field of View					●						
Export Sensor Grid as Geometry					●						
Camera Sensor					●						
Camera Raw Signal Export					●						
Camera Sensor Post Processing					●						
Dynamic Effects in Camera Simulation	●	●	●								
Dynamic Effects in LiDAR Simulation	●	●	●								

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

/ OPTICS AND VR

	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN AND ANALYSIS	SPEOS FAR INFARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER	VRXPERIENCE PERCEIVED QUALITY	VRXPERIENCE LIGHT SIMULATION	VRXPERIENCE HMI
OPTICAL SENSOR											
SPEOS Lens System Importer (ZEMAX OpticStudio)					●						
LiDAR Sensor					●						
LiDAR Rotating & Scanning					●						
LIDAR Raw Time of Flight generation					●						
HEAD-UP DISPLAY											
HUD Optical Analysis						●					
HUD Optical Design						●					
HUD Visualisation						●					
SOLVER PERFORMANCES											
Default Number of Cores	4	4	4								
Parallel Solving on Local PC	●	●	●								
Parallel Solving on Cluster	●	●	●								
Parallel Solving with Ansys Cloud Launched from Desktop	●	●	●								
Ansys RSM Compatibility	●	●	●								
Multi-GPU Solving on Local PC		●	●								
SIMULATION PREPARATION											
Source Group	●	●	●								
Geometry Group	●	●	●								
Local Meshing	●	●	●								
3D Textures		●	●								
Polarizer		●	●								
Fluorescent Converter		●	●								
Light Field	●	●	●								
Preset Manager	●	●	●								

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/ OPTICS AND VR

OPTICS AND VR	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN AND ANALYSIS	SPEOS FAR INFARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER	VRXPERIENCE PERCEIVED QUALITY	VRXPERIENCE LIGHT SIMULATION	VRXPERIENCE HMI
SIMULATION PREPARATION											
Texture Mapping (Bamp, Multi-Layer)		●	●								
Uniform Ambiant Source	●	●	●								
HDRI Source	●	●	●								
CIE Sky Source		●	●								
Natural Light Source		●	●								
Near Infrared Extended Ambient Source		●	●								
Thermic Source							●				
POST PROCESSING											
Virtual Lighting Controller		●	●								
Photometric Numerical Certification	●	●	●								
Colorimetric Analysis	●	●	●								
Spectral Analysis		●	●								
Light Expert	●	●	●								
Layer by Source		●	●								
Layer by Face		●	●								
Layer by Sequence		●	●								
Stray Light Analysis		●	●								
Layer by Polarisation		●	●								
Visibility and Legilbility			●								
Night Vision Goggle							●				
Script Automation	●	●	●								
OPTIMIZATION											
Parameters	●	●	●								
Design of Experiment	●[3]	●[3]	●[3]								
Design Optimisation	●[3]	●[3]	●[3]					●[10]			
Ansys optiSLang Interface (12)	■	■	■								

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

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/ OPTICS AND VR

	SPEOS PRO	SPEOS PREMIUM	SPEOS ENTERPRISE	SPEOS OPTICAL PART DESIGN	SPEOS OPTICAL SENSOR TEST	SPEOS HUD DESIGN AND ANALYSIS	SPEOS FAR INFARED EXTENSION	SPEOS OPTICAL DESIGN OPTIMIZER	VRXPERIENCE PERCEIVED QUALITY	VRXPERIENCE LIGHT SIMULATION	VRXPERIENCE HMI
TOOL INTEROPERABILITY											
Shared Workflows with Ansys Lumerical Products	●	●	●								
Shared Workflows with Ansys Zemax OpticStudio	●	●	●								
Shared Workflows with Ansys Mechanical	●	●	●								
SYSTEM SIMULATION											
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											●
Virtual Display & Actuators Interaction											●
RENDERING ENGINE											
Real-Time Physics-Based Lighting									●	●	●
Advanced Raytraced Lighting									●		●
Full Physics GPU Lighting									●		
VR											
HMD									●		●
CAVE, Powerwall									●		●
Finger Tracking											●
SOLVER											
Tolerance Variation Engine									●		

