End-to-end integration to manage complexity and increase development velocity
With Siemens highly-integrated electronics workflow

Software Partner Sell SILVER

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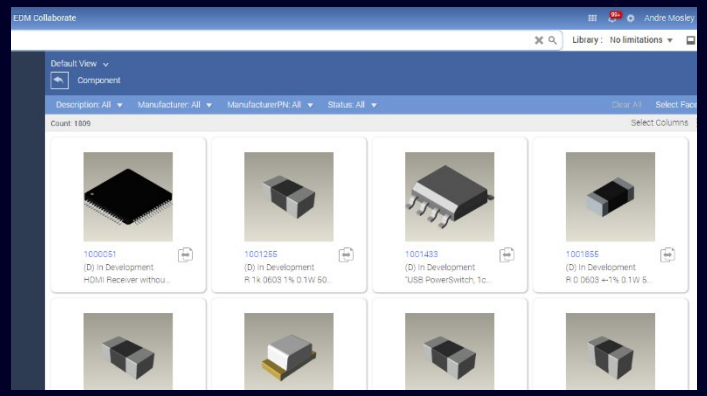
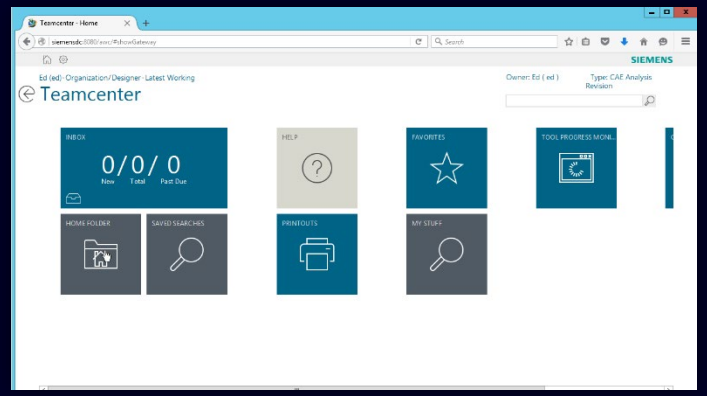
Lifecycle Management

Product data management

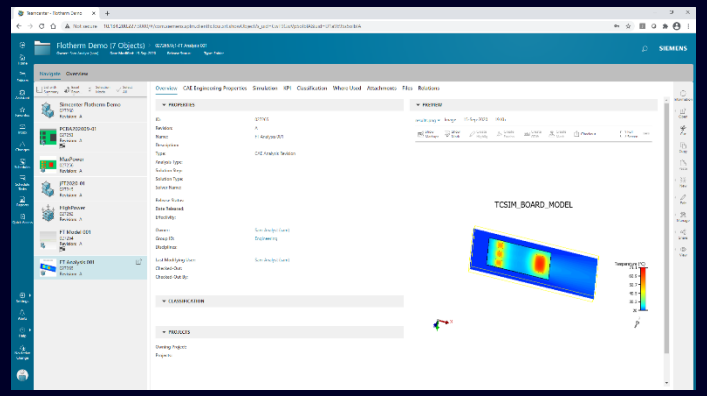
- Electronics data management
- Library data
- Collaboration



- Bill of materials
- Change management
- Cost management
- Systems engineering and requirements



- Simulation process data management
- Collaboration environment
- Guided simulation workflows



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Siemens highly-integrated electronics workflow
Electronics and mechanical design integration

Software Partner Sell SILVER

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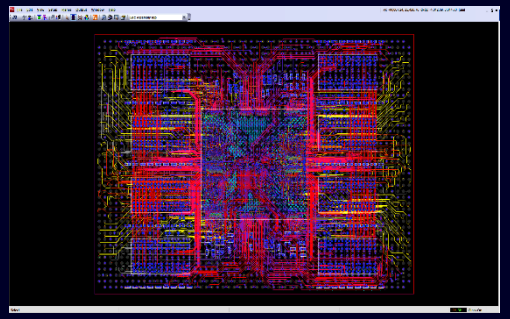
Lifecycle Management

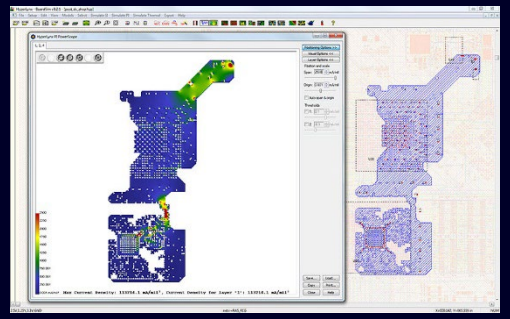
Electronics design ↔ **Mechanical design** ↔ Analyze & Explore ↔ Test, Quality & Reliability ↔ MDAO

