



Comparative Analysis

Why Autodesk Inventor Series Is the Best Choice for AutoCAD Users

If you're an AutoCAD® user who wants to move to 3D design, this paper will give you some of the reasons to consider the Autodesk Inventor™ Series.

The Autodesk Inventor Series is a collection of design applications that includes Autodesk® Mechanical Desktop® and Autodesk Inventor™ software in one package. This series gives you the flexibility to continue to use AutoCAD and AutoCAD-based mechanical solutions while you discover the advantages of the new paradigm in 3D design software—Autodesk Inventor.

As an AutoCAD user you have a risk-free opportunity to get started with the latest 3D technology without giving up the system you depend on today.

This paper highlights the many unique advantages of Autodesk Inventor software:

- Easiest 3D design system to learn and use
- Painless migration from 2D to 3D
- High-performance 3D design
- Built-in production Sheet Metal application

Autodesk Inventor helps you to complete your designs with greater speed and accuracy, protects your technology investment by making it easy to reuse your existing data, and gives you access to the first new design technology for the manufacturing industry since 1985.

Recently, *CADALYST* magazine selected Autodesk Inventor as the **best midrange modeler for large and complex assemblies**. "Autodesk Inventor was the clear winner. We've had the opportunity to conduct an in-depth review of the software and other similar solutions, and Autodesk Inventor stands heads and shoulders above the rest," said Art Liddle, *CADALYST* Labs director, and executive editor, technology. According to *CADALYST*, Autodesk Inventor software is "destined to change the way designers and engineers work."

Single-Day Productivity

Autodesk Inventor is recognized as a leader in technology innovation and ease of use. For example, its sketching environment is simple, yet powerful. This sketcher allows you to create almost any profile without lifting your hand off the mouse. This means you don't have to learn a complex series of selections or commands to create your designs.

The entire user interface has been designed with not only fewer commands, but smarter commands that never leave you guessing what to do next or looking through multiple layers of dialog boxes to find a particular option or capability. For example, the single Dimension command produces virtually every dimension type you can think of by interpreting what dimension you are trying to place, based on the position and motion of the mouse.

Likewise, the gesture-based interface of Autodesk Inventor software understands what you are trying to accomplish. For instance, while in the sketcher your hand can simply gesture the shape of an arc, and the system draws an arc without necessitating any extra commands.

Other 3D modeling systems cannot offer this level of innovation, intelligence, or ease of use. This means you can always quickly reacquaint yourself with the application and not waste time digging through multiple layers of menus or commands.

Autodesk Inventor also has a deeply integrated learning and support system that helps you understand and use the system as well as examine, diagnose, and cure modeling problems. It's called the Design Support System (DSS), and there is nothing like it on the market today. It truly helps you every step of the way in developing and maintaining your productivity.

Empower Your AutoCAD Data

Autodesk Inventor software offers industry-leading DWG compatibility. Its AutoCAD import features are focused on reproducing an AutoCAD (or other DWG file) drawing as accurately as possible into Autodesk Inventor.

DWG Import

Autodesk Inventor drawing documents that are created by importing a DWG file have several exclusive characteristics designed to make the editing and representation of the drawing as accurate as possible.

Autodesk Inventor automatically organizes AutoCAD geometry, text, and annotation objects such as symbols, dimensions, and leaders.

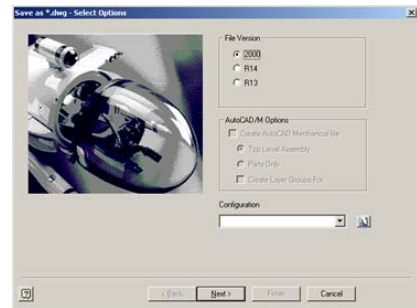
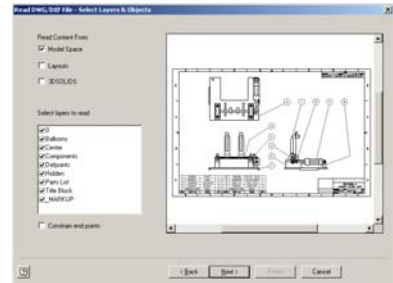
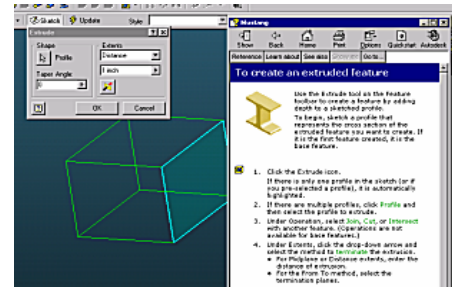
This organization ensures that all AutoCAD formatting options are preserved. Dimensions, text, blocks, and symbols all can be edited directly in the drawing. Moreover, if the 2D geometry is modified, all views and crosshatches affected are updated automatically.

