

Siemens Rolls Out Next-Generation Design with NX

By Dick Slansky

Keywords

Closed-Loop Digital Twin, Generative Design, Electromechanical Design, Industrialized Additive Manufacturing, Collaborative Design Management, Immersive Visualization, Data Integrity

Summary

Product design has evolved greatly since the emergence of the first 2D and 3D wireframe models decades ago and, later, the first surface and solid modeling CAD tools. Designers quickly mastered the technology afforded to them at the time and, as any good designer and innovator would do, often pushed the authoring applications well beyond their intended limits. This constant pushing of the boundaries by the designer user community and the never-ending need for better design tools also drove the CAD suppliers to

With the latest version of its flagship product design solution, NX, Siemens now offers the designer the ability to work in a digital engineering innovation environment for multi-discipline ideation across the mechanical, electrical, and software domains.

develop new innovations and more robust and easier-to-use design tools and introduce a continuous stream of cutting-edge design concepts and computing technology.

Siemens, for example, has developed a well-earned reputation as a leader in providing the designer community with innovative technology and design tools to support innovation. With the latest version of its flagship product design solution, NX, Siemens now offers the designer the ability to work in a digital engineering innovation environment for multi-discipline ideation across the multi-discipline engineering environments of mechanical, electrical, and software domains. Siemens refers to this design environment as *a closed-loop digital twin for virtual product development*. According to the company, it provides designers and design engineers with the ability to model, simulate, and verify products digitally in a cyber-secure environment hosted flexibly either on-premise or in the cloud.

This design platform is based on six core themes across the design/build lifecycle:

- Most productive modeling environment
- Generative design & integrated validation
- Electromechanical design
- Collaborative design management
- Industrialized additive manufacturing
- Immersive visualization

Each of these core areas represents next generation-design technologies and concepts that provide the designer with tools for innovation.

NX: An Integrated Solution from Generative Design to Additive Manufacturing

Siemens is offering the design community a single integrated design solution that is initiated at requirements engineering, continues through the design process, validates the design through advanced simulation, and - finally - generates an end-to-end manufacturing process. Underlying this design/build lifecycle are complete data and process management.

This NX integrated solution can be broken down further. Product requirements are assimilated by generative design features to accelerate and optimize the design process. This process includes lightweight design and adaptation to optimal part shape and function, followed by concurrent sim-

Siemens is offering the design community a single integrated design solution from requirements engineering through the design process, validating the design through simulation, and generating an end-to-end manufacturing process.

ulation to validate physical performance. Next (or even concurrently) comes manufacturing validation, pre-processing and 3D-printing, and finally, part finishing and quality assurance.

At its core, NX technology is designed to provide a very productive modeling environment for the designer. NX can now predict the modeling commands that the designer will likely want to use next. This adaptive user interface is powered by machine learning algorithms that collect data while the user interacts with the system. NX then uses these data as a continuous source of insight to personalize the users' design choices based on what the designer has used in the past and design knowledge from a knowledge-based engineering database. ARC believes this could lead to a significant increase in

modeling productivity while maintaining a focus on a model-based definition and design.

Electromechanical Design at the Heart of New Product Innovation

A significant amount of new product innovation now comes from mechatronic design. Products across all industries from automotive, to medical devices, to consumer goods are based on electromechanical systems design with mechanical, electrical, electronic, and embedded software components. Siemens offers an integrated system design approach for electromechanical

The goal of NX is to streamline the development process from concept to production, and to provide a model-based definition that represents a single source of the truth for all engineering design.

product design that includes solution interoperability across all the engineering design disciplines of mechanical, electrical, and software.

The Siemens NX design platform, along with its Teamcenter collaboration backbone, offers a complete design environment for both mechanical and

electrical routing through the integrated Mentor Capital electrical system design application. For electronic design, NX Flexible PCB and PCB Exchange is powered by the Mentor Xpedition enterprise IC package and PCB design system.

Embedded systems software is an integral element of all mechatronic systems today. In the smart connected world of IoT and connected products, embedded intelligence is becoming essential to all connected ecosystems. This applies whether it is production factory machines and equipment, products in the field that require maintenance and monitoring, or smart cities and infrastructure.

Siemens NX/Mentor Capital electrical design offers a systems design solution for electromechanical integration and embedded systems software. Additionally, NX/Mentor Xpedition provides cross-discipline PCB integration to tightly integrate and embed electronic board design with mechanical layout. And finally, NX ELMA offers a lightweight, standalone tool that augments ECAD-MCAD collaboration during the design review, design iterations, and markups.

Collaborative Design Management Essential to Team Engineering

Today's complex engineering product design projects often require a team approach with multi-discipline engineering skills and multiple designers needed to complete the various phases of the project. This, in turn, requires

a robust collaborative design management environment in which the team can work together on all tasks with coordinated engineering data management. Siemens Teamcenter provides this environment with a broad set of data management and process capabilities that can be launched from within NX. This includes Teamcenter Navigator, Embedded Active Workspace, Intelligent Save & Engineering Integration, and Advance Security.

The goal is to streamline the product development process from concept to production and provide a model-based definition that represents a single source of the truth for all engineering design. This would constitute a fully integrated technical data package for NX that supports collaboration with suppliers, manufacturing, quality assurance, assembly, product support and service, and all stakeholders requiring access to 3D engineering content.

Immersive Visualization

Siemens has now fully integrated virtual reality visualization capability into NX. This means design reviews can be conducted in full scale via an immersive virtual environment with a direct connect to any NX session, eliminating the need to export data. This will allow for an enhanced VR user experience with a fully immersive 3D viewing environment. Designers will be able to view and navigate complete and complex assembly and product designs in a VR environment that will allow them to view and inspect fully assembled products such as automobiles, aircraft, large turbines, and other structures.

Conclusion

The latest releases and upgrades to the company's flagship NX design solution help demonstrate Siemens' commitment to delivering best-in-class, next-generation design solutions to its customers. Today, NX users have the capability to use legacy data right out of the box. Additionally, with its focus on game-changing technologies in areas such as generative design, additive manufacturing design processes, electro-mechanical model-based design, and immersive VR, Siemens is well-positioned to lead its customers into the future of product design.

For further information or to provide feedback on this article, please contact your account manager or the author at dslansky@arcweb.com. ARC Views are published and copyrighted by ARC Advisory Group. The information is proprietary to ARC and no part of it may be reproduced without prior permission from