Thermal and Power Integrity co-design

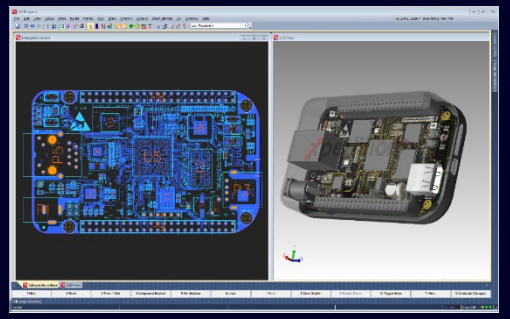
Design authoring
- Layout/Placement
- Routing
- Cabling
- Electrical DfM



- Circuit simulation
- Signal Integrity
- Parasitic Extraction



- Native ECAD-MCAD integration
- MBSE KPI tracking
- Mechanical DfM



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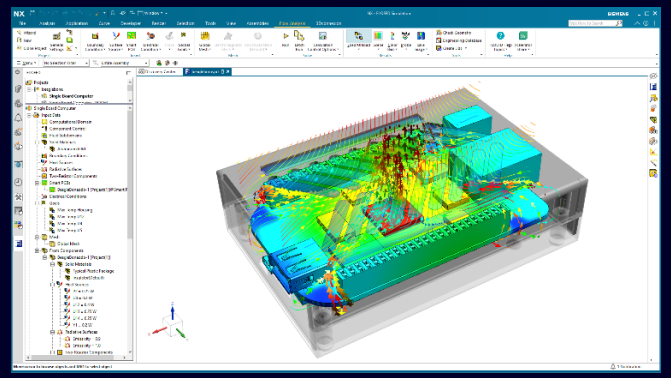
Siemens highly-integrated electronics workflow
Embedded MCAD analysis

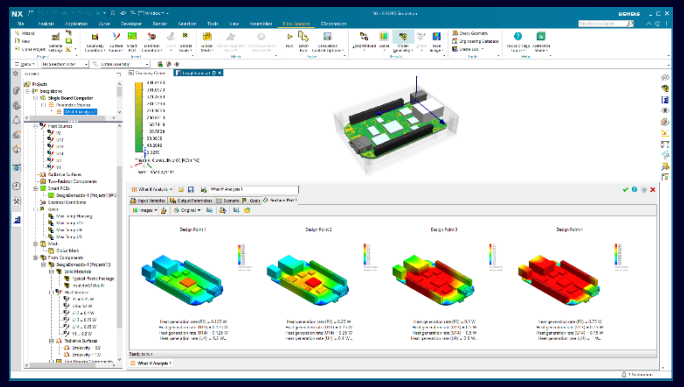
Lifecycle Management

Electronics Design | **Mechanical design** | **Analyze and explore** | Test, Quality & Reliability | MDAO

- Fluid & Thermal design within MCAD environment
- Uses native CAD with automated fluid volume detection
- No CAD simplification required
- Results displayed directly on CAD geometry



- Parametric study using parametric geometry definition
- Design of Experiment and optimization using SHERPA intelligent adaptive search



Siemens highly-integrated electronics workflow
Increased fidelity with simulation and test

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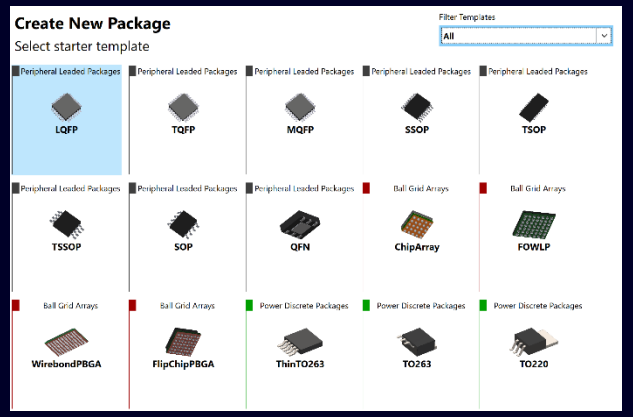
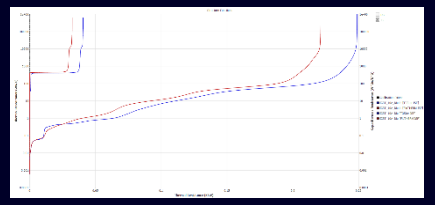
Lifecycle Management

Electronics Design | Mechanical Design | **Analyze and explore** | **Test, quality and reliability** | MDAO

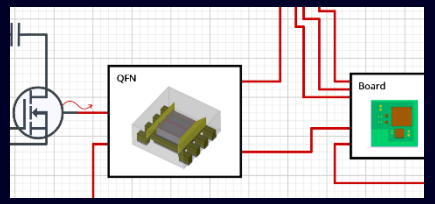
Automated generation of package thermal models



