

NC Software and Related Services Market Assessment

Version 17

May 2008

**Prepared by
CIMdata, Inc.**

Alan M. Christman

CIMdata[®]

<http://www.CIMdata.com>

CIMdata, Inc.

3909 Research Park Drive, Ann Arbor, Michigan 48108

Tel: +1 (734) 668-9922 Fax: +1 (734) 668-1957

CIMdata[®] is a Registered Trademark of CIMdata, Inc.

Copyright © 2008 by CIMdata, Inc. All rights reserved.

About CIMdata

CIMdata, a leading independent worldwide firm, provides strategic consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata works with both industrial organizations and suppliers of technologies and services seeking competitive advantage in the global economy by providing world-class knowledge, expertise, and best-practice methods on PLM solutions.

CIMdata helps industrial organizations establish effective PLM strategies, identify requirements and select PLM technologies, optimize their operational structure and processes to implement solutions, and to deploy these solutions.

For PLM solution suppliers, CIMdata helps define business and market strategies, delivers worldwide market information and analyses, provides education and support for internal sales and marketing teams, as well as overall support at all stages of business and product programs to make them optimally effective in their markets.

CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM enabling technologies including product data management (PDM), visualization, collaboration, digital manufacturing, computer-aided design/manufacturing (CAD/CAM), and numerical control (NC). CIMdata also provides expertise in the integration of PLM with other business solutions such as customer relationship management (CRM), supply chain management (SCM), and enterprise resource planning (ERP).

In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through international conferences in North America, Europe, and the Pacific region.

To learn more about CIMdata's services, visit our website at www.CIMdata.com or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 (734) 668-9922. Fax: +1 (734) 668-1957. In Europe: Siriusdreef 17-27, 2132 WT Hoofddorp, The Netherlands. Tel: +31 (0)23 568-9385. Fax: +31 (0)23 568-9111.

About the Author

Alan M. Christman

Alan Christman, Chairman and member of the CIMdata Board of Directors, has more than 30 years of experience in defining, marketing, and implementing CAD/CAM/CAE/CIM technology. He has been associated with NC programming technology since the late 1960s and interactive CAD/CAM technology since the late 1970s. A consultant since 1989, Mr. Christman is a worldwide recognized authority on numerical control software systems.

He is the primary author of the CIMdata NC Software Market Assessment Reports and Compendium of NC Software Product Reviews. He has conducted extensive research in manufacturing engineering, digital manufacturing, and topics related to CAM and PLM software use. Mr. Christman consults with end-users of CAM software, all major CAD/CAM companies, digital manufacturing suppliers, and most significant CAM-centric vendors on a variety of strategic, marketing, and technical subjects. He frequently reviews CAM operations and performs product or market assessments for vendors.

Prior to joining CIMdata, Mr. Christman held a variety of corporate technical and executive positions with Union Carbide Corporation and Control Data Corporation. At Union Carbide, he served as an engineering supervisor, Manager of Manufacturing Process Analysis, and Director of Information Systems in one of their major manufacturing facilities. At Control Data, his positions included General Manager of Product Planning, General Manager of Manufacturing Industry Marketing, and General Manager of CAD/CAM Marketing. He is often quoted in the trade press and is a frequent chair/speaker at industry conferences. Mr. Christman has been or is currently listed in:

- Biltmore Who's Who among Executive and Professional men in Technology, Programming and Computer Services
- Executives and Professional Who's Who
- International Who's Who in Information Technology
- International Who's Who of Professionals
- The National Register Who's Who in Executives and Businesses
- Sterlings' Who's Who
- Who's Who in the Computer Industry
- Who's Who in Computer Graphics
- Who's Who in the Midwest

Mr. Christman received Bachelor of Science and Masters of Science degrees in Chemical Engineering from the University of Michigan. He was a Ph.D. candidate in Mathematics at the University of Tennessee.