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

/ ELECTRONICS	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
LOW FREQUENCY ELECTROMAGNETICS											
Electrostatics	●									●	●
AC Conduction	●									●	●
DC Conduction	●									●	●
Magnetostatics	●									●	●
Adaptive Field Mesh	●									●	●
AC Harmonic Magnetic	●									●	●
Electric Transient	●										●
MAGNETIC TRANSIENT											
Translational Motion	●									●	●
Fully Automatic Symmetrical Mesh Generation	●									●	●
Rotational Motion	●									●	●
Non-Cylindrical Motion	●									●	●
Advanced Embedded Circuit Coupling	●									●	●
Circuit Coupling with Adaptive Time Stepping	●									●	●
Direct and Iterative Matrix Solvers	●									●	●
ADVANCED MAGNETIC MODELING											
Vector Hysteresis Modeling	●									●	●
Multi-Conductive Terminals Modelling (PCBs, Busbars etc.) / A-Phi Solver	●										●
Hysteresis Modeling for Anisotropic Material	●									●	●
Frequency Dependent Reduced Order Models	●									●	●
Reduced Order 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 Dependent De-Magnetization Modeling	●									●	●

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

/ ELECTRONICS

ELECTRONICS	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
ADVANCED MAGNETIC MODELING											
Temperature Dependent 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	●									●	●
Temperature Dependant Litz Wire Modeling	●									●	●
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						●					
3D Thermal and Fluid Network						●					
Optimization Workflow						■					
Temperature Dependent Duty-Cycle Analysis						●					
Manufacturing Effects Due to Winding Impregnation and Housing Interfaces						●					
Linear Structural 2D FEA						●					
Noise Vibration Harness Analytical Modelling						●					
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		●									●

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

/ ELECTRONICS

	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
HIGH FREQUENCY ELECTROMAGNETICS											
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		●									●
Range Doppler Plots for Radar Scenario Analyses											●
Accelerated Doppler Processing (ADP) for SBR+ Range Doppler Analyses											●
RF and Digital Filter Synthesis and Design									●		
Domain Decomposition Method (DDM) for Frequency Domain FEM Analysis		●									●
Hybrid Finite Element/ Integral Equation Analysis		●									●
Efficient Wirebond Package Meshing		●									●
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		●									●
Frequency Dependant Materials		●									●

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

/ ELECTRONICS

ELECTRONICS	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
HIGH FREQUENCY ELECTROMAGNETICS											
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		●									●
3D Component with Encryption Utilization		●									●
RF Discharge Solver		●									●
Mutli-paction Solver		●									●
Volumetric SBR+ for 3D Dielectrics		●									●
Surface Roughness Model for SBR+		●									●
Accelerated Doppler Processing (ADP) for SBR+ Range-Doppler Analysis											●

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

/ ELECTRONICS

POWER AND SIGNAL INTEGRITY BOARD SIMULATION CAPABILITIES

	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
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			●								●
Dynamically Linked Electromagnetic Field Solvers			●								●
Chip, Package, PCB Analysis (CPM)		●	●								●
Near-Field EMI Analysis											●
Far-Field EMI Analysis											●
EMI/EMC Full Board Scan											●
Characteristic Impedance (Zo) L PKG/PCB Scan											●
Full PCB/PKG Cross-Talk Scanning											●
TDR Wizard											●
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											●

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

/ ELECTRONICS

	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
POWER AND SIGNAL INTEGRITY BOARD SIMULATION CAPABILITIES											
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				●							●
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					●						●

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

ELECTRONICS	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
ELECTRONICS COOLING											
Network Modeling	■	■	■	■	●						●
Joule Heating Analysis					●						●
Thermo-Electric Cooler Modeling					●						●
Thermostat Modeling					●						●
Package Characterization					●						●
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 Meshing, Multi-Domain, Multi-Technology		●									●
HPC Accelerated Frequency Sweeps	●	●	●								●
HPC Accelerated Broadband Fast Frequency Sweep		●									●
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 2D Skew Parallel Processing	●									●	●
HPC Enabled Parallel Processing	●	●		●	●					●	●