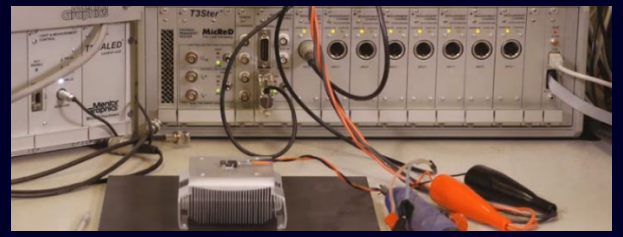
Structure Functions support automated calibration of thermal models for >98% simulation fidelity



Reduced order models protect sensitive IP across the supply chain



- Measure TIM material properties
- Thermal/optical behavior of ICs & LEDs
- Measure thermal properties of structure
- Measure reliability using power cycling
- Shaker testing & mission synthesis
- Damage mechanism cause-and-effect



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Siemens highly-integrated electronics workflow
High density advance packaging workflow

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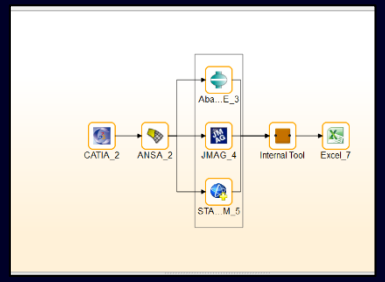
Lifecycle Management

Electronics Design | Mechanical Design | Analyze & Explore | **Test, quality and reliability** | **MDAO**

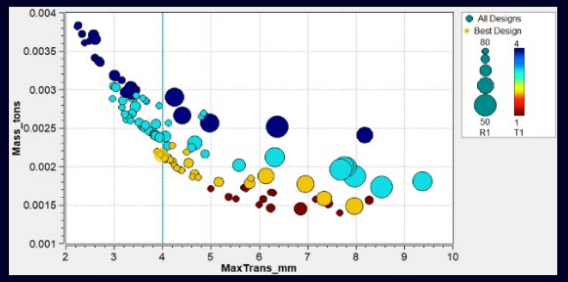
Multi-disciplinary analysis

- Open, flexible workflow automation
- Compute resource management

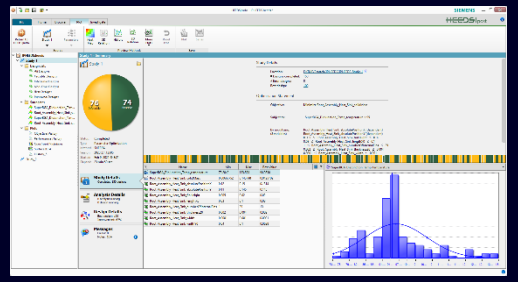


Optimize competing objectives:

- Thermal, stress, vibration, shock, electromagnetics, acoustics (noise, sound quality), etc.
- Post-processing & data analysis



- DFMEA
- Robust design



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Siemens highly-integrated electronics workflow – Summary

End-to-end integration to manage complexity and increase development velocity

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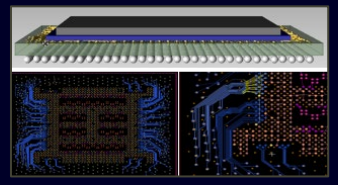
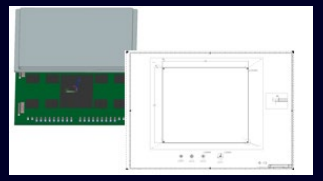
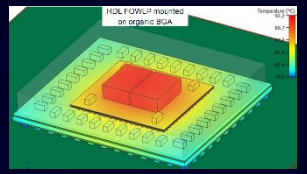
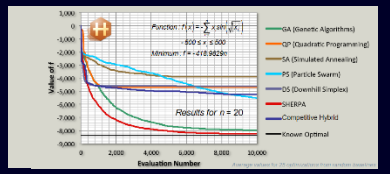
Lifecycle Management (Teamcenter, Polarion, Xpedition EDM)

HEEDS Portals

Electronics design (Xpedition/Calibre)	Mechanical design (NX Platform)	Electromagnetic, thermal and structural analysis (NX & Simcenter; embedded HEEDS)	Characterize, test quality and reliability (T3STER, Power & Quality Tester)	MDAO: Automate, explore and optimize (HEEDS)
2-way exchange	Simcenter 3D			
• Rapid Development of 'what-if' prototypes • Enables system connectivity viewing and management without error-prone spreadsheets • Flexible multi-direction flow for die, package, substrate or PCB-driven optimization	• Bi-directional MCAD-ECAD collaboration workflow • 2D/3D clearance checking • Characterize materials for simulation • Advanced modeling, surfacing, and drafting capabilities	• Comprehensive die and package level extraction • Detailed thermal modeling from die to system level • Analyze durability against drop, shock, vibration, etc. • Noise and acoustics • Unique ROMs support supply chain	• Non-Destructive test • Identify infant mortality and future failures • Integrated with original thermal model to update data and assumptions • Test quality during manufacture	• Multi-disciplinary design analysis and optimization using SHERPA • Automated simulation-driven design changes • Process automation • Distributed job execution • Insight & discovery
				

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