

DIGITAL INDUSTRIES SOFTWARE

# Accelerating automotive aftermarket design

Leveraging a powerful product development solution for automotive supply chain  
and aftermarket manufacturers

[solidedge.siemens.com](https://solidedge.siemens.com)

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# Industry trends

A revolution is taking place in the automotive industry. Autonomous and electric vehicles are disrupting the entire supply chain with no end in sight. Accelerated product development, new manufacturing processes and the need to connect anything and everything within a vehicle are here to stay. This transportation revolution also requires the automotive supply chain and aftermarket industry to achieve operational excellence while reacting to disruptive technologies and business models.

The growing global industry has been impacted by emerging markets and new technologies such as electric vehicles (EVs) and autonomous vehicles (AVs). These new green-conscious technologies increase product complexity and place increasing importance on the software. Designing and manufacturing more complex parts, including those for hybrid/electric cars, can be an attractive proposition for automotive supply chain and aftermarket companies due to rising consumer demand and the profitability of such parts.

Connectivity in vehicles and demand for customized products adds even more complexity to product design. Those who can supply products with a higher level of customization have a leg up on their competition. However, manufacturers are under pressure to deliver quality products faster and more cost-effectively.

According to an article from the Wall Street Journal from June 2021 titled, "Americans are keeping their cars longer, as vehicle age hits 12 years," another industry trend is consumers are keeping cars for longer periods of time. For example, in 2019 the average age of licensed vehicles in

Some of the major trends that are impacting the automotive supply chain and aftermarket manufacturers are:

- More complex product design
- Demand for customized and connected products
- Consumers owning cars longer

the United States exceeded 12 years. The longer a car is in service, the greater possibility there is for component failure. Older cars typically require more repairs and maintenance than newer cars, and more importantly, a greater number of aftermarket parts.

Automotive supply chain and aftermarket manufacturers are under pressure to improve the speed and efficiency of their product design and engineering processes so they can deliver new products on time and meet their customer's expectations for reliability and performance. Siemens Digital Industries Software is a partner in addressing the challenges these manufacturers are facing.

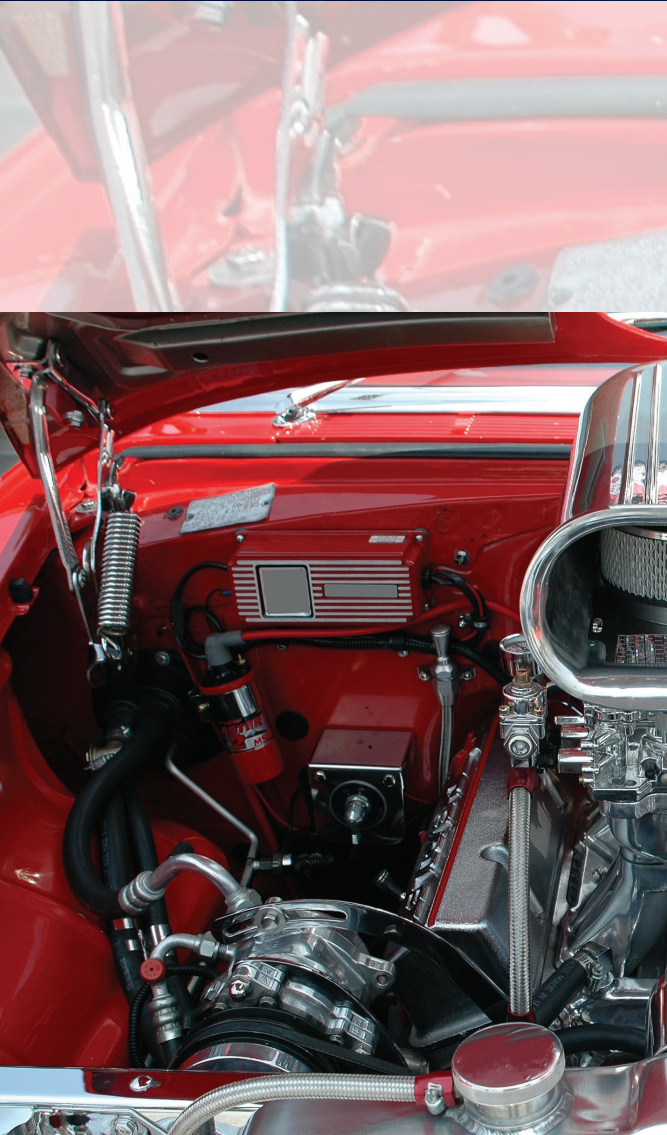
A majority of the top 50 automotive original equipment manufacturers (OEMs) and supply chain companies rely on Siemens software to optimize the performance of their product development processes and the final product. Data exchange is straightforward for automotive aftermarket and supply chain companies using Siemens software. Product development is future-proofed by using the same software solutions and data standards as leading automotive OEMs.