DWG Export

The DWG export function is focused on

- Allowing AutoCAD clients, vendors, and suppliers to use the DWG file as a common communication mechanism
- Providing accurate 2D data for downstream processing applications such as NC
- Allowing the use of AutoCAD to complete the detailing of Autodesk Inventor drawing views
- Supporting previous versions of AutoCAD, including AutoCAD 2000i and 2000 plus, AutoCAD Release 14 and 13 files, and Release 12 DXF™ files

Autodesk Inventor software ensures that all DWG files created are visually complete, geometrically accurate, and organized in a manner that is consistent with AutoCAD conventions.



Best Workflow for AutoCAD users

Autodesk Inventor software also adds additional intelligence to 2D static DWG data in three unique workflows.

Adaptive Layouts

In the early stages of design, you may not yet know the final shape of individual parts, so you may prefer to use conceptual design methods such as simple 2D sketches or stick figures. These sketches may coexist within 3D solid models and can become the foundation of the 3D bodies they represent. With Autodesk Inventor, these conceptual sketches can “adapt” their shape and position in the context of the assembly. Any combination of 2D sketches and 3D models can be used to validate the design. You can test the range of motion of an assembly without being forced to create a full 3D assembly. Autodesk Inventor software lets you design the way you want to: determine function before form.

Autodesk Inventor offers the most complete toolset for this workflow. Other 3D CAD systems, some claiming to offer layout capabilities, eventually force you to solve the modeling problem before solving whether the design will function correctly.

Create 2D Parametric Drawings

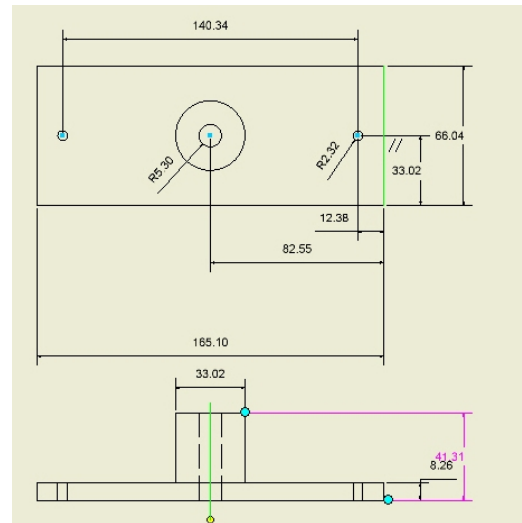
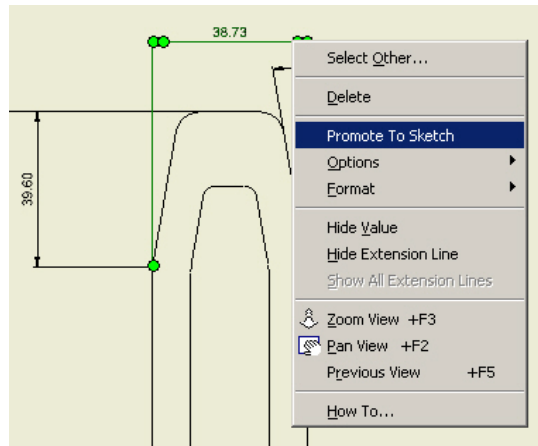
Autodesk Inventor software extends legacy information by bringing static AutoCAD DWG files to life with 2D parametric intelligence. After importing your data, you can easily promote AutoCAD dimensions to parametric dimensions with a single click of a mouse.

