

INTELLIGENT MANUFACTURING SYSTEMS

Global Research and Business
Innovation Program



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CAD/CAM





CAD/CAM

How to Use This Guidebook

Each CAD/CAM Guidebook is created with the business growth needs of small and medium manufacturers in mind. By utilizing the information in this guidebook, you are taking the first steps to creating a competitive advantage for your company by innovating in the face of disruptive technologies.

This guidebook follows a logical flow to guide you as you learn more about CAD/CAM (see Fig. 1). Review the sections as they apply to your individual opportunities and resources, either in the order they're presented or jump around to fit your immediate needs.

Figure 1: CAD/CAM Guidebook Information Flow



This is your toolkit for plugging into the CAD/CAM platforms innovation network.

Together, all of our guidebooks work to uplift manufacturers through increasing digital readiness; working together to accelerate the understanding and investment in emerging technologies; and foster a culture of innovation in the manufacturing industry. We encourage you to also review the other guidebooks in this series.

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CAD/CAM

CAD/CAM at a Glance

What are CAD/CAM systems?

Wikipedia has a simple definition for both computer-aided design¹ and computer-aided manufacturing:²

“Computer-aided design (CAD) is the use of computer systems (or workstations) to aid in the creation, modification, analysis, or optimization of a design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing. CAD output is often in the form of electronic files for print, machining, or other manufacturing operations.”

“Computer-aided manufacturing (CAM) is the use of software to control machine tools and related ones in the manufacturing of workpieces.”

Inc. Magazine also published a summary of both online:

<https://www.inc.com/encyclopedia/computer-aided-design-cad-and-computer-aided-cam.html>

“Computer-aided design (CAD) involves creating computer models defined by geometrical parameters. These models typically appear on a computer monitor as a three-dimensional representation of a part or a system of parts, which can be readily altered by changing relevant parameters. CAD systems enable designers to view objects under a wide variety of representations and to test these objects by simulating real-world conditions.

“Computer-aided manufacturing (CAM) uses geometrical design data to control automated machinery. CAM systems are associated with computer numerical control (CNC) or direct numerical control (DNC) systems. These systems differ from older forms of numerical control (NC) in that geometrical data are encoded mechanically. Since both CAD and CAM use computer-based methods for encoding geometrical data, it is possible for the processes of design and manufacture to be highly integrated. Computer-aided design and manufacturing systems are commonly referred to as CAD/CAM.”

Why do CAD/CAM systems matter?

Manufacturers can be more fast and flexible as well as more visible and accessible to new customers, partners and geographies by utilizing CAD/CAM systems. Building your part related data online and being able to update and share that data with suppliers and customers is critical to competing in a global economy where access to potential manufacturing partners is seemingly unlimited and business information travels fast. The definition of “business as usual” has evolved to “going digital” is now crucial for manufacturer survival.

What are the biggest CAD/CAM opportunity areas?

We have identified three key opportunity areas in CAD/CAM systems for manufacturers. More information and case studies can be found in the Identify Opportunities section on pg. 8.

Opportunity #1: Streamline processes for better engineering and manufacturing productivity

Opportunity #2: Reduce lead times, design time, programming time, and rework

Opportunity #3: Improve time to market and exceptional design

¹ https://en.wikipedia.org/wiki/Computer-aided_design

² https://en.wikipedia.org/wiki/Computer-aided_manufacturing



What are the business benefits of utilizing CAD/CAM systems?

There are numerous benefits to implementing CAD/CAM systems into your workflow. For example, CAD/CAM has been proven to be more cost-effective means of:

- Having a unified source of part geometry and manufacturing data.
- Providing both improved external and internal communications.
- Improved productivity of operations.

Customers who feel connected to their manufacturer throughout the design, purchase, and delivery process are also more likely to purchase as well as recommend and refer you to their peers.

This article lists the top benefits to incorporating CAD/CAM software into your CNC manufacturing:

- The 10 Top Advantages to Using CAD-CAM in the CNC Manufacturing Process, via BobCAD-CAM.
<http://bobcad.com/10-top-advantages-to-using-cad-cam-in-the-cnc-manufacturing-process/>

CAD/CAM also can be used to reduce product development costs, with 60 percent of overall project cost determined during the concept stage:

- 10 Ways to Reduce Product Development Costs, via SolidWorks.
<http://blogs.solidworks.com/solidworksblog/2016/04/10-ways-reduce-product-development-costs.html>

Where can I find help to get started?

There are partners who can assist you with full CAD/CAM strategies or specific implementations of tactical solutions on business functions that you've prioritized. There are also many free online resources, as well as educational courses offered by state universities and colleges. Turn to p.16 for a list of resources to help jumpstart your use of CAD/CAM solutions available to grow your business.



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Mexico (Pending) are eligible to create an account.

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