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

/ ELECTRONICS	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
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	●	●	●	●	●					●	●
Push-Back Excitation	●	●								●	●
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		●								●	●
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											●

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

/ ELECTRONICS

ELECTRONICS	Maxwell	HFSS	SIwave	Q3D Extractor	Icepak	Motor-CAD	EMA3D Cable	EMA3D Charge	Nuhertz FilterSolutions	Electronics Pro 2D	Electronics Enterprise
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	●	●	●	●	●						●
MULTIPHYSICS 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	■	■	■	■	■	■				■	■
Granta MI Materials Gateway	■	■	■	■	■	■				■	
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	●	●	●	●	●						
Elastic Licensing		●	●	●	●	●					
CHARGING AND DISCHARGING MODELING											
Internal Charging								●			
Electrostatic Discharge in Air								●			
Surface Charging								●			
3D Particle Transport								●			
Arcing in Solid Dielectrics								●			
Coupled Charging Simulations								●			

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

PHOTONICS	CHARGE	CML Compiler	DGTD	FDTD	FEEM	HEAT	INTERCON-NECT	MODE	MQW	STACK	RCWA	Verilog-A Platform
DESIGN ENVIRONMENT												
Finite Element IDE (with 2D/3D modeling)	●		●		●	●						
Finite Difference IDE (with 2D/3D modeling)				●				●		●	●	
Hierarchical Schematic Editor							●					
GENERAL												
HPC-ready / compatible with cloud providers				●				●				
PIC Element Library							●					
Supports CML development and distribution		●					●					
Automated CML generation		●										
Version controlled CMLs		●										
Structured input with template and data validation		●										
Automated test case generation		●										
IP protected CMLs		●					●					
INTERCONNECT and Verilog-A models from single source		●					●					●
Leverage build-in analysis from 3rd party EDA tools												●
Design and model using Verilog-A in 3rd party EDA tools												●
Available in Ansys Cloud	●	●	●	●	●	●	●	●	●	●	●	●
Ansys Cloud HPC Services Integration	●		●	●	●	●		●	●	●	●	
GENERAL SOLVER CAPABILITIES												
Charge transport (electrostatic potential and drift diffusion)	●											
Self-consistent heat/charge modeling	●					●						
Heat transport (heat flux, convention, and radiation)						●						
Finite Element Eigenmode Solver				●	●							
Discontinuous Galerkin Time Domain Solver			●									
Finite Difference Time Domain solver				●								
Finite Difference Eigenmode solver				●				●				
Bidirectional eigenmode expansion								●				
2.5D variational FDTD (varFDTD)								●				
Advanced Finite Difference Conformal Meshing				●				●				

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

PHOTONICS	CHARGE	CML Compiler	DGTD	FDTD	FEEM	HEAT	INTERCON-NECT	MODE	MQW	STACK	RCWA	Verilog-A Platform
GENERAL SOLVER CAPABILITIES												
Quantum mechanical band structure calc. (kp method)									●			
Waveguide and band diagram calculation									●			
Gain and spontanious emission calculation									●			
Temperature, strain, and field effects									●			
Closed form solver for rapid multilayer thin-film analysis										●	●	
Planewave and dipole illumination										●	●	
Capture Interface and microcavity effects										●	●	
Circuit frequency domain analysis							●					
Circuit transient mode simulator							●					
Circuit transient block mode simulator							●					
Circuilt multi-mode and multi-channel support							●					
Circuit mixed signal representation							●					
Laser library with TWLM solver							●					
System library including optical fibre, FEC and MLSE models							●					
Rigorous Coupled-Wave Analysis Solver											●	
Waveguide Bend Calculation for Bend Loss and Ring Analysis					●							
MATERIALS SELECTION & RELATED TOOLS												
Comprehensive Material Models	●		●	●	●	●		●	●	●	●	
Multi-coefficient models			●	●				●				
Non-linearity and Anisotropy modeling				●	▲			▲				
OPTIMIZATION												
Inverse Design with lumopt				●				▲				
Particle Swarm	●		●	●	●	●	●	●		▲	▲	
Parameter Sweeps	●		●	●	●	●	●	●	▲	▲	▲	
POST PROCESSING												
Far-Field Projection			●	●	●			●				
Band Structure Analysis				●								
Bidirectional Scattering Distribution Function				●								