Any dimensional change will ensure that all related drawing views, cross-section patterns, and annotations update automatically to reflect the change. Furthermore, geometric relationships (collinear, tangent, concentric, and so on) can also be added to create relationships within and among Autodesk Inventor views.

Sometimes it is easier to create a quick 2D drawing for the shop floor rather than create a 3D part or assembly. In these cases you can use Autodesk Inventor software as a stand-alone 2D parametric editor. With Autodesk Inventor software, you can create an entire 2D parametric drawing without any related 3D data.

You have access to the same powerful sketching tools whether you are creating 2D drawings or 3D parts. With the gesture-based user interface, sketching has never been easier. Any dimension you add to your sketch can be changed to modify your drawing. If you decide that there is a need to turn this 2D drawing into a 3D part or assembly, you can do so at any time.

The ability to add intelligence to your 2D DWG files gives you the familiar feel of the AutoCAD 2D environment while logically helping you to make the transition to a 3D design system.

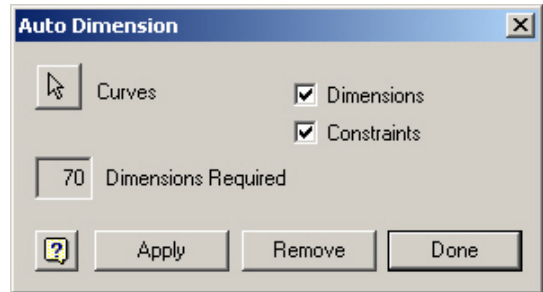


2D to 3D: What Works Best for You?

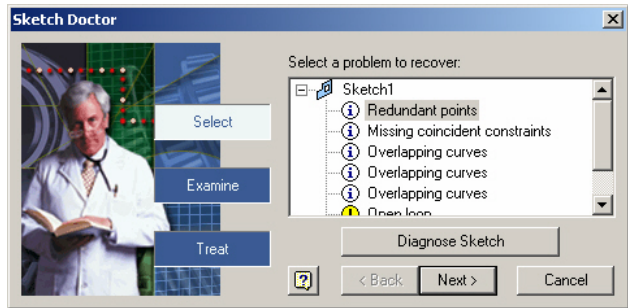
Unlike other systems, Autodesk Inventor software does not limit or interfere with your natural workflow by forcing you down one path as you move from 2D to 3D. Instead it offers multiple paths, allowing you to choose what works best for you. AutoCAD 2D DWG data can be imported wherever and whenever it is required, whether in the 2D drawing view environment or directly into a part sketch for use in 3D modeling.

AutoCAD DWG data can be imported into the Autodesk Inventor 2D drawing environment, where you can promote dimensions to driving dimensions and copy views into part sketches for 3D modeling. This is especially useful when using current design data as a backdrop for subsequent innovation.

AutoCAD data can also be easily imported directly into a part sketch where you can take advantage of the automatic dimensioning capability in Autodesk Inventor. This simple tool is used so you may automatically add any necessary dimensional and geometric relationships before you create 3D parts.



When Autodesk Inventor software attempts to create features with imported DWG data, it may find errors that prevent the feature creation from proceeding—items such as open loops, redundant sketch points, or overlapping curves. The Sketch Doctor highlights and describes these errors and suggests solutions. This matchless functionality makes the transition from AutoCAD easier by guiding you through the error recovery procedure.



These same issues plague other 3D systems; however, other systems can provide only cryptic information about the errors with little (if any) method for repairing them. You must investigate and apply your own solutions with limited guidance from such a program. This manual investigation and repair can be a long and tedious process. In fact, most other 3D systems will tell you to not leverage your existing 2D DWG data, but to start over by re-creating every profile to develop the 3D model. Autodesk Inventor software allows you to extend your AutoCAD data easily.

High-Performance 3D Design

Autodesk Inventor software is a proven solution that helps AutoCAD users get the job done through large-assembly performance, innovative adaptive technology, and embedded applications such as sheet metal, surfacing, and a fastener library.

Large-Assembly Design

Autodesk Inventor software was specifically architected to handle large assemblies in a multiple-user environment. To do so effectively, Autodesk Inventor directly addresses issues of performance, concurrent design, visualization, and the ability to manage your design projects.

