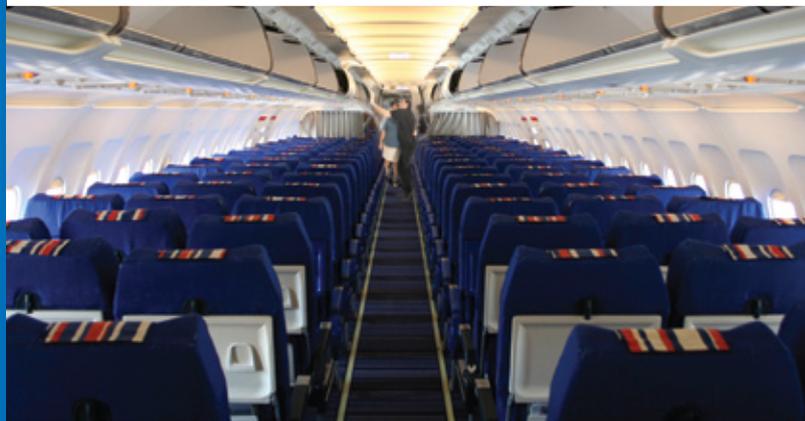# IRONCAD

## Aerospace & Defense

Get your products to market faster with better quality.

- Accurate

- Flexible

- Productive

- IRONCAD

# CAXA

## Aerospace and Defense Design

More than 25,000 aircraft will be produced in the next 20 years by companies like Boeing and Airbus. As these companies outsource more work, aerospace and defense industry suppliers stand to increase revenue by adapting to work better with these companies. CAXA's IRONCAD solution offers engineers in aerospace and defense flexibility, ease-of-use and speed – perfect for suppliers, toolmakers and high-tech aircraft component designers looking to collaborate with larger companies in the industry.

With IRONCAD you have a cost effective solution that can communicate with all other 3D systems on the market today. By bringing IRONCAD into your organization you as a supplier to Aerospace and Defence companies will see faster more efficient design and higher profits. In todays tough economies that is a solution we can all use.
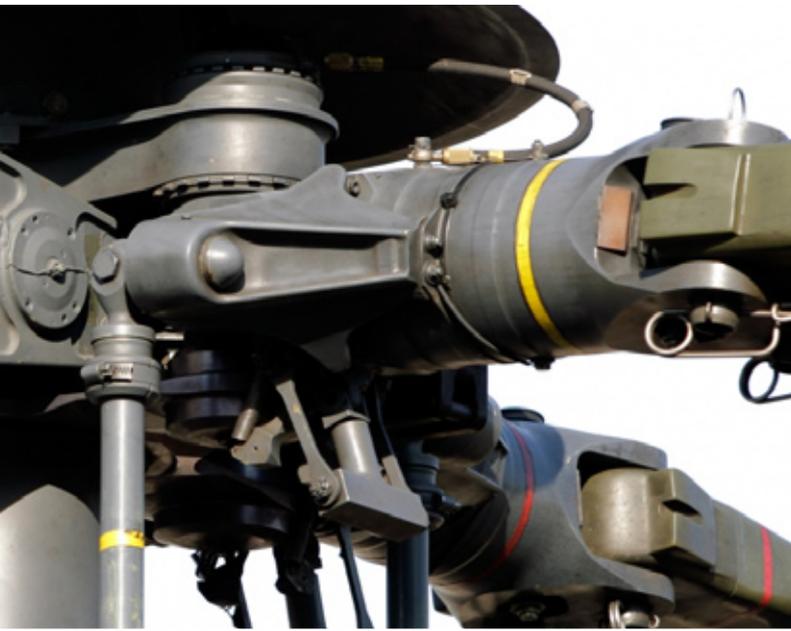
## Design

We live in a 3D world, but most 3D systems out there make you start in 2D. Mainstream 3D CAD applications make you begin with a 2D sketch which has to be constrained and is then extruded, spun, lofted etc to create your design. These features need constant management to avoid your design from breaking later on. IRONCAD is different, in IRONCAD shapes are unique and intelligent. To begin a design in IRONCAD simply start by dragging and dropping features, parts and assemblies from standard catalogs or use advanced tool wizards to create standard parts, like bolts and gears. Create your own catalogs of commonly used designs to further speed up the design process. With IRONCAD you spend your time designing and not managing data, no longer do you need to worry about rebuild errors and broken relationships.

Unlike other 3D CAD systems, you have a choice in IRONCAD to work in a more traditional approach to design by working with intelligent features such as extrudes, spins, sweeps, lofts, and surfaces, or work by direct manipulation of part and feature geometry, or even a combination of both! It's what we call Hybrid modeling and IRONCAD has had this technology since the product launched in 1998. The power of the system means IRONCAD does not constrain you by limiting your design changes to only those that are anticipated. Hybrid modeling allows dynamic, unanticipated changes to be made easily; just open the file in IRONCAD and make the changes that are required to get your product to market. It's that simple.

If you do work with features IRONCAD makes design easy. IRONCAD's intelligent parts and features enable geometry to mate and align automatically, history is automatically reordered to reflect your intent, and even allows entire assemblies to be resized without changing individual shapes. If you need to move a hole or boss to another area of your design simply click and drag. It will apply itself to the new location regardless of how the part was built and without breaking other areas of the design.

Changing the size of an item is as simple as pulling on a 3D handle on the design. Need to make that hole bigger,

Exploded views and 3D animations provide additional clarity for production departments to help detail instructions for clients. IRONCAD automatically generates all necessary information from 3D scene files and two-dimensional views based from 3D geometry automatically update as models change.

IRONCAD also supports your rapid prototyping needs with full support for STL import and export. This allows you to test your designs using 3D printers prior to going to production.

## Information Exchange

Imagine importing parts and assemblies from aerospace companies and other suppliers then referencing their components while creating your design. CAXA's IRONCAD solution simplifies communication with the standardized CAD packages aerospace and defense companies use.

Dual ACIS and Parasolid kernels allow engineers to import and export in common file formats (like Catia® V4 and V5; Pro/Engineer®; Granite; Unigraphics® and STEP) precisely and error-free. Once imported, IRONCAD can edit existing geometry with feature recognition and direct face modeling. These time-saving features, allow engineers to more time designing and less time understanding how models were built.

IRONCAD can even publish information online thanks to 3D PDF export and the ability to embed models in web sites using standard web based 3D formats. And with the press of a single mouse click you can package up your design in a light graphics format for distribution via email to anyone you wish and the recipient can view the model in full 3D on their computer (Internet Explorer required).

## Efficiency

By enhancing information exchange, design process, simulation and production, CAXA's IRONCAD solution for engineers in the aerospace and defense industries will increase productivity. IRONCAD's design system is easy-to-use and can be learned in weeks, not months like other CAD systems.

Use IRONCAD to freely exchange ideas and eliminate misunderstandings during development and production. Everything will change with CAXA's IRONCAD solution. Communication will improve, turn-around time will be shorter, revisions will be reduced and productivity will increase – making your company more profitable.

pull on a handle, need to change the bend radius of that sheet metal part, pull a handle! IRONCAD puts the controls directly on the model so you can change your design dynamically in 3D instead of having to edit a sketch.

Engineers even control how IRONCAD organizes their data. Choose between externally linked files or IRONCAD's single-scene design environment, which stores projects in a single file and makes sharing designs easy. IRONCAD's single scene design environment makes data management a thing of the past. No longer does a 4000 part assembly have to be represented by 4000-5000 files on your hard drive or server. In IRONCAD you have everything in one file, spread amongst five files, ten, it's your choice. IRONCAD's freedom to choose how you work changes the way engineers design for the better.

## Simulation

Simulate designs virtually before clients ever see them with IRONCAD's real-world mechanical testing. By applying mechanical constraints during design, engineers can simulate mechanical operations using four different solving methods with fully integrated collision detection in mechanical simulation and regular design modes. This allows designers to easily watch for part interference and similar conflicts.

Integration with analysis tools like Algor adds aerodynamics, part durability and other testing options to ensure designs are ready for their working environment. IRONCAD also comes with a one-year Algor FEA license at no extra charge. IRONCAD will change how designs are tested and its ease-of-use will solve many challenges for engineers working in the aerospace and defense industries.

## Production

IRONCAD's complete 3D and 2D design package will change your production process. With it, engineers can export files into formats directly compatible with tooling machines used within the industry. Fully associative 2D views of 3D models can also be dimensioned to clearly document designs.

**IRONCAD**

# Case Study:
# Kairos Autonomi

Kairos Autonomi is a company on the cutting edge of defense technology. Their engineers use IRONCAD to design kits for turning ordinary military vehicles into autonomous driving units — steering-wheel based vehicles that navigate themselves. Kairos Autonomi's unique retrofit system utilizes custom-built parts designed internally by engineers using IRONCAD. These same parts are then manufactured on-site as either a prototype (through a Stratasys Rapid Manufacturing Machine) or a finished product with the aid of Kairos Autonomi's HAAS CNC mill. Engineers like Troy Takach, a senior designer with over 25 years of experience, enjoy the flexibility and ease-of-use IRONCAD provides.

"When Kairos Autonomi first started using IRONCAD, we had it delivered as a rush order on Saturday morning. By Sunday afternoon our engineers had learned the system and created a production drawing ready to be sent for a manufacturing bid," says Takach.

Because military vehicles come in all shapes and sizes, Kairos Autonomi's kits must be adaptable to a variety of scenarios. IRONCAD's ability to design using parametrics reduces design time by allowing models to change based on measurements entered by engineers, instead of creating different products with similar characteristics. Users also have the ability to override parametric constraints and modify geometry directly, an important feature for engineers conducting research in unpredictable scenarios like Kairos Autonomi.

"Most engineers are limited by what they know how to make. That is why there are designers and engineers. Using IRONCAD, we are able to break that divide and create something that gets the job done and can also be manufactured within the project constraints for the end user," says Takach.

Engineers at Kairos Autonomi have a 20-minute "thought-to-part" cycle for simple parts. IRONCAD's facilitation of rapid design and flexibility for change makes this possible. "When a simple part is given to interns for modeling, we usually expect finished results that same day. This kind of turn-around is only possible because IRONCAD works like interns think, in 3D," says Takach.

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   *Troy Takach*
   *Senior Designer*
   *Kairos Autonomi*