

# Garmin International Inc.

LEADING THE GLOBAL POSITIONING SATELLITE (GPS) MARKET WITH SOLIDWORKS



Garmin International uses the sophisticated surfacing and geometric modeling capabilities in SolidWorks to set new standards for innovation in hand-held GPS design.

→ Garmin International Inc., part of Garmin Ltd. (NASDAQ: GRMN), is a leading designer, manufacturer, and marketer of navigation and communications equipment for aviation and consumer markets. Founded in 1989 to produce a hand-held Global Positioning Satellite (GPS) system, Garmin International introduced the first hand-held GPS unit for the consumer market, which the company now leads in both sales and critical acclaim. With facilities in Kansas, the United Kingdom, and Taiwan, Garmin International has expanded to provide additional consumer products, including combination fishfinder/GPS units and radio communication devices, as well as navigation systems for the automotive industry.

Garmin International Inc. pioneered the consumer hand-held Global Positioning Satellite (GPS) market by introducing its first hand-held GPS unit in the early 1990s. While the company enjoyed an early advantage as one of the first consumer hand-held GPS companies, Garmin soon found itself facing an onslaught of competitors. To differentiate itself in an increasingly competitive market, Garmin evaluated upgrading its AutoCAD® 2D product development tools with an eye toward reinventing itself as the leading provider of innovative, aesthetically pleasing GPS products of distinction, according to John Whiteside, senior mechanical engineer.

“Our early products, which we designed in 2D, were very basic designs that were simply a display with buttons in a box,” Whiteside recalls. “We realized that as the market matured, GPS units would become a commodity and evolve to a more sophisticated product set. We believed upgrading to a 3D solid modeling system would enable us to improve the overall aesthetics and performance of our products, which would allow us to maintain and extend our market dominance.”

Garmin International’s evaluation of 3D solid modeling packages narrowed the field to two: Pro/ENGINEER® software and the SolidWorks® mechanical design system. The company selected SolidWorks software as its 3D design environment in 1996 because it was easier to use, Windows®-compliant, produced model data that could be leveraged for other functions, worked with complementary engineering applications, provided sophisticated surfacing and geometric modeling capabilities, and provided a better value.

“By transitioning to SolidWorks software, we could afford to provide the tool to more professionals in product development, including designers, industrial design, technical publications, and manufacturing engineering,” Whiteside says.

## Designing distinctive products

Since implementing SolidWorks software, Garmin International has raised the bar substantially for innovation in GPS products by producing a range of compact, organically shaped GPS systems. “SolidWorks gives us the ability to improve the overall aesthetics and 3D aspects of our products,” Whiteside notes. “We pretty much had to do things manually in AutoCAD, which limited our creativity and innovation. With SolidWorks, we can efficiently create a range of complex curvilinear shapes that not only are more attractive but more comfortable for consumers to hold and use.”

Using SolidWorks configurations capabilities, company engineers can easily produce a range of designs, such as long, thin models and short, squat models, with variations in between. This capability allows the company’s industrial designers to fine-tune product designs.

“SolidWorks has given our new concept development team a tremendous boost,” he adds. “We no longer have to fool around with a fillet here or a cut there and can push the envelope on geometric shapes and surfacing. SolidWorks enabled us to go from bulky to sophisticated product designs very quickly and has played a major role in contributing to our success.”



- Reduced design cycles by 20 percent
- Improved product aesthetics
- Cut 2-3 weeks from tooling development
- Achieved leadership position in GPS consumer market

→ **CHALLENGE:** Garmin International pioneered the consumer hand-held Global Positioning Satellite (GPS) market by introducing the very first hand-held consumer GPS system. When the company found itself facing an onslaught of competitors, Garmin engineers decided to upgrade their 2D CAD system to a 3D solid modeling environment to develop innovative, aesthetically pleasing GPS product designs that would differentiate the company's products in an increasingly competitive market.

→ **SOLUTION:** The company selected SolidWorks software because of its ease-of-use, Windows-compliant interface, versatility, compatibility with complementary engineering applications, sophisticated surfacing and geometric modeling capabilities, and value. By deploying SolidWorks, Garmin has reduced its design cycles by 20 percent, improved the aesthetics of its products, cut two to three weeks from tooling development, and achieved a leadership position in the GPS consumer market.

### Slashing the design cycle, reducing errors

In addition to elevating product sophistication at Garmin, the SolidWorks implementation has helped Garmin to shorten design cycles while at the same time reducing the number of design errors. "Before implementing SolidWorks, our product design cycles averaged about 15 months, in some part due to the need to correct design errors. With SolidWorks, we have cut our design cycles down to about 12 months with far fewer errors," Whiteside says.

Garmin uses SolidWorks in conjunction with CircuitWorks, a printed circuit board layout program, and COSMOSWorks®, an integrated design analysis application. "We are an electronics-driven company, and the ability to take a 3D neutral file from CircuitWorks with the location of parts and heights on the printed circuit board is a huge time- and mistake-saver. It enables us to create more complex housings more accurately, which we can then validate using COSMOSWorks," Whiteside notes.

The company also uses SolidWorks collision detection capabilities to verify clearances and check for interferences between mechanical and electrical components.

### Accelerated tooling development

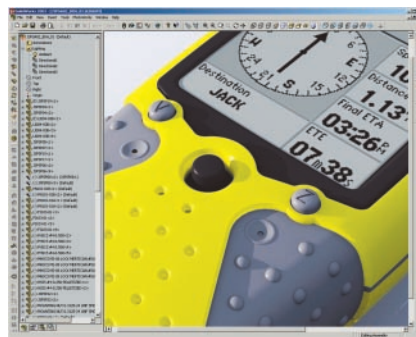
Using SolidWorks mold analysis capabilities to validate designs, stereolithographic (SLA) models to verify fit and function, and SolidWorks eDrawings™ to communicate with toolmakers and the company's tooling operations in Taiwan, Garmin has cut an average of two to three weeks from its tooling development process while simultaneously reducing the volume of tool rework.

"The draft and undercut analysis tools in SolidWorks are huge assets for streamlining mold development and minimizing tool rework," Whiteside explains. "With SolidWorks, we understand what will cause tool problems early on and address those issues before we cut tooling, which makes the tool development a faster, smoother process."



Garmin International Inc.  
1200 East 151st Street  
Olathe, KS 66062  
Phone: +1-913-397-8200  
Fax: +1-913-397-8282

[www.garmin.com](http://www.garmin.com)



Garmin International leverages SolidWorks integration with other applications, such as CircuitWorks for designing printed circuit boards and eDrawings for communicating with tooling developers, to accelerate time-to-market.



SolidWorks Corporation  
300 Baker Avenue, Concord, MA 01742  
Phone: +1-800-693-9000  
Outside the US: +1-978-371-5011  
Fax: +1-978-371-7303  
Email: [info@solidworks.com](mailto:info@solidworks.com)

SolidWorks Europe  
Phone: +33 (0)4 42 15 03 85  
Fax: +33 (0)4 42 75 31 94  
Email: [infoeurope@solidworks.com](mailto:infoeurope@solidworks.com)

SolidWorks Asia/Pacific  
Phone: +65 6866 3885  
Fax: +65 6866 3838  
Email: [infoap@solidworks.com](mailto:infoap@solidworks.com)