The keystone of this capability is the Adaptive Data Engine and its segmented database. The database organizes data on disk for fast retrieval and segments it. Only the required data is read from disk.

Today's modeling systems typically incorporate data structures that capture file properties, intelligent feature recipes, constraints, undo histories, and optimized graphic information.

This data is typically spread out over the hard disk and, when retrieved, is randomly intermixed on every page of memory.

In contrast, the Adaptive Data Engine organizes data by part and usage category, thus optimizing data retrieval and usage. To further increase runtime performance, the Adaptive Data Engine intelligently loads only those data segments needed to perform specific operations.

Traditional systems force you to manually control the loading of large, complex assemblies. The Adaptive Data Engine transparently performs this sophisticated management task as you work. Autodesk believes that you should not have to worry about how to manage large assemblies in order to work in an efficient design environment.

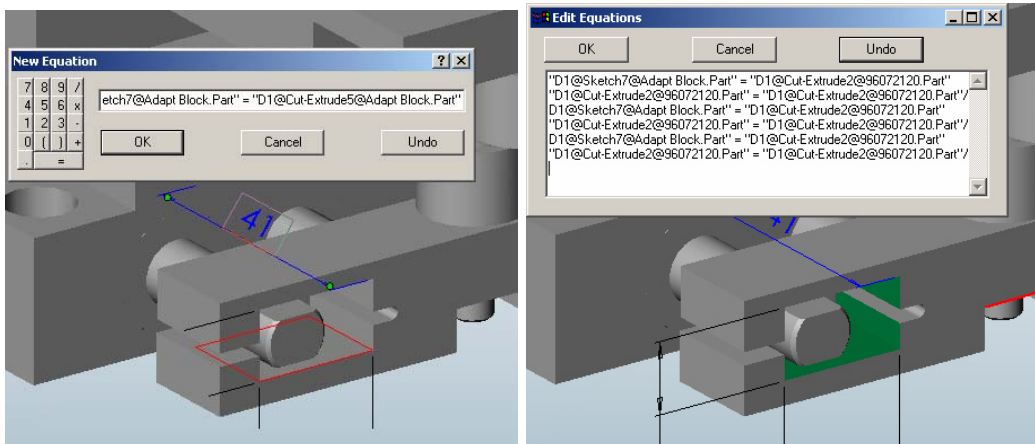
Adaptive Technology

While Autodesk Inventor software supports the parametric design philosophy of parameters and equations, it also allows for a new technological approach. The *adaptive* technology of Autodesk Inventor provides total design flexibility to solve the inherent flaws of parametric-only systems.

With adaptive technology, you can easily create part relationships without depending on algebra, parameters, or dimensions. You simply specify how parts fit together, and the assembly based “fit” definition automatically determines the relative parts’ sizes and positions. The adaptive system is superior to traditional parametric and variational systems in that it is much more intuitive. This means that you can change any part of the assembly regardless of when it was created.



In a traditional parametric system, this level of flexible change is extremely difficult, if not impossible, since you are forced to use parameters and equations to relate the form and fit of assembly components. The way you create these parametric and/or associative relationships dictates the order in which you’re allowed to make changes.



A more natural method is to specify the fit and have the shape and position of the component automatically “adapt.” In addition, this is a two-way process where you can change your mind at any point and make changes in any order. The benefit is that you can make the necessary changes quickly to release a correct design.

Concurrent Engineering

Large designs are frequently the result of collaborative efforts. For this reason, Autodesk Inventor supports a multiuser design environment, enabling large design teams to work safely within a single project framework.

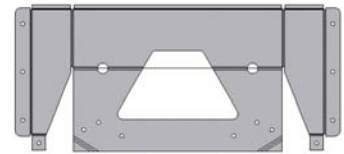
The entire design team can access the same assembly at the same time without worrying about overwriting someone else’s work. Many competitive systems have difficulty with this concurrent engineering principle without requiring its users to implement a costly and time-consuming PDM system.