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

/ PHOTONICS

PHOTONICS	CHARGE	CML Compiler	DGTD	FDTD	FEEM	HEAT	INTERCONNECT	MODE	MQW	STACK	RCWA	Verilog-A Platform
POSTPROCESSING												
Q-Factor Analysis			●	●								
Charge Generation Rate			●	●								
Bend Loss Analysis								●				
Overlap analysis								●				
Model area analysis								●				
Helical waveguides								●				
Extract gain/absorption and spontaneous emission coefficients for TWLM model (INTERCONNECT)									●			
Statistical support (Monte-Carlo Analysis)	●		●	●	●	●	●	●				
Statistical Support (Corner analysis)							●					
Small-signal analysis	●											
Steady-state and transient analysis	●					●						
Laser Self-Heating							●					
TOOL INTEROPERABILITY												
Multiphysics Solver Interoperabilty	●		●	●	●	●		●				
Automation API (Lumerical script/Matlab/Python)	●		●	●	●	●	●	●	●	●	●	
Circuit electronic photonic co-simulation (3rd party tools)							●					●
optiSLang Integration	●		●	●	●	●	●	●	●	●	●	
Shared workflows with SPEOS				●						●	●	
SPEOS surface models: BSDF/BRDF format exchange				●								
SPEOS surface models: Diffraction Grating SOP Plugin (BETA)				●								
Shared workflows with Speos				●						●		
Process Enabled Photonic Component Design Workflows	●		●	●	●	●		●				
Virtuoso layout integration				●				●				
KLayout integration							●					

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/ DESIGN TOOLS

FLUIDS	SpaceClaim	DesignModeler	Discovery
Steady-state Flow			●
Transient Flow			●
Incompressible Flow			●
Compressible Flow			▲
Porous Media			■

GEOMETRY	SpaceClaim	DesignModeler	Discovery
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 and Create Inner Fluid Domains	●	●	●
Extract Outer Air Enclosures	●	●	●
Shared Topology for Conformal Meshing	●	●	●
Booleans and Slicing	●	●	●
Create Weld Bodies	●	●	
Boundary Condition Mapping	●	●	●
Scripting	●	●	●
Repair and Edit Faceted Data	●		●
Icepak Integration	●	●	
Reverse Engineering Faceted Data	●		●
Prep for Additive Manufacturing	●		●

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13 = Ansys CFD Pro - Ansys Fluent with a reduced set of capabilities

DMP = Distributed-memory parallel

SMP = Shared-memory parallel

MAPDL = Mechanical APDL

Explicit = Autodyn

RBD = Rigid Body Dynamics

Aqwa = Aqwa

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/ DESIGN TOOLS

DESIGN TOOLS	SpaceClaim	DesignModeler	Discovery
HEAT TRANSFER			
Steady-state Solid Conduction			●
Transient Solid Conduction			●
Natural Convection			●
Conjugate Heat Transfer			●
INTERFACES AND ADD-ONS			
Transfer to Mechanical	●	●	●
Transfer to Workbench	●	●	●
Transfer to Fluent	●	●	●
Algoryx Momentum	●		
GRANTA MATERIALS DATA FOR SIMULATION			
Materials Data for Simulation			■
MULTIPHYSICS			
Conjugate Heat Transfer			●
Thermal-Stress			●
STRUCTURAL			
Static Structural Analysis			●
Modal Analysis			●
Pre-Stressed Modal Analysis			■
Point Masses			●
Springs			●
Joints			●
Nonlinear Contact			■
Pre-Tension Bolts			■
Large Deformation			■
Topology Optimization			●
TOOL INTEROPERABILITY			
Supported running on the Ansys Cloud In browser interactively	●	●	●