Alan Christman
Chairman, CIMdata, Inc.
E-mail: a.christman@CIMdata.com
Phone: (561) 416-9356

I. Introduction

This NC Software Market Assessment Report provides information about the worldwide market for Numerical Control software products and services. The report includes market size in terms of expenditures by user companies for NC software products and related services, analyses of various technical aspects concerning the industrial use of NC software and techniques, trends in the NC software industry, market share of NC vendors by various measurements, reseller revenues, and other information related to NC software vendors.

This report is one component of the annual CIMdata NC Market Service. The annual service begins on April 1 of each year. Components of the Service include:

- An annual update to the NC Software Market Assessment Report. The Advance Packet of Key Data is issued in early April of each year. The full report is expected to be issued in the second quarter of each year. This Version 17 report is the update for the year beginning April 1, 2008. Each version of the report builds on the prior version. As such, the careful reader will find some areas that are unchanged, some that are updated, and some that are totally new; hence each version is complete in itself.
- The CIMdata Late Breaking News email that provides daily updates on PLM, including CAM and happenings in the industry.
- A call-in option for NC market information. CIMdata will respond to specific questions related to the CAM market if the information is known or can be obtained with reasonable effort. CIMdata does not perform market research under the call-in option; however, CIMdata will accommodate requests for more substantial information as a research project.

D. Machine Tools

2007 was an excellent year for machine tool production and consumption as both increased by approximately 16% over 2006. This clearly had an impact on the growth in CAM software to drive these machine tools.

The following table shows the top ten countries producing machine tools in millions of U.S. dollars and the percent change from 2006 to 2007. It can be seen that although Japan and Germany remain as the top two countries producing machine tools, China is rapidly moving up in the rankings with a 43% growth rate in 2007 output. Brazil and Italy also experienced strong growth rates at 21% and 17% respectively. Overall output grew by about 16% to \$71.0 billion. More than half (52.5%) of the world's output comes from Japan, Germany, and China.

Rank	Country	2007 Output \$ Million	Change 2007 vs 2006
1	Japan	14,443	8%
2	Germany	12,725	15%
3	China	10,090	43%
4	Italy	7,273	17%
5	S. Korea	4,550	11%
6	Taiwan	4,378	14%
7	United States	3,578	-3%
8	Switzerland	3,323	7%
9	Spain	1,436	7%
10	Brazil	1,157	21%

Figure 5—2007 Worldwide Machine Tool Production and Growth Rates

Source: Gardner Publications

The top consumers of machine tools as measured by the value of machine tools installed for the top ten countries, as well as the percentage change in 2007 is shown in the following table:

Rank	Country	Value of Machine Tools \$ Million	Change 2007 vs 2006
1	China	15,390	17%
2	Japan	7,619	-2%
3	Germany	7,252	29%
4	United States	6,171	-3%
5	Italy	5,056	22%
6	S. Korea	4,150	3%
7	Taiwan	3,785	31%
8	Brazil	1,822	28%
9	India	1,774	36%
10	Mexico	1,669	34%

Figure 6—2007 Value of Machine Tools Installed

Source: Gardner Publications

It can be seen that China is far and away the largest user of machine tools, as the value of tools installed is essentially double that of Japan, the nearest competitor. Moreover, they experienced a 17% growth in value in 2007, as compared to a -2% growth for Japan. The value of China's consumption is 23% percent of the total of all consuming countries. Other countries showing a significant double digit growth were Germany, Italy, Taiwan, Brazil, India, and Mexico. For the United States, the value of installed machine tools fell by 3%. The total consumption was \$15.4 billion and this was an increase of approximately 16% over 2006. Seven countries consume 70% of the world output. The statistics come from the 43rd World Machine Tool Output and Consumption Survey that is conducted annually by Gardner Publications.

E. Total NC Software Market Size and Growth

The estimated and forecasted size of the total worldwide CAM software and related services market for the period 1999 through 2008 is shown in Figure 7. (Note that the CAM and NC terms are used interchangeably in this report.) The total revenue shown is based on end-user payments. These payments are segmented into revenue going to the software vendors and those payments retained by reseller and OEM firms.

