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IGIT

IRONCAD™

Included Technologies

Table of Contents

Table of Contents **1**

IronCAD Included Technologies **3**

3D Design Methods *3*
Structured Part Design Mode (SPM) 3
Innovate Part Design Mode (IPM)* 3
Dynamic Part Design Mode* 3
Direct-Face Part Design Mode (DFM) 3
Feature-Retention Boolean Part Design Mode* 3
Surfacing Design Mode 3
Sheet Metal Modeling 3
Parametric Modeling* 3
Assembly Modeling* 4
Dual Modeling Kernel Technology* 4
Structural Steel Weldment Creation 4
Point Cloud Data 4

3D Environment and Tools *4*
Library of Catalogs* 4
Part Content and Management 4
IntelliShape™ Modeling Intelligence* 4
Dynamic View Sensitivity Modeling (DVSM)* 5
SmartSnap™ Technology* 5
Behavioral Modeling 5
Variant Modeling (Design Variations) 5
SmartAssembly™ Technology* 5
IntelliStretch ® Technology* 5
Auto-Feature® (On-Demand feature recognition)* 5
Cruising Technology* 5
Multiple Coordinate Systems Creation 6
TriBall®* 6
SmartHandle™ Technology* 6
Auto-Project Sketching (APS)* 6
Spreadsheet-Driven Parametric Design 6
2D Sketch SmartSnap Feedback Indicators* 6
Cosmetic Weld 6

Simulation and Analysis *7*
Mechanism Kinematics and Collision Detection 7
Interference Checking 7
Minimal Distance Analysis 7
Part/Assembly Analytical Data Extraction 7
Multiphysics for IronCAD (MP for IronCAD) 7

Rendering and Visualization *8*
Rendering Content 8
Real-Time Rendering Options 8

Animation *8*

Collaboration and Data Sharing *8*
3D Email Package Builder 8
IronWEB - Web Publishing 8
3D PDF Support 9
CAD File Translation 9
SmartMarkup 9
3D Annotation (Basic PMI) 9
IronCAD-Compose (Sales Configurator) *9*
IronCAD-Compose iOS *10*
2-Dimensional Drawing and Drafting *10*
Drawing 2D Environment 10
CaxaDRAFT 2D Production Drafting Environment 10

IronCAD Included Technologies

This section outlines all the innovative functionality and technologies that is included with IRONCAD™ software at no extra costs. An asterisk (*) indicates a feature unique to IronCAD.

3D Design Methods[1]

IronCAD provides a multi-modal method of 3D design approaches universally in a single scene design environment. This is truly unique to IronCAD solutions and provides flexibility in design far beyond even the most common applications on the market today.

Structured Part Design Mode (SPM)

This design mode is the traditional history-based parametric modeling methodology typically found in older and more common 3D design software. SPM provides support for 3D multiple body capabilities.

Innovate Part Design Mode (IPM)*

This design mode is IronCAD's unique and patented design methodology that combines catalog-based drag-n-drop and sketch-based approaches in a synergistic environment.

Dynamic Part Design Mode*

This design mode is IronCAD's unique and patented design methodology with you combine the abilities of Innovative design mode and the more history feature based approach of Structured design mode using an on-demand type basis. In essence, this mode provides the most flexibility and power of all old and new cad design methodologies in a single environment.

Direct-Face Part Design Mode (DFM)

This design mode is allows the end user to edit 3D models at the face level for extreme ease of use. Explicit modeling as it is frequently referred to, in most systems is non-history based, but with IronCAD it can be history-based if used while in Structured Part Design Mode. DFM is used mostly in Innovative Part mode since it maintains the integrity of unaffected features of the part.

Feature-Retention Boolean Part Design Mode*

This design mode is allows you to generate models by combining parts in either a positive or negative approach to either add or remove material. Boolean features are common in most 3D CAD applications; however unique to IronCAD is the ability for the Boolean parts to retain their feature history structure even after the Boolean operation. So there is never a loss in fidelity to parts structure making editable a snap.

Surfacing Design Mode

This design mode is allows you to generate organic and complex models using IronCAD's surface creation tools. Surfacing can be used entirely you generate 3d models or they can be used in modifying solid models as a hybrid form of models that are both solid and surface based.

Sheet Metal Modeling

Unique to IronCAD is its ability to design sheet metal parts using Drag-n-Drop tools as well as sketched based tools. This collaborative effort makes modeling sheet metal parts the most productivity and user friendly. Also this is created in the same design environment; there is no need to switch a process-specific design environment which is counter-productive.