Built-in Production Sheet Metal Application

AutoCAD users that design and manufacture sheet metal products will immediately benefit from the Autodesk Inventor embedded Adaptive Sheet Metal application. Designers will be able to quickly and easily form their sheet metal products utilizing the industry specific tools such as faces, cuts, flanges, hems, bends, punches, and corner seams. The purpose-built Autodesk Inventor Sheet Metal environment provides the user with the ability to create and control custom settings such as material and thickness, unfold methods, and bend-and-relief settings.



AutoCAD users will find that they can reuse their existing DWG data to assist in new sheet metal designs, no matter where the part is in the design cycle. Autodesk Inventor can generate a flat pattern of the part, which will indicate possible unfolding errors with the design. The flat pattern can be directly exported to an SAT, DWG, or DXF file format for CNC use. For detailing purposes, this same flat pattern can be placed within a 2D drawing file along with a view of the formed part for reference. When coupled with the Autodesk Inventor ease of use, high-performance 3D design, and adaptivity, sheet metal designers now have the tools they need to get the job done.



Conclusion

Autodesk Inventor Series is the clear choice for any AutoCAD user moving to 3D design, providing the best of both worlds: AutoCAD-based mechanical products and Autodesk Inventor software. You get both technologies in one easy-to-use solution that gives you the flexibility to use what you want when you want. Best of all, it’s a risk-free opportunity to get started with the latest 3D technology without giving up the system you depend on today.

Further, Autodesk Inventor helps you to complete your designs with greater speed and accuracy. It protects your technology investment by making it easy to reuse your existing data and gives you access to the first new design technology for the manufacturing industry since 1985.

“Using Autodesk Inventor, **we’ll save up to one million dollars** by drastically reducing prototyping.”
—Alfredo Bentivoglio,
President,
Alpha Marathon
Technologies, Inc.

Autodesk Inventor Series 5, the Best Choice for AutoCAD Users

- It is the easiest 3D design system to learn and use.
- It offers industry-leading DWG compatibility that lets you import and export your AutoCAD data better than any other system.
- It provides AutoCAD users the best possible workflow for leveraging AutoCAD data.
- It delivers high-performance 3D design through an innovative adaptive technology that provides large-assembly performance on a platform built for concurrent engineering.

The transition from 2D to 3D has never been easier.

See this comparison table showing how Autodesk Inventor software stacks up against a competitor's features in DWG compatibility.

	Autodesk Inventor™ 5.3	SolidWorks® 2001 Plus
Import AutoCAD & AutoCAD Mechanical DWG data		
Thumbnail preview of DWG in "Open" dialog box	✓	
Zoom and pan the AutoCAD drawing within the Import preview	✓	
Linked layer and viewing controls in for a WYSIWYG preview	✓	
Support AutoCAD Mechanical symbology	✓	
Control which AutoCAD dimensions promote for parametric use	✓	
Maintain intelligence of blocks and attributes	✓	*
Support dimension styles	✓	✓
Support text styles	✓	
Supports AutoCAD GD&T objects	✓	✓
Support AutoCAD layers		✓
AutoCAD command line with aliases		✓
Control which layout to import (Model space/Paper space)	✓	
Control which layout to export to (Model space/Paper space)	✓	
Import to AutoCAD Mechanical with support of its objects	✓	
Export to AutoCAD Mechanical with support of its objects	✓	
Purpose-built help and support for AutoCAD users	✓	
Automatic dimensioning tool for sketch data	✓	
Ability to move self-intersecting 2D profiles into 3D	✓	
Test dynamic motion of hybrid assemblies (2D plus 3D)	✓	**
Support for parametric modeling	✓	✓
Support for adaptive modeling	✓	

*Does not appear to follow AutoCAD concept of a block that contains one definition and multiple instances.

**Limited graphics capabilities cause sketch entities to disappear during motion testing within 3D environment; only limited subset of assembly constraints available for assembling 2D and 3D parts together, forcing many different assembly scenarios to 3D before motion can be tested.

Autodesk, Autodesk Inventor, AutoCAD, and DXF are either registered trademarks or trademarks of Autodesk, Inc., in the USA and other countries. All other brand names, product names, or trademarks belong to their respective holders.

© Copyright 2002 Autodesk, Inc. All rights reserved.