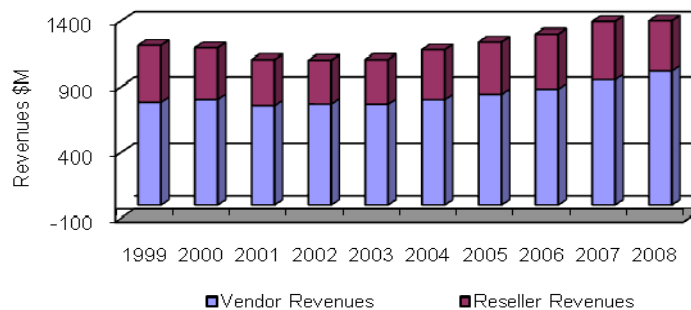


Figure 7—Size and Composition of the NC Market

The actual estimated revenue data by year for vendor-received revenues, reseller and OEM revenues, and end-user payments are shown in Figure 8. Figure 7 is based on this data.

Year	Vendor Revenues (\$M)	Reseller Revenues (\$M)	End-User Payments (\$M)
1999	779	436	1,215
2000	802	394	1,196
2001	752	354	1,106
2002	765	336	1,101
2003	763	344	1,107
2004	800	380	1,180
2005	841	399	1,240
2006	882	419	1,301
2007	952	443	1,395
2008	1,020	484	1,504

Figure 8—Size and Composition of the NC Market

It can be seen from the figures above that the market reached \$1.2 billion in 1999 and that this was the high watermark until 2005. End-user payments then declined from 2000 through 2002. It was essentially flat for three straight years from 2001 through 2003. There has been solid growth since then.

The NC software market has shown steady growth as global economies have improved. There has been worldwide growth in manufacturing output, and greater emphasis is being placed on efficient operation of machine tools as manufacturing firms must enhance their competitive position. Machine tool sales have increased significantly (approximately 16% in 2007) in the past couple of years, and the overall PLM (Product Lifecycle Management) market, of which CAM is a component, has shown strong growth. CAM software purchases are directly related to all of these factors.

Even though software to control machine tools to cut parts is a relatively mature market, it has been active and exciting in the past couple of years. Some software vendors have had revenue growth of as much as 30% per year. Acquisitions are driving market consolidation, new manufacturing areas such as China are emerging, corporations are placing greater emphasis on streamlining manufacturing operations, and the underlying CAM software technology continues to evolve.

In the following figure, the end-user payments by year are repeated, but the corresponding annual growth rates are also shown for the ten-year period ending in 2008. Solid growth was achieved in 1999. Negative growth rates of -1.6%, -7.5%, and -0.4% were then experienced in 2000, 2001, and 2002 respectively. As noted above, the market was flat from 2001 through 2003. From 2004 through a forecasted 2008, the growth rates are 6.6%, 5.1%, 4.9%, 7.2%, and 7.8%, all of which are acceptable growth rates for a mature industry.

Year	End-User Market Size (\$M)	Annual Growth Rate (%)
1999	1,215	8.0
2000	1,196	-1.6
2001	1,106	-7.5
2002	1,101	-0.4
2003	1,107	0.5
2004	1,180	6.6
2005	1,240	5.1
2006	1,301	4.9
2007	1,395	7.2
2008	1,504	7.8

Figure 9—End-User Payments and Annual Growth Rates

Most CAM software vendors remain optimistic about 2008. In 2007, nine of the ten most rapidly-growing vendors grew at double-digit rates. They were SolidCAM, Cimatron, OPEN MIND, Missler Software, Dassault Systèmes, Delcam, Geometric Tech, Gibbs, and Planit Holdings. For 2008, CIMdata is projecting that eight of the ten most rapidly-growing companies will also grow at a double-digit rate. They are expected to be Cimatron, SolidCAM, Geometric Tech, OPEN MIND, Dassault Systèmes, Vero International, CNC Software, and Delcam. It should be noted that in some cases this rapid growth is directly related to acquisitions.