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/ DIGITAL MISSION ENGINEERING

MODELING CAPABILITIES	STK Pro	STK Premium (Space)	STK Premium (Air)	STK Enterprise	STK Scheduler	STK Solis	STK Missle Tool Kit	ODTK
Physics-Based Object Modeling	●	●	●	●				
Full 3D and 2D Visualization	●	●	●	●				
Streaming Imagery	●	●	●	●				
Integrated Timeline View	●	●	●	●				
Basic Reports and Graphs	●	●	●	●				
Advanced Reporting	●	●	●	●				
Moviemaking	●	●	●	●				
Simple Conic Sensor Models with Fixed Pointing	●	●	●	●				
Advanced Sensor Models (complex conic, SAR, etc.)	●	●	●	●				
Basic Vehicle Attitude Profiles (nadir aligned, ECF, ECI, etc.)	●	●	●	●				
Advanced Vehicle Attitude Profiles (fixed in axes, external-file, etc.)	●	●	●	●				
Basic Object Constraints (azimuth, elevation, range, line of sight)	●	●	●	●				
Advanced Constraints (geometric, temporal, lighting, etc.)	●	●	●	●				
Single Object Access Calculations	●	●	●	●				
Many vs. Many, Multinode Access Computations	●	●	●	●				
Body Masking	●	●	●	●				
Sensor Obscuration Tool	●	●	●	●				
Import Digital Terrain Data	●	●	●	●				
Terrain-Based Analysis and Route Following	●	●	●	●				
Advanced Orbit Trajectory Design	▲	●	▲	●				
Model Advanced Space Environment Effects		●		●				
Consider Spacecraft Perturbation Effects (e.g., solar radiation pressure drag)		●		●				
Solar Panel Power Estimation Tool		●		●				
Performance-Based Aircraft Route Design			●	●				
Wind Effects on Airborne Vehicle Trajectories			●	●				
Runway and Waypoint Catalogs			●	●				

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/ DIGITAL MISSION ENGINEERING

MODELING CAPABILITIES	STK Pro	STK Premium (Space)	STK Premium (Air)	STK Enterprise	STK Scheduler	STK Solis	STK Missle Tool Kit	ODTK
Scenario Focused Content Management System				●				
SysML Behavior Modeling and Execution Engine				●				
Test and Evaluation Execution Planning and Data Reduction Tool	▲	▲	▲	●				
Software Development Kit APIs	●	●	●	●				
Real-Time Tracking Data Feeds		●	●	●				
DIS and HLA Interfaces		●	●	●				
RF Communications System Modeling	●	●	●	●				
Radar System Modeling	●	●	●	●				
Urban Environment Signal Attenuation	●	●	●	●				
Parallel Computing	▲	●	●	●				
Electro-Optical and Infrared Sensor Modeling		●	●	●				
User-Defined Coverage Grids for Data Visualization	●	●	●	●				
Resource and Asset Scheduling in STK-Modeled Missions					■[1]			
DynamicSpacecraft Attitude System Modeling						■[1]		
Emulate Onboard Attitude Control Flight Controls						■[1]		
Design Attitude System P-I-D Controls						■[1]		
Model Onboard Spacecraft Reaction Wheels and Gyros						■[1]		
Missile and Launch Vehicle Modeling							■[1]	
Process Spacecraft Tracking and Measurement Data								●
Resolve Spacecraft Maneuvers from Tracking Measurements								●
Multiple Simultaneous Orbit Solutions								●
Combine Multisource Satellite Tracking Data								●
Object Association and Correlation Against Existing Catalog								■[1]
Collection of Common Automation Routines for On-Orbit Operations								■[1]

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