

INSIGHT

Autodesk Acquires Three Visualization Companies, Opening the Door for Broader Use of Digital Prototyping in Manufacturing

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IDC OPINION

At first glance, Autodesk's acquisition of three small visualization companies in August 2007 appears to address the independent product strategies of three of its business divisions — architectural, engineering, and construction (AEC); media and entertainment; and manufacturing solutions. This is certainly true, but beyond that, IDC believes:

- ☒ In the coming years, these new products and technologies will end up driving an emerging market strategy for Autodesk's manufacturing solutions division, namely the expansion from product design and engineering into conceptual product design and product optimization through digital prototyping.
- ☒ Autodesk's initiative will go a long way to improve the competitive strength especially of consumer products manufacturers in high-wage countries by providing the tools to accelerate time to market for new product introductions but, equally important, to attract distributors and customers through superior styling.

IN THIS INSIGHT

This IDC Insight explores the characteristics of three recent acquisitions by software applications provider Autodesk and their effect on Autodesk's position within manufacturing automation. Autodesk is beginning to develop a new marketing strategy for its Inventor product line. In fact, the company is expanding its market definition of manufacturing solutions from an engineering focus to a focus on digital prototyping — that is, dealing with the complete product before it becomes a physical reality. In Autodesk's definition, digital prototyping includes the creation, validation, optimization, and design management from conceptual design to the manufacturing process.

SITUATION OVERVIEW

Unquestionably, Autodesk is on an acquisition spree into visualization. In quick order, the company announced in late August the completed acquisitions of NavisWorks and Opticore and the agreement to finalize the Skymatter Ltd. acquisition in the near future. Each of these acquisitions targets visualization in the specific market segments addressed by three of Autodesk's four business divisions — NavisWorks

for AEC, Opticore for manufacturing solutions, and Skymatter for media and entertainment.

First a look at the company profiles and product offerings of each of the three acquired companies, and then a discussion about how the expansion of Autodesk's visualization technology will benefit Autodesk's discrete manufacturing end users and open a new application arena for the manufacturing solutions division: digital prototyping.

Skymatter for the Media and Entertainment Division

Privately owned Skymatter Ltd. of Auckland, New Zealand, was founded in 2005. The three company founders — Dave Cardwell, Tibor Madjar, and Andrew Camenish — met while working at Weta Digital, a visual effects design firm in Wellington, New Zealand, where they were involved in character design for films such as *The Lord of the Rings* and *King Kong*. In December 2006, the firm announced the first public release of its 3D brush-based modeling and sculpting software, Mudbox. The tool features high-resolution brush-based sculpting that is targeted at companies focusing on visual effects, game development, and toy manufacturing. Mudbox Professional pricing starts at \$649; noncommercial Mudbox Basic is available for \$299. Customers come from markets such as architecture, defense/military, illustration and graphics, media and entertainment, medical visualization, jewelry, and toy design. Among its customers are Blur Studio, Cinesite, Collective Studies, Epic Games, Radical Entertainment, Naughty Dog, The Orphanage, and Pandemic Studios.

According to Autodesk, this acquisition was dictated primarily by the technology of Skymatter, rather than by its customer base. The purchase price has not been disclosed. Finalization of the deal is expected within the next two months. In the immediate future, this acquisition will strengthen Autodesk's media and entertainment division's offering for the film, television, and game market segments. It will certainly complement Autodesk's three product lines from its 2006 acquisition of Alias Software — Maya for modeling, animation, and rendering; StudioTools industrial design software for automotive and consumer product design; and MotionBuilder for character animation product lines. However, the manufacturing solutions division and particularly the Inventor team will also take advantage of Mudbox. With Mudbox, it will be able to expand its Alias-based presence in conceptual design for the automotive and the industrial products design market.

Autodesk has kept the Alias development largely intact in its Toronto office. The Skymatter team will relocate to Autodesk's Toronto office upon completion of the acquisition and will focus on releasing the next version of Mudbox, as well as achieving greater interoperability between the Mudbox toolset and Autodesk 3ds Max and Autodesk Maya.

Opticore for the Manufacturing Solutions Division

Opticore AB of Gothenburg, Sweden, was a wholly owned subsidiary of privately owned Design Communication. The company's product offerings focused on

interactive and realistic 3D digital visualizations and presentations for conceptual product design. Founded in 1998 and with U.S. headquarters in Troy, Michigan, Opticore has won automotive and consumer product design customers, including Ford, Audi, Hyundai, and all eight major automotive manufacturers in Japan. Customers in the consumer product arena include Canon Inc., Philips Consumer, Nokia Mobile, and Electrolux.