In Figures 10 and 11, the growth in vendor-received revenues is shown. Figure 10 presents the growth in vendor revenues only, as compared to that of end-user payments. It can be observed that of the estimated \$1,395 million in end-user payments in 2007, the software vendors received \$952 million, or 68%. The balance of \$443 million went to resellers and OEM firms. This was an increase in vendor revenues from the \$882 million received in 2006. CIMdata projects that in 2008, vendor-received revenues will increase to \$1,020 million, which will result in a growth of 7.1% over 2007. During the period of 1999 through projected 2008, vendor revenues will have grown by approximately 30% from \$779 million to \$1,020 million. It is interesting to note that vendor revenues will likely cross the \$1 billion level in 2008 for the first time.

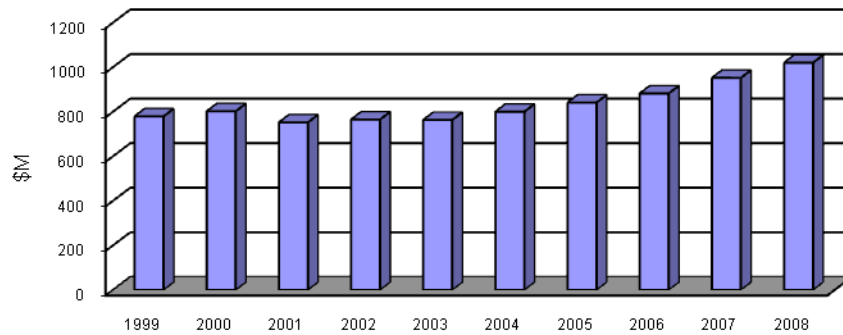


Figure 10—Revenue Growth at the Vendor Level

The following figure shows vendor revenues and annual growth rates for those revenues. The vendor revenue growth was in single digits in 1999 and 2000, and then went negative for the 2001 through 2003 period. From 2004 through 2006, the growth rate returned to the 5% to 6% range, and it is in the 7%-8% area in 2007 and 2008, which is much more respectable.

Year	Vendor Revenues (\$M)	Annual Growth Rate (%)
1999	779	5.4
2000	802	3.0
2001	752	-6.2
2002	765	1.7
2003	763	-0.1
2004	800	4.8
2005	841	5.1
2006	882	4.9
2007	952	7.9
2008	1,020	7.1

Figure 11—Vendor Revenues and Annual Growth Rates

The CAM market is defined to include manufacturing modeling, machining process planning, toolpath generation, toolpath verification, CMM support, and post-processing functions. Manufacturing modeling includes preparing a design model for manufacturing, and design and documentation of the manufacturing tools required to produce a part. For example, mold base design or progressive die design software is considered by CIMdata to be a manufacturing modeling or a CAM function. Some vendors and market analysts consider this to be a CAD function. Service revenues are only included for vendors and resellers that provide NC software and for the services associated with the sale and installation of that software. Vendors that provide services only are not considered part of this market.

For CAD/CAM or PLM-oriented companies like Siemens PLM Software that provide NC, revenues associated with CAM functions are estimated and included. CAD or other PLM revenues are not included. This is sometimes difficult to obtain directly, since CAM revenues may not be recorded as a separate business. In this case, a best effort estimate is developed. For CAM-centric companies, such as Delcam, Cimatron, OPEN MIND, etc., the total company revenues are usually included in the tabulation. This includes sales of their design software as well as their CAM software. Niche vendors that provide only one of the CAM functions, such as toolpath verification or post-processing, are included in the

CIMdata definition of the NC market. For niche vendors providing multiple functions, only their NC-related revenues are included.

To obtain end-user payments, CIMdata segments vendor revenues into those received from direct sales and those received from a reseller channel. CIMdata multiplies the revenue that is received from resellers by a factor of 2.2 to obtain an approximation of end-user payments. The 2.2 factor is based on the assumption that the average discount given to resellers is 50%, such that for each dollar of end-user payments, half goes to the reseller and half goes to the software vendor. In addition, CIMdata adds an additional 20% to the end-user payment to account for services performed by resellers.