Parametric Modeling*

IronCAD provides on-demand parametric modeling capabilities along with geometric/dimensional constraint relationships in all the above listed design modes. This ability varies slightly depending on design modes. This is unique to IronCAD because some competitive software allows parametric modeling in very restrictive ways that IronCAD has learned to adapt around.

[1] All design modes listed can co-exist in the same design file as desired allowing delivering the most robust productivity and flexibility while making file management extremely easy.

Assembly Modeling*

Although assembly modeling is evident in most all cad software, Only IronCAD solutions provide the ability to create, edit. Restructure and manage complex assembly structures in a single design environment without the need to switch to an assembly-specific design environment. This allows extreme flexibility of maintaining assemblies without complex procedures or expensive add-ons. IronCAD allows the user to design in either a top-down assembly approach or a bottom-up assembly approach. Also, assemblies can reside as individual scene files or with externally linked capabilities to accommodate design preference or data management requirements (if implemented).

Dual Modeling Kernel Technology*

Only IronCAD solutions utilize both the ACIS® and PARASOLID® modeling engines to simultaneously solve the geometric creation of your models. By having both engines driving the creation (whereas all other software only use one) allows you eliminate virtually any inability to create a 3D model due the limitation of the underlying engines weaknesses. So where a model will fail to generate in competitive software, it's no problem in IronCAD. Also Dual Modeling Kernel Technology enhances the ability to share your 3D data more effectively with other CAD software.

Structural Steel Weldment Creation

Machine design inevitably involves the use of structural steel members for items such as frames for tables, building structures, crane supports, etc. This process involves building a profile that can consist of 2D and 3D curves that layout the path of the members to trace followed by end conditions for members that are connected or intersected. The Structural Steel process is a specialty application where the framework for this capability has been added for 2015. You can use these tools to build a single part consisting of many different members and sizes that can be trimmed to define the appropriate end conditions. In addition, these parts will automatically be called out in the Bill of Materials with the name and length of each member to give accurate cut lists for manufacturing.

Point Cloud Data

IronCAD allows for importing Point Cloud Data and allowing to convert it to useable geometry for model creation and or analysis.

3D Environment and Tools

Library of Catalogs*

All IronCAD products have included catalogs of predetermined shapes, colors, textures, fasteners, gears and more to help your design along. Additionally you can create and customer your own catalogs as needed to build your libraries to further speed up your designs. Also, catalogs are a primary component of IronCAD because they are more than just libraries they can act as project folders, workbooks, and scratch pads and allow you to store and type of Windows® based files (i.e. MSWord, PDF, etc...)

Part Content and Management

Through our partnership with CADENAS GmbH, IronCAD users can launch the free PART community online library by using a ribbon bar button inside the IronCAD Design Collaboration Suite products. Directly browse catalogs or use a powerful search engine for cross-catalogs searches based on the dimensions or other technical properties of the part attempting to locate. After selecting a part, users have access to a real-time 3D preview and a summary of all its Bill of Materials (BOM) attributes. Users can then download the desired part to load into the IronCAD Design Collaboration Suite products to increase design productivity and reduce time to market by leveraging the supplier content directly into the design.

In addition to Cadenas, IronCAD users also have plug-ins for GrabCAD and SketchFab.

IntelliShape™ Modeling Intelligence*

IntelliShapes™ are IronCAD's trademarked term for "feature". An IntelliShape is a building block of a complete 3D part (i.e. Blocks, holes, surfaces etc.) However, unique to IronCAD is the ability to assign intelligence to these shapes to add behavioral modeling

abilities to design even quicker. Some intelligence could be; shelling, blending, assembly behavior, orientation, tapering (draft) and more.

Dynamic View Sensitivity Modeling (DVSM)*

DVSM is IronCAD's innovative viewing intelligence at the core architecture that allows IronCAD to "watch" what you are modeling and adapt IntelliShapes resizing and orientation based on your field of view. It's like having an assistant handing your tools as you need them without even thinking.

SmartSnap™ Technology*

Some competitive software has some limited form of snapping capabilities in the design environments, however IronCAD was the developer of this technology in the late 1980's and holds robust patents on the technology. Therefore still to these day only IronCAD can achieve a multitude of SmartSnap behaviors that improve the modeling experience that others cannot match.

