SIEMENS

NX for Electromechanical Systems Design

A unified solution for every phase of electromechanical design

Benefits
- Integrates electromechanical design teams, disciplines and workflows in a single solution
- Accelerates development with system-level design and engineering capabilities
- Enables re-use and knowledge sharing
- Improves speed and efficiency with process-specific applications and streamlined workflows

Features
- Enables simple two-way interaction between ECAD and MCAD
- Supports flexible and rigid PCB design

NX™ software is an integrated product development solution that brings together mechanical, electrical and electronics design disciplines. It accelerates and streamlines electromechanical product development. NX includes flexible printed circuit board (PCB) design, ECAD/MCAD integration, wire routing, sheet metal design, assembly design and knowledge-based tools such as re-use via templates. Design freedom with synchronous technology allows users to create history-based, history-free or hybrid models. NX can also perform analysis on integrated electromechanical models.

Challenges
As electronics become core to more products, the challenges of electromechanical design increase. Synchronization of mechanical and electrical/electronic design representations have increased product complexity, making it more difficult to manage. Each of these different disciplines uses different data management systems,

creating an integration issue. Each domain has its own configuration challenges which increase when combined with other domains. In order to keep the systems interconnected, the requirements that drive each other must be maintained.

Process overview
The electromechanical design process typically starts with a mechanical design in NX. From there, the designer uses printed circuit board modeling tools to define the initial PCB layout and key component locations, as well as holes and restriction areas. The circuit board design is then exported to an ECAD design software package using the industry-standard IDF format. When the PCB electonics design is completed, the integrated NX model is updated to reflect the complete design.

At this stage, the user can perform any necessary analysis on the completed model. At any point in the design process, the user can take advantage of NX's high-perfor-

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Features *continued*
- High-performance modeling technology
- Advanced simulation for integrated electromechanical systems
- Allows designers to work in the context of the entire product
- Knowledge-based tools for design re-use
- Advanced electrical/wire routing capabilities

mance design tools, including process-specific applications such as wire routing and sheet metal design to create and refine the product design. With NX Active Mockup and assembly modeling, designers can work in the context of the entire product with all electronic, electrical and mechanical component details.

With leading-edge design, knowledge capture and re-use and automation technologies, companies can eliminate tedious, repetitive design tasks to streamline and accelerate development of electromechanical systems and products.

An integrated solution
NX provides a single solution that not only integrates electronic, electrical and mechanical design, but also integrates design with analysis and manufacturing to address the entire lifecycle for electromechanical systems.

Key components for electromechanical systems include:

NX PCB Exchange
This tool enables the modeling of a PCB within the NX digital product development system. Within NX a mechanical designer can define board shape, specify important keep-in and keep-out areas and pre-place critical components such as connectors, switches, displays and LEDs using the assembly design capabilities within the NX and PCB Exchange modeler tools. The preliminary PCB design is then transferred via the universal IDF format to an ECAD system for the PCB designer to use as the basis for the board design. After placing the remaining components in the ECAD system, the updated board can be passed back to NX. The mechanical designer ensures the board assembly fits into the final product package. Multiple iterations of this basic design data flow between ECAD and MCAD systems typically occur during the product design phase. PCB Exchange makes it easy to transfer complex PCB assembly data bi-directionally between NX and ECAD packages.

NX flexible printed circuit design
This solution is a native NX application that enables the design of flexible or rigid printed circuits using an intuitive workflow. Not only can product designers develop printed circuits in the context of an NX assembly model, they can also flatten flexible printed circuits and send the outlines to manufacturing or to an ECAD system for further refinement.
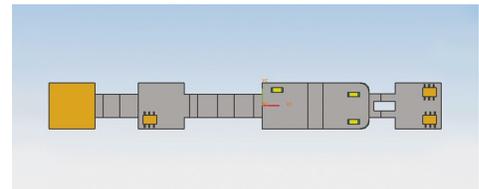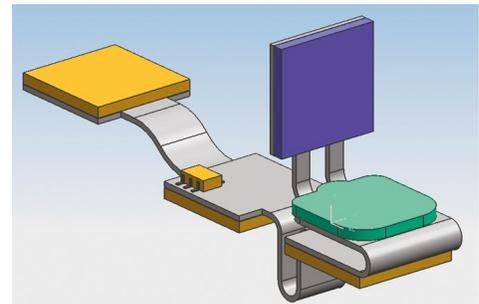
Flexible PCB design enables users to flatten a PCB for manufacturing or other purposes.