Solid Edge® software, which is part of the Xcelerator portfolio, the comprehensive and integrated portfolio of software and services from Siemens Digital Industries Software, enables manufacturers to respond to major trends that are impacting the automotive industry.





# Leveraging software to support innovation



To respond to these trends and succeed in competitive global markets, manufacturers will benefit from improving performance in key process areas.

## **Work easily with computer-aided design (CAD) data in different formats:**

- There's no need to purchase additional third-party CAD software when your CAD software can directly open and reuse designs created in a variety of formats
- Solid Edge includes excellent capabilities for translating third-party data with a high degree of accuracy while maintaining the original intelligence of the data
- Solid Edge uses built-in translators that open third-party CAD files directly in Solid Edge, including those for SolidWorks, Inventor, PTC Creo and more. Additional translators for computer-aided applications such as CATIA are available as add-on modules

## **Share multi-CAD design data in a controlled way while protecting intellectual property (IP):**

- Cloud-based collaboration tools provide faster and more controlled communication of design intent between suppliers and customers to reduce errors and speed up the product development process
- Xcelerator Share from Siemens provides cloud-based collaboration closely integrated with Solid Edge
- Xcelerator Share includes integrated visualization, markup and augmented reality (AR) capabilities for multi-CAD data

## **Maintain data integrity by managing data created and consumed throughout the product lifecycle:**

- Speed up the introduction of new products with fast and accurate completion of projects and engineering changes
- Leverage Solid Edge data management tools to help you manage engineering changes efficiently with built-in capabilities and to safeguard data integrity with revision and release management features
- Solid Edge can provide a growth path to Teamcenter® software when you need more comprehensive product lifecycle management (PLM) capabilities

## **Ensure products meet requirements and comply with industry regulations:**

- Linking customers requirements to 3D CAD models and design projects makes them easily accessible to all involved in product development
- Solid Edge data management offers flexible file storage and sharing solutions using local, network and cloud-based storage options
- Solid Edge Requirements Management software captures and tracks customer requirements and relevant industry standards



### Create complex components quickly and accurately:

- Comprehensive 3D CAD tools can make design faster and more efficient
- Solid Edge 3D design tools include unique synchronous technology to help you enable fast and flexible product design
- Synchronous technology contains built-in intelligence that interprets design intent regardless of where the design originated

### Don't let complex assemblies slow you down:

- Designing components in the context of an assembly can ensure fit and function
- Solid Edge provides all the tools you need to work more efficiently on large assemblies, regardless of their size
- Taking advantage of off-the-shelf catalog components can reduce costs and speed the design process. Solid Edge provides users with immediate access to integrated cloud-based catalogs, streamlining and simplifying the process of finding 3D models

### Design components to fit existing vehicles:

- Reverse engineering capabilities are extremely useful when designing components based on physical data from existing vehicles. It can create 3D CAD models from scanned data
- Solid Edge includes robust reverse engineering and convergent modeling capabilities
- Convergent Modeling™ technology enables mesh-based data to be used alongside b-rep CAD models

### Configure new products quickly and accurately:

- Gain and retain more insightful engineering knowledge using rules-based design processes
- Rules-based automation can speed the development of product configurations
- Solid Edge Design Configurator delivers powerful design automation capabilities within the Solid Edge environment

### Communicate correct information for manufacturing, inspection and service:

- Publishing complete 3D technical data packages, including comprehensive product manufacturing information (PMI), can decrease the need to create 2D drawings
- Solid Edge supports a model-based definition (MBD) approach for communicating manufacturing information to reduce errors
- Solid Edge Model Based Definition software can be used to publish production information in 3D PDF formats based on company-specific templates

**Up to 90 percent of the economic and user value created by a product will soon derive from its digital and software components.**

Accenture, "Time to reinvent your product," March 2019



# Leveraging software to support innovation

## **Design electrical components for electro-mechanical products:**

- Simultaneous collaboration between electrical and mechanical domains can optimize product design
- Validating electrical circuitry using simulation and design rule checking enables the development of functionally accurate schematics
- Using Solid Edge electrical design products allows you to design fully functional and manufacturable electrical systems while simultaneously collaborating with the mechanical domain

## **Route electrical wiring around 3D assembly models and along complex 3D geometry:**

- Enabling data to flow seamlessly between 2D wiring, 2D harness and 3D mechanical computer-aided design (MCAD) environments can help teams understand and trace the impact of design decisions
- Virtual prototyping that includes real-time design rule checking of violations can optimize the routing of a product's wiring
- Solid Edge Electrical Routing includes a connected mode for interactive MCAD and electrical computer-aided design (ECAD) integration