Behavioral Modeling

IronCAD has integrated at its core the ability to assign basic behavioral modeling intelligence most of which works seamlessly as you model, but can be altered and modified as need if needed. Behavioral modeling such as "Attach to surface" which automatically knows to attach a shape to another shapes surface and remain attached regardless of modifications.

Variant Modeling (Design Variations)

Design variations is the ability to generate a parametric parts and thru its parameters to assign new variations of the part to create a "family of parts" driven by a single component.

SmartAssembly™ Technology*

Developed by IronCAD, SmartAssembly™ technology allows you to assign connection points and paired connection points to parts and assemblies that enhance the behavioral modeling experience. SmartAssembly tools can "build" your design automatically by simply dragging components from a catalog onto components in the scene, SmartAssembly then knows how to connect to the part and which way it should orientate thus saving time. Many customers use this technology in the Bid modeling processes for their sales efforts.

IntelliStretch ® Technology*

IntelliStretch ® Technology was developed by IronCAD recently which allows you to stretch parts and/or assemblies to quickly adapt similar product goals. For instance, if you have design a complete conveyor belt system and its 20" wide then after your design is complete you're told the machine needs to be 30" wide, that's where IntelliStretch ® Technology comes to play. Select a point (plane) in which the assembly will stretch about, enter 10" to stretch and wallah, IronCAD widens the assembly including all the individual parts that are affected (or required).

Auto-Feature® (On-Demand feature recognition)*

Although many 3D CAD solutions on the market today offer some sort of feature recognition, only IronCAD provides it on-demand and as needed. Its IronCAD's unique ability to simple select a face(s) and either a BREP or other "dumb" model and convert the selection to an intelligent feature that can be edited as though it was created natively in IronCAD. Auto-Feature not only is a feature recognition tool, but also doubles a selection tool as well. One example is if you wish to add a fillet (blend) to an entire part and don't want to select each part edge, use the Auto-Feature and it will do it for you.

Cruising Technology*

Cruising is unique to IronCAD solutions; it provides the ability to move features of a part anywhere on the part with a simple drag movement. Via the shapes default behavioral intelligence when "cruising" it knows how to remain orientated correctly anywhere on the part. This is ideal in conceptual design phases. You can use "Cruising" in connection with 3D constraints and other tools to further enhance the productivity of conceptual modeling experience.

Multiple Coordinate Systems Creation

IronCAD allows users to generate and unlimited amount of coordinates system if needed. Typically for most designers, coordinate systems are not needed to create 3d models and assemblies in IronCAD. However on occasion they can prove vital if the design requires that parts and assemblies need to reference a common datum point as is the case generally in the Aerospace industry.

TriBall®*

"The TriBall®, the most useful tool in the CAD industry" as one respected industry analyst stated. The TriBall more recently has been attempted to be duplicated in just about every cad software on the market. However, due to robust patented technology they will ALWAYS fall short by a mile. IronCAD was the developer of the TriBall back in the late 1980's and still to this day no competitive product can match its power. Its ability to position components in extremely complex 3d spatial restrictions is an example what the analyst stated his comments. Some of the TriBall's abilities beyond complex 3d spatial position is its abilities is Mirroring, Patterning, Copying, Linking and more. It is the heart of IronCAD and is treated as such. The TriBall manipulates any component evident in the 3D design environment from features, parts, assemblies, cameras, lights, surfaces, 3D splines, nodes and whatever else in the scene we forgot to mention.

SmartHandle™ Technology*

Again, most competitive software has a limited form of geometry handles that allow for pushing and pulling faces on 3D data. However, IronCAD was the developer of this technology over 20 years ago and again holds the rights to various handle technology that competitors cannot duplicate. SmartHandles go way beyond just move faces on a model, they also can be use to edit 2D section geometries with the need to enter sketch mode, they can be used to modify geometry to specific numerical values based of keypoints in the scene that can reorient ate the reposition themselves to accommodate a complex orientation evident in your design and so much more. SmartHandles simply need to be seen in action to appreciate their abilities.

Auto-Project Sketching (APS)*

APS allows when sketching a profile to "project" edges from other parts or assemblies in the current scene to be used as needed geometry. While some competitive software provides this, ONLY IronCAD allows you to do this anywhere parts feature structure regardless is location in the history structure whereas in all other software you can only reference edges that were created beyond the point at which you're trying to edit. This excludes Structured Part Design Mode parts.
Additionally APS provides the ability when creating a 2D sketch to reference any 3D data evident in the scene to use for alignments, measurement and more, without the need to project the geometry first.