Opticore products offer high-end visualization capabilities, real-time raytracing, and the ability to create diverse environments and materials. Its product line includes:

- ☒ Opticore Opus Realizer, for photo-realistic presentations (Realizer can export and publish models in Web format.)
- ☒ Opticore Arena, for design management access and feedback
- ☒ Opticore Studio, for the creation of advanced presentations
- ☒ Opticore Visualizer, for the visualization of engineering CAD data of full vehicle data sets for engineering

Opticore is compatible with many CAD and 3D data formats including CATIA, JT, and IGES. It is available only in English.

Opticore distributed its applications directly as well as through a list of global resellers. This will most likely remain unchanged now that the acquisition has closed.

The completion of the Opticore acquisition by Autodesk was announced in August 2007. A purchase price was not disclosed. This acquisition will add approximately 25 employees to Autodesk's payroll. The company will become part of Autodesk's initiative to drive mass adoption of 3D among its customers in key industries including automotive and consumer products. Opticore products are interoperable with Alias Studio and with Maya. Autodesk's manufacturing solutions division will have to address some overlap of its own Autodesk Showcase software and Opticore. For the near future, the two product lines will most likely continue to exist side by side, but over time, Autodesk will probably merge the two product offerings.

NavisWorks for the AEC Division

NavisWorks was a privately held company based in Sheffield, England, and was founded in 2002. The company's JetStream product is used by construction companies, architects, engineering companies, shipbuilders, and building owners/operators. It is sold in 35 countries worldwide and has more than 3,000 customers, which own more than 15,000 licenses. NavisWorks has offices in Scottsdale, Arizona, and Mainz, Germany, and currently has about 40 employees. Autodesk completed the acquisition in August 2007 for the price of \$26 million plus a working capital adjustment.

Currently, NavisWorks' JetStream product line is targeted at AEC, as well as the plant design and shipbuilding market. It allows users to digitally aggregate 3D models and data from multiple sources for construction, process plant, and marine design projects. This model data can come from 2D and 3D civil, architectural, structural, building

systems design, and as-built data that may be acquired through laser scanning technology. JetStream provides the following product modules:

- ☒ Roamer, for real-time walkthrough of all major native 3D designs produced in different applications for review
- ☒ Publisher, for the sharing of 3D models for viewing
- ☒ Freedom, a freely available viewer that allows users to visualize NavisWorks projects
- ☒ Presenter, for the creation of images and animation of various projects
- ☒ Clash Detective, for the identification, inspection, and reporting on interferences
- ☒ TimeLiner, for the visual simulation of work processes

In May 2007, NavisWorks announced that JetStream had been certified compatible with Autodesk's product design offering Inventor 2008. The compatibility with AutoCAD Architecture, AutoCAD Civil 3D, and Revit had been achieved earlier. The company distributes its products directly and through a small worldwide VAR channel. It is available in six languages: English, Simplified Chinese, French, German, Japanese, and Russian.

Autodesk plans to invest in further expanding the NavisWorks product solution into an even more comprehensive suite of solutions for design and construction. Another likely development will be the move into discrete and process manufacturing as supported by Autodesk's manufacturing solutions division.

FUTURE OUTLOOK

Autodesk's Manufacturing Solutions Pushes into Digital Prototyping

At first glance, these acquisitions appear to be relatively modest investments in visualization capabilities for three separate applications arenas that have little end-user overlap — AEC, media and entertainment, and manufacturing solutions. In fact, these acquisitions map into Autodesk's new strategy to expand more deeply into visualization and digital prototyping. This strategy first became clear with the 2006 acquisition of Alias Software for an impressive \$182 million. The following Alias products are now the foundation for Autodesk's expansion into ideation, which is critical for digital prototyping in discrete manufacturing: AliasStudio, an integrated suite of tools for industrial design and visualization — from concept sketches through engineering

- ☒ ImageStudio, with rendering for designers
- ☒ Showcase, with realistic imagery from 3D design data and an environment in which to present and review designs for important product decisions

Alias was the start, but IDC believes that over time, the newly acquired technologies from Skymatter, Opticore, and NavisWorks will get leveraged into an expanded visualization product offering for Autodesk's discrete manufacturing customer base. (In this document, IDC uses the terms *digital prototyping* to refer to the activity of graphically representing a physical product that is under development and *conceptual design/industrial design* to refer to the creative/artistic process of styling a new consumer product under development.)

The question that needs answered here is why a division like manufacturing solutions that primarily focuses on small and medium-sized businesses (SMBs) in discrete manufacturing should invest substantial resources in entering a market that is currently controlled by the complex conceptual design offerings of a few leading vendors including Dassault Systemes with its recently acquired ICEM technology, PTC's Pro/Concept, UGS' Imageware, and a few niche vendors such as Rhinoceros and DeskArtes as well as open source software.