## **Integrate printed circuit boards (PCBs) into electromechanical products:**

- Using 3D CAD models of PCBs during the design process can ensure they are housed accurately and safely in electromechanical assemblies

- Solid Edge PCB Collaboration enables users to send design aspects between electrical and mechanical disciplines so changes can be accepted or rejected
- Solid Edge PCB Collaboration supports the mapping of 3D models to Siemens' PADS™ Professional and Xpedition products and integration with third-party solutions using the IDX format

## **Analyze structural performance to optimize product design prior to manufacturing:**

- Identifying and resolving problems prior to manufacturing can lead to a significant drop in costs and time-to-delivery by reducing the number of required physical prototypes
- Simulating vibration levels during product operation using harmonic response analysis can ensure designs successfully overcome resonance
- Solid Edge Simulation provides integrated stress simulation analysis including static, dynamic and fatigue analysis

## **Confirm products perform as required in areas involving fluid flow and cooling:**

- Integrated computational fluid dynamics (CFD) tools can optimize products and identify and resolve problems before manufacturing
- Using software easy enough for designers prevents the need to employ CFD specialists or outside consulting firms
- Simcenter™ FLOEFD™ for Solid Edge provides integrated fluid flow and heat transfer analysis

## **Choose the best manufacturing process that can reduce errors and rework:**

- Creating efficient machining toolpaths and simulations based on digital models results in reduced errors and rework in manufacturing
- Computer-aided manufacturing (CAM) solutions that are associative to a CAD model can maximize the value of your machine tools
- Using Solid Edge CAM Pro enables you to create accurate and efficient 2.5, 3 and 5-axis milling processing

## **Prepare parts for manufacturing on in-house 3D printers:**

- Using 3D printing techniques can minimize the need to stockpile spare parts
- Manufacturing small volume parts efficiently can significantly reduce tooling costs
- Solid Edge enables you to create world-class products using the latest additive manufacturing (AM) technology, 3D printing techniques and access to cloud-based services for quoting and manufacturing of parts

## **Generate clear technical documentation:**

- Create easy-to-understand technical documentation to help users operate and maintain products correctly to ensure a product's performance and reliability
- Communicate the most efficient manufacturing, installation and maintenance processes for your products using dynamic technical publications



- Using Solid Edge technical publications solutions, designers can quickly create many types of technical documents; from simple illustrations for end-user manuals to interactive 3D technical documents for manufacturing and service

**Improve communication of designs to highlight the unique value of innovative solutions:**

- Photorealistic imagery and animations can be made quickly and easily from 3D models
- Augmented reality can show products in real-world environments
- KeyShot capabilities launched directly from Solid Edge can help you create high-quality renderings, animations and interactive visuals (augmented reality capabilities bring ideas to life with design visualization)



**Suppliers benefit from CAD software that is easy to use, easy to access and built on open standards.**

## Benefits of using Solid Edge

Solid Edge is based on the Parasolid geometric modeling kernel, owned by Siemens and used by many automotive OEMs. Parasolid enables you to create and modify digital 3D models and deliver complete 3D model compatibility between product development applications such as design, simulation and manufacturing.

Many automotive OEMs use the CAD features of Siemens NX™ software for high-end solutions. The Siemens mechanical design bundle provides flexible access to both NX and Solid Edge CAD solutions. NX and Solid Edge are based on the Parasolid modeling kernel.

Solid Edge 3D design provides tutorials and wizards to speed the learning curve. An adaptive user interface (UI) learns typical command usage and predicts the next steps. Users have a choice of perpetual and/or subscription licenses with free software for 2D users, students and startups.

To learn more about how Solid Edge enables automotive aftermarket suppliers to be successful, please visit [siemens.com/automotive-suppliers](https://www.siemens.com/automotive-suppliers).



## About Siemens Digital Industries Software

Siemens Digital Industries Software is driving transformation to enable a digital enterprise where engineering, manufacturing and electronics design meet tomorrow. Xcelerator, the comprehensive and integrated portfolio of software and services from Siemens Digital Industries Software, helps companies of all sizes create and leverage a comprehensive digital twin that provides organizations with new insights, opportunities and levels of automation to drive innovation. For more information on Siemens Digital Industries Software products and services, visit [siemens.com/software](https://siemens.com/software) or follow us on [LinkedIn](#), [Twitter](#), [Facebook](#) and [Instagram](#). Siemens Digital Industries Software – Where today meets tomorrow.

Americas: 1 800 498 5351

EMEA: 00 800 70002222

Asia-Pacific: 001 800 03061910

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