Spreadsheet-Driven Parametric Design

IronCAD provides the ability to use spreadsheet files such as Microsoft Excel or CSV to drive parameters of 3D parts to alter its geometry.

2D Sketch SmartSnap Feedback Indicators*

While sketching your 2d profiles, SmartSnap feedback automatically will snap to logical keypoints in the sketch to help in your creation. The user can turn this on off at will if required. Also indicators will automatically pop up to indicate various geometric conditions such as parallel curves, perpendicular curves, etc... These are indicators and not constraints, however if you with the geometry to adhere to the implied conditions, use simply right-clicks and "Locks" them to convert to hard constraint. Of course can be unlocked at anytime.

Cosmetic Weld

With the addition of the 3D Annotation, you will now have the ability to define a cosmetic weld bead on edges and between faces that also automatically create the weld callout in 3D. This callout can be transferred to the CAXA DRAFT environment automatically to properly annotate your 2D layout view.

Simulation and Analysis

Mechanism Kinematics and Collision Detection

IronCAD has integrated the ability to perform real-time mechanism movements that provides collision detection. They can also be use when generating animations to better convey design intent to potential customers and vendors. Various mechanism conditions can be reviewed to determine the mechanisms feasibility in the design intent.

Interference Checking.

IronCAD has the ability to select multiple parts and/or assemblies to determine if there is interference inherent between them. If an interference is detected a dialog pops up indicating the affect parts and highlights them in red in the scene.

Minimal Distance Analysis

IronCAD provides the ability to check parts to ensure that a minimal distance is maintained between them.

Part/Assembly Analytical Data Extraction

IronCAD at its core allows designers to extract various analytical data from a part such as Moment of Inertia, Surface Area, Center of Gravity, Weight and Mass and more.

Multiphysics for IronCAD (MP for IronCAD)

IronCAD is pleased to exclusively announce the completely integrated Multiphysics solution for IronCAD. "Multiphysics for IronCAD" (MPIC) is the newest generation of integrated CAD/FEA for general entry level to advanced design simulations.
MPIC focuses on ease of use for CAD users and provides fully coupled multiphysics with stress, thermal, and electrostatic which includes the following analysis types:

- Static/Steady State
- Dynamic/Transient Response
- Modal/Vibration Modes
- Instability Buckling
- Frequency Domain

As part of the IronCAD Gold Partner Program, MPIC is included with full product capabilities with the standard IRONCAD solution as a node-limited version allowing you the ability to experiment with your designs. Even though the included version is node-limited, MPIC's technology using SefeaTM (Strain-Enriched Finite Element Analysis) gives you extended capabilities to test you products at a lower mesh level. SefeaTM is the newest enriched finite element formulation developed specifically for low-order 4-node tetrahedron elements commonly used in CAD simulation. It achieves the same accuracy as 2nd-order elements, but is more robust, without mid-side-node noise, and requires much less computing cost.
Seamlessly integrated, simply add a multiphysics analysis to your IRONCAD model. Add material, forces, constraints, and hit the AutoSolve to quickly mesh and return your analysis results. Make modifications on the IRONCAD model and associativity will allow you to simply update and re-solve your analysis in seconds.
Beyond the included version, options to purchase full accuracy levels, advance versions, and add-on functionality are available.

- MPIC Basic includes full mesh quality accuracy with static/steady state and modal that includes contact support for product assembly analysis.
- MPIC Advance provides additional large deformation and large rotation abilities, as well as advanced nonlinear modeling ability of nonlinear elastic, plastic, hyperelastic/foam materials with fully runtime coupled nonlinear material dependency.
- MPIC Advanced Dynamic Add-on adds advanced Stress Stiffened Modal analysis, Arc-Length Nonlinear Buckling, Frequency Domain analysis, and Fatigue analysis for advanced analysis options.
- MPIC is an advanced multithread FEA design application with fast solver technology that can process large models with millions of equations in minutes.

MPIC is developed and designed specifically for CAD design simulation by AMPS Technologies Company.

Rendering and Visualization

All IronCAD solutions have integrated a best-in-class rendering engine to perform high quality renditions of designs so realistic they often mistaken as real images. Raytracing is a rendering technique for generating realistic images by tracing the path of light through a 3D scene. The capabilities are too expensive to outline in this document, so please refer the link below to download the PDF brochure for full details.

Rendering Content

As part of the IronCAD Gold Partner program, Dosch Design delivers sample High Dynamic Range Images (HDRI) that can used in IRONCAD's/INOVATE's/IRONCAD DRAFT's Advanced Realistic Rendering free of charge. These samples images include both high and low resolution that can be used for accurate reflections or for lighting sources. Sample images of the HDR images provided on the IronCAD Gold Partner CD are shown below.

Real-Time Rendering Options

IronCAD allows you set various rendering option in your modelling environment such as reflections, shadows, ambient lighting, and more. By setting up some of these options, you can design and more realistic environment as well as generate images you can share with your supply chain and customers of “lifelike” products before even venturing into the full blown rendering capabilities.

Animation

Animation, like film and television, is based on illusion. If a sequence of drawings is presented in rapid succession, your perceptual system fuses the individual images into an apparently continuous motion. In computer animation, the computer generates each of the individual images, or frames, from a high-level description of the movement. SmartMotions™ makes these high level movements reusable on any part. You can also save custom SmartMotions™ in a catalog for future use.
SmartMotions™ are the animation features that provide the functionality to transform a static scene into an animated presentation. To see the full details and features IronCAD’s animation has to offer, visit the link below to download brochure.

Collaboration and Data Sharing

It wasn’t long ago that customers were only allowed to review specific design plans after the design staff had completed their visions and concepts. Well, more than ever, companies are allowing their customers to be more involved in the actual design process of the products. What does this mean to the engineer? Today the engineer has gone beyond the slide rule sort to speak and now more than ever involved with the customer relations of projects. Sharing your 3D designs is just as essential as creating the design in the first place. So when you’re ready to distribute and discuss your 3D designs with others, IronCAD offers a variety of options. These tools enables improved communication and faster decision-making, which helps reduce design errors, improve quality, and increase productivity and most importantly ... Customer satisfaction!

3D Email Package Builder

3D Email Package Builder allows users to package their scene file and email it to non-IronCAD (or IronCAD) users as a viewable file. Users can send the package as a zip or exe file in addition to the ability to save the package locally as a self extracting exe. When the package is sent through the command in an email, instructions are added to instruct the recipient on how to use the package. The package contains a HTML and HSF viewable file and the users will need to have Internet Explorer and the ability to run ActiveX controls. IronCAD does not need to be installed on the recipient’s computer to view the 3D viewable file.

IronWEB - Web Publishing

IronWeb Publishing allows you to make information about your design available to anyone in your organization who has a web browser and access to the company intranet. People will be able to understand the state of the project, and view each part/assembly and drawings in a 3D viewable format and 2D PDF. Set up a web server pointed to your CAD directories. Set up appropriate security policies for the web server, and then set up the Web Publisher to automatically keep an HTML and Files repository up-to-date. The Web Publisher can run automatically at night, updating the web versions of any CAD file that has been changed during the previous day. Or, run it manually whenever you’re ready.

3D PDF Support

Interactive 3D PDF files look exactly like the original 3D design, regardless of the application used to create it or the environment in which it's viewed. IronCAD supports the ability to export 3D PDF and U3D files from the IronCAD Scene. This capability allows users the ability to share and collaborate on their 3D Designs in a lightweight format. 3D PDF's can be used for visualization only or can be used for markup collaboration. (Markup capability requires Adobe® Acrobat™ 3D software)

CAD File Translation

With IronCAD's Design Collaboration Suite, engineers communicate more freely. Dual ACIS and Parasolid kernels allow precise, error-free import and export of native SAT and X_T files as well as common file formats like IGES, CATIA V4, and STEP and beyond.

SmartMarkup

IronCAD's commitment to sharing design content throughout the supply chain and the extended global team has fueled the creation of more powerful collaboration tools. Capabilities such as SmartMarkup allows users to collaborate with extended teams to speed up the development process. Designers and other collaborators can move beyond the traditional text based markups to apply meaningful change requests on data that is clearly communicated. Typically, basic markups are not clear and involve back and forth communication to make it clear. Using SmartMarkup, the changes are performed on the model so that everyone can clearly understand the desired change. Designers can then accept, reject or further optimize design changes directly on the real design models to speed product designs into production. Markups can be saved so that they can even be stored in data management systems for tracking RFQ's.

3D Annotation (Basic PMI)

3D Annotation framework that is the basis for PMI (Product Manufacturing Information). Levering the annotation capabilities of CAXA DRAFT, users will now have the ability to create 3D annotation such as Linear, Angular, and Radial/Diameter Dimensions, Notes, Geometric Tolerances, Surface Finish, Weld and Datum annotations directly in 3D on desired plane or viewing orientations. All annotations created can be transferred to the CAXA DRAFT's 2D environment for improved speed in annotation when desired.

IronCAD-Compose (Sales Configurator)

More than just a 3D CAD viewer, IRONCAD COMPOSE is a revolutionary new product empowering users to work share and collaborate with their company's 3D geometry. IRONCAD COMPOSE delivers the ability to manipulate models and assemblies in 3D, Interrogate them, and even make changes to the structure and assembly, quickly, easily and cost effectively.

Using key elements of IRONCAD's powerful modelling capabilities, IRONCAD COMPOSE allows users to import 3D geometry, manipulate and assemble parts and even create measurements and intelligence to control how and where parts may be placed within assemblies. Once users have created an assembly, they can use IRONCAD Compose to present and deliver their concepts with realistic real-time rendering and animations, export as images or as 3D PDF's, or even publish them directly to the web.

Using IRONCAD's unique intuitive User Interface, the COMPOSE product can be mastered in minutes. By adding Design intelligence to parts ensures users can snap together parts easily and more importantly following any predetermined design rules.

We believe that sharing and collaborating with 3D design data is essential in today's fast changing world. Today with IRONCAD COMPOSE, everyone can have real time access to information wherever they are and best of all, it's completely free.

- Import IronCAD files and other industry standard and native CAD files.
- Import Facet formats such as STL, VRML, 3D Studio, AutoCAD 3D DXF, TrueSpace, and Wavefront (OBJ).
- Ability to Assemble/Disassemble Parts and Assemblies.
- Position Parts/Assemblies with Unique TriBall Utility found in IronCAD Solutions.
- Ability to Create Measurements on Imported 3D Data.
- Realistic and Real-time Rendering and Animation Support.

- Export to 3D Facet Formats including 3D PDF for Extended Communication.
- Reuse 3D Data by Using Catalog Drag & Drop.
- Scale Imported Geometry to Fit into Designs.
- Visually Inspect Parts/Assemblies with 3D Visual Tools Such as Hide and Section.
- Build SmartAssembly Intelligence for Automatic Positioning of Parts/Assemblies.
- Web Publish Data for Extended Communication and Visualization.

IronCAD-Compose iOS

The IRONCAD COMPOSE iOS application allowing users to view and collaborate designs with your extended teams. Share files and catalogs with the iOS version of COMPOSE and configure your designs on your tablet directly with your customers. Share these new designs directly with the design team to speed up the development process.

2-Dimensional Drawing and Drafting

IronCAD actually includes 2 distinct drafting environments.

Drawing 2D Environment

The “Drawing” environment provides simply and easy part detailing associative to the 3D parts/assemblies and is commonly used to generate fast accurate simple intention drawings. Many use the “Drawing” environment for all their production detailing needs. It includes a vast array of drawing and detailing tools to include in this document, but below some are the key highlights.

- 2D Bidirectional Drafting/Detailing
- Library of Catalogs
- Shaded Views
- BOM creation
- Geometric Tolerance
- Weld Symbols

The Drawing environment was initially IronCAD’s drafting environment in the beginning, however in recent years they had acquired the development of the CaxaDraft product and had decided to integrate as well to provide a more industry standard type drafting tool.

CaxaDRAFT 2D Production Drafting Environment

Although many use the “Drawing” environment for all their production detailing some will choose to use the integrated “CaxaDraft” drafting environment. CaxaDraft in itself an extremely powerful 2D mechanical drafting tool that can be used as a standalone drafting tool of in harmony with your IronCAD 3D data. With an easy to learn, industry standard user interface and a unique 3D integration capability, CaxaDraft enables users to work in 2D but also to view, leverage, analyze, and reference 3D model data. For users wanting all the power of a proven 2D drafting tool then they will choose to use the CaxaDraft environment over the Drawing environment. However, you as the user can choose for yourself which is best for your specific requirements. It includes a vast array of drawing and detailing tools to include in this document, but below some are the key highlights.

- 2D Bidirectional Drafting/Detailing
- Library of Catalogs
- Parametric 2D Parts Library
- Shaded Views
- BOM creation
- Geometric Tolerance
- Weld Symbols
- Gear Creation tools

- Formula-Driven equations

All the outlined features and technologies are included in the core package of IronCAD without any additional costs.