The answer is simple: The digital prototyping market is at the point where three market drivers are converging to create rapidly growing market opportunities:

- Growing demand for superior styling of consumer goods
- Digital prototyping as a means to bring new products to market faster
- The growing number of next-generation industrial designers who are trained and willing to use computer-aided tools for conceptual design

Market Demand for Superior Product Styling

The market for manufacturing companies, particularly for consumer goods, has become a daily struggle for survival, especially for small and midsize companies. Competition from low-cost countries is putting enormous pressure on price competition that drives large numbers of first-world manufacturers out of business. The only rescue, we believe, is to focus on product innovation. Customers are willing to pay premium prices for market-leading novelties. However, product innovation by itself would be hard put to attract attention. One other factor needs consideration, and that's styling.

Consumer product styling has been recognized for many years as a major sales advantage. The kitchen equipment by Braun — now a division of Gillette/Procter & Gamble — is legend not only for its excellent quality but even more so for its beautiful clean styling. Even now, 50 years after its first product introductions, Braun can still serve as a model to SMBs for how to succeed and reach high brand recognition in a competitive and cost-sensitive market.

Digital Prototyping for Faster Time to Market

New product introductions, particularly for consumer goods, depend on the design sign-off by a number of departments within each company: product design and engineering, manufacturing, marketing, sales, and often also distributors and retailers. In the past, this process required the development of physical product prototypes that

had to undergo a whole range of alterations before they met the approval of all concerned. Not surprisingly, this cost money but also valuable time.

In the last few years, software developers have begun to introduce digital applications for electronic representations or prototypes to accelerate this process. Digital prototyping is now defined as dealing with the complete product before it becomes real — that is, creation, validation, optimization, and design management from the conceptual design phase through the manufacturing process. Using a single digital model throughout the design process helps product development teams improve the level of communication between different stakeholders and accelerate time to market. With digital prototypes, manufacturers can visualize and simulate the real-world performance and appeal of the design with fewer physical prototypes.

Although Web-enabled digital prototyping is a great help in accelerating product sign-offs, the quality of many of the visualization applications leaves much to be desired — many visual product prototypes look flat, lifeless, and unappealing. If products are to win the wholehearted support of marketing and sales as well as retail buyers, they have to reflect light and throw shadows, have realistic surfacing, and operate in front of exciting backgrounds — all of this within a much shorter time frame than required for physical prototypes to accelerate time to market.

Conceptual Designers and Digital Prototyping

Conceptual designers, also called industrial designers, are artists. For many years, they shunned computerized product design and stuck by pencil/charcoal and paper. This opposition caused computer-aided graphics design companies serious headaches about how to win users and grow the market. Now, it appears that the new generation of artists entering the conceptual design and digital prototyping world is willing to give computers a chance. At the same time, the computer games industry has driven the computer graphics developers to improve technical sophistication, ease of use, and collaboration. The consequences are a rapidly expanding group of experienced users and relatively low prices for conceptual design packages. For the consumer goods industry, this means the following:

- ☒ Designers can try a larger number of design choices because designs can be executed much more rapidly.
- ☒ There is no need to build costly and time-consuming physical prototypes to convey a precise idea of the appearance and handling of a product.
- ☒ A design can be evaluated by a larger group of decision makers in marketing and sales because a first-rate electronic representation can be distributed over the Web.

Conclusion

The sum total of these considerations is that Autodesk's manufacturing solutions division is getting ready to provide its SMB customers with the tools needed to improve the competitive strengths of their products and processes, especially in the consumer goods arena. The timing appears to be right: Requirements from

manufacturing, user expertise, and software technology are converging to satisfy the increasing demand for conceptual design applications that in the past were the exclusive domain of high-cost and complex products.

At this point, Autodesk is poised to become the clear leader in digital prototyping and conceptual design with its broad product offering for new product development and data management. Either competitors are high-end niche players such as ICEM for automotive, or they offer applications of lower-quality technology or limited use. In the coming months, Autodesk will have to develop a road map for three key issues:

- ☒ How to move the newly acquired visualization technologies into an integrated product offering by the manufacturing solutions group
- ☒ How to distribute and support these products (i.e., whether to develop VAR expertise or an in-house sales force and support group)
- ☒ How to package the applications (i.e., for high-end professionals, midrange, low-end, and educational use)

If Autodesk succeeds in integrating its Inventor design applications with its applications for conceptual design and digital prototyping, it may play an important role in improving the future of hard-pressed consumer goods manufacturers in high-wage regions of the world. IDC believes that if these manufacturers have the right tools at the right price, they can design truly desirable leading-edge products and accelerate new product introduction.

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