System-level engineering
NX supports a systems engineering approach to electromechanical products with intelligent product control structures that maintain key design characteristics and automatically propagate change to subassemblies and components, streamlining creation of options and variants.

NX WAVE is a dedicated environment for the definition and manipulation of product layouts and templates. It allows users to capture and re-use engineering and process knowledge within a top-level product control structure. Top-level design changes automatically ripple through to downstream components. Product structure links, component interfaces, ownership, variant rules, configurations and requirements are maintained by Teamcenter® software.

Electromechanical simulation

The NX environment includes solutions for the major issues found in electromechanical simulation, including thermal simulation, vibration and drop test analysis, flow analysis for cooling or dust accumulation, condensation analysis, durability, motion studies and others. All types of analysis can be performed on integrated ECAD/MCAD models, enabling more accurate and thorough analysis. Contact Siemens PLM Software for detailed information on NX Electromechanical Simulation solutions.
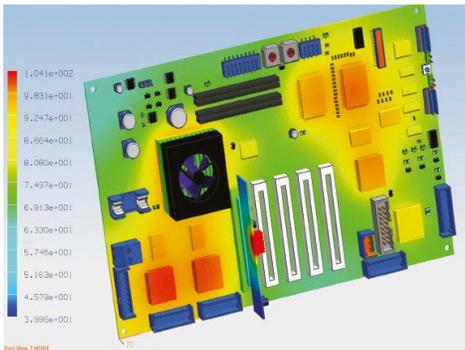
Simulation capabilities include thermal and flow analysis.

NX Active Mockup

This solution allows users to design within the context of the entire product by loading lightweight, CAD-neutral versions of component models, which can include multi-CAD data. This comprehensive view improves product quality and supports requirements-driven design validation. It also enables easy clearance checks, assembly/disassembly, weight management and materials management.

Knowledge capture and re-use

NX enables easy knowledge sharing and the re-use of existing designs through design templates. Benefits include immediate re-use of design elements, easy-to-understand model history, more efficient feature construction and control, faster model updates and embedded validation.

NX Product Template Studio (PTS) quickly modularizes any parametric design into an easily re-usable template with no coding. Design validation and simulation can be built in. Templates snap together into larger systems of templates.

Process-specific applications

Specialized electrical routing, sheet metal design, industrial design and manufacturing capabilities help coordinate multidisciplinary design teams to accelerate electromechanical systems design.

NX for electrical routing

NX includes a fully integrated 3D electrical wire routing application that allows users to design and route harnesses in complex assemblies. Built upon the NX routing applications architecture, the electrical routing tools provide electrically smart features and functions to automate the design, modification and analysis of wire harnesses. NX electrical routing and harness design enable integration with all electrical disciplines including system design, logical design, PCB design, physical design, electrical analysis, manufacturing, installation, service documentation and service delivery.

NX Sheet Metal Design

This application is process-driven and allows rapid design of straight-brake sheet metal components typical of housings and enclosures in electromechanical products. It also offers support for common sheet metal features. In addition, non-native geometry can be quickly converted into NX Sheet Metal parts for forming/unforming, supporting multi-CAD strategies.
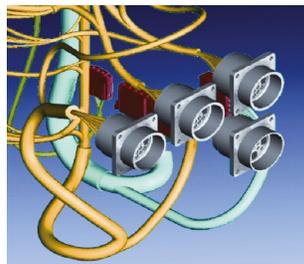
NX electrical routing and harness design enable users to produce a wire harness directly from product assembly models.