I. Rapidly-Growing Companies

The companies that CIMdata believes experienced the largest percentage increase in NC software and related services revenues in 2007 are shown in the following figure. Only those vendors with more than \$3.0M in annual revenues are considered, since for small companies, a relatively modest increase in dollars of revenue can result in an abnormally high percentage increase. SolidCAM, and Cimatron were the most rapidly-growing companies with more than 30% growth over 2006. In both cases the growth was primarily internal, although the Cimatron acquisition of one of their resellers contributed to their growth. For Cimatron, this was a spurt after years of stagnant growth.

Rank	Company	Growth Rate (%)
1	SolidCAM	37.1
2	Cimatron	33.5
3	OPEN MIND	22.9
4	Missler Software	18.9
5	Dassault Systèmes	18.0
6	Delcam	15.0
7	Geometric Technologies	14.3
8	Gibbs	13.0
9	Planit Holdings	10.3
10	IMS	9.4

**Figure 52—2007 Most Rapidly-Growing Companies
by Vendor Revenue**

VIII. CIMdata Comments on the Top 20 NC Software Vendors

Comments are provided below with regard to each of the top twenty NC software vendors in order of their ranking by vendor revenue received in 2007.

SolidCAM

SolidCAM is implementing a distinctive business and product strategy, their revenue growth rate is exceptional, and they have a broad-based, easy-to-use, competitive CAM product offering. CIMdata is favorably impressed by the core SolidCAM strategy to be closely aligned with and embedded within SolidWorks, the SolidCAM decision to only develop CAM products, the extensions to their product line in high-speed and 5-axis machining, and the breadth and depth of their CAM product offerings. The offering meets the needs of a broad range of industries and users. SolidCAM is rapidly becoming a significant player in the worldwide CAM marketplace.

SolidCAM has established a distinguishing position in the market as one of only two CAM software vendors that are certified Gold partners of SolidWorks. Certified Gold partners are those vendors that have embedded their NC software within a single SolidWorks window. SolidWorks is the SolidCAM modeler. As such, in combination with SolidWorks, SolidCAM is able to provide a fully associative, integrated offering for design and NC that appears seamless to the user. SolidCAM does not provide a standalone CAM product. To run SolidCAM requires SolidWorks. SolidCAM has customized their NC software to meet the SolidWorks Gold standard. CIMdata is supportive of this strategy.

SolidWorks has attained industry acceptance as the defacto standard product in the mid-range solid modeling market. SolidCAM is doing an excellent job in leveraging this market acceptance. They have been effective in promoting the SolidWorks relationship and building on the SolidWorks brand name. As a Gold partner, SolidCAM is inextricably linked to SolidWorks in conducting their business, and in their marketing and product development programs. SolidCAM is totally focused on CAM. They are not only leveraging SolidWorks for product design, but for other functions as well, such as tool design, interfaces with third-party products, and access to engineering analysis products, information management, process planning, PDM and other third-party applications.

With the single-window integration of SolidCAM in SolidWorks, all machining operations are defined, calculated, and verified without leaving the SolidWorks environment, although the SolidCAM user interface can also appear on the screen for NC operations. All 2D and 3D geometries used for machining are fully associative to the SolidWorks design model. When geometry used to define a machining operation is changed in a SolidWorks design, SolidCAM enables the user to automatically synchronize all machining operations with the updated geometry.

Within NC, a strength of SolidCAM is that they offer an easy-to-use, modestly-priced product that includes an exceptionally broad range of industry-competitive machining capabilities. It is a general purpose CAM product. It supports all aspects of hole making, 2.5-axis milling, 3-axis milling, 4-axis milling, 5-axis positioning, simultaneous 5-axis milling, high speed milling, “tombstone” machining, basic turning, mill turning up to 5-axis, wire EDM, toolpath verification, and machine tool simulation.

SolidCAM also provides customized post-processors that utilize their internally developed post-processor generator. This is unusual for a CAM-centric vendor in that many competitive suppliers rely on third-party products for post-processing. Individual posts can be generated by a central SolidCAM group, resellers, or users.

SolidCAM has elected to base their high-speed machining offering on the Machining Strategist product that was originally developed by NC Graphics, and to further enhance it with SolidCAM resources. It provides a competitive capability that is critical to a number of important application areas such as moldmaking. It includes a large number of machining strategies, as well as advanced features that are specifically directed at high-speed machining.

SolidCAM is a process-oriented CAM system that supports knowledge-based machining. Intelligence is built into the system and machining templates are provided with the software for specific functions such as thread milling, face milling, floor and wall machining, and rest milling. SolidCAM creates and captures process templates, and then permits the user to re-use these templates in subsequent and similar situations.

Many of the SolidWorks users and prospects are potential SolidCAM users. The SolidCAM market is increasingly becoming the SolidWorks market. Given the large SolidWorks installed base, SolidCAM has a more-than-adequate cadre of companies from which to draw. SolidCAM is sold either as an add-on CAM product into the SolidWorks base of customers, or it is promoted as a packaged CAD/CAM offering of SolidWorks and SolidCAM to companies that have not yet implemented CAD/CAM, or those that have previously selected other vendors. SolidCAM emphasizes the market position of SolidWorks as the industry standard mid-range solid modeler and the complete integration of SolidCAM within SolidWorks. The benefits of this tight integration are stressed as the key differentiator for SolidCAM, as compared to most other CAM-centric vendors.

In addition to their tight integration with SolidWorks, SolidCAM also highlights in their marketing program the availability of multiple third-party products from other SolidWorks partners, the broad product offering of SolidCAM in CAM, ease of use, programming process automation, modest software price, and worldwide product support. As such, users can obtain a productive, extensive, and a fully-integrated CAD/CAM capability at an attractive price/performance ratio.

SolidCAM has defined a balanced strategy between incorporation and integration of third-party products and internal product development. Third-party products are employed for design and modeling, mold design, high-speed machining, 5-axis machining, and full machine simulation. SolidCAM often adds functionality to third-party products and has done so in both high-speed machining and 5-axis machining. Internal product development is utilized for functions such as the CAM Manager, hole making, 2.5 and 3-axis milling, feature-based machining, turning, mill turning, toolpath verification, and post-processing.

Because of the ease of use and wide range of machining operations that are supported, CIMdata believes that SolidCAM is particularly well suited for use in small- to mid-sized job shops or general-purpose machine shops in which the user produces a variety of parts or components, has a need to perform a multiplicity of functions, and is or would like to be a SolidWorks user. These shops can be found as independent operations or within larger manufacturing companies in a variety of industries. SolidCAM also can be employed in machining of molds, aerospace components, or for machining of high volume production parts. Unlike some vendors that direct their efforts at a single type of user such as moldmakers, SolidCAM does not focus on any specific application area. SolidCAM tracks the SolidWorks base, but is best suited to satisfy a range of needs, as compared to a particular need.

SolidCAM is used in shop floor programming by machinists, as well as by professional dedicated programmers. Since it is easy to use, automated, and modestly priced, it is well suited for this application. A demonstration version of SolidCAM, in which G code is not generated, is also available at no charge for previewing machining operations by shop floor machinists. With this version, a user can read in existing parts and observe the cutting operations, but is not permitted to make changes or produce a toolpath file to actually cut parts.

Since the SolidCAM market focus is to track SolidWorks, they have a focused marketing program. SolidCAM participates in SolidWorks user conferences, advertises on the SolidWorks web site, and works closely with SolidWorks resellers. In the past, SolidCAM has only conducted a full marketing program in their major markets, such as Germany. However, this is beginning to change as SolidCAM grows and expands its market presence. For product support, customers interact almost solely with resellers and the SolidCAM Web site. Their resellers appear to be well qualified in CAM. Customer access to SolidWorks is through SolidCAM.

Major SolidCAM releases are done every year concurrently with releases by SolidWorks. SolidCAM and SolidWorks product development and releases are done independently, but Alpha and Beta releases of SolidWorks are provided to SolidCAM so that the each can provide new releases within a short time period of each other. SolidCAM also does interim releases between major releases that include new feature capability as well as code correction.