

***Altium***<sup>®</sup>

**Collaborative  
Design for MCAD and  
PCB Designers**



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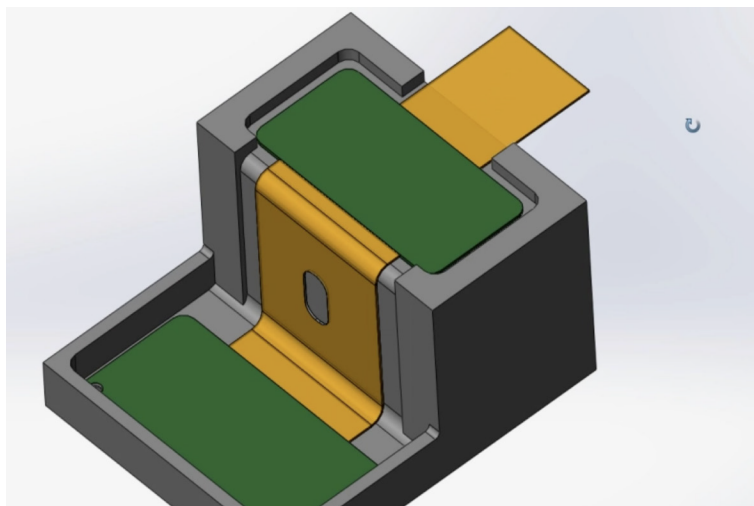
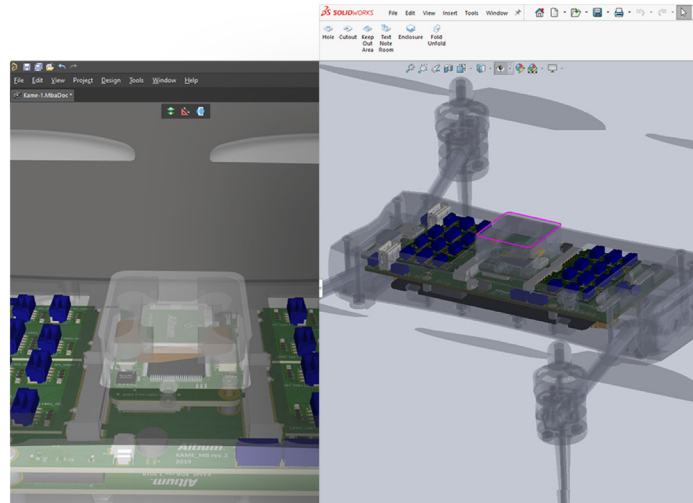
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# Create better products by streamlining collaboration between PCB and mechanical designers

## Unified Electromechanical Product Design

Do you want to design better products? Effective and efficient collaboration between mechanical and electrical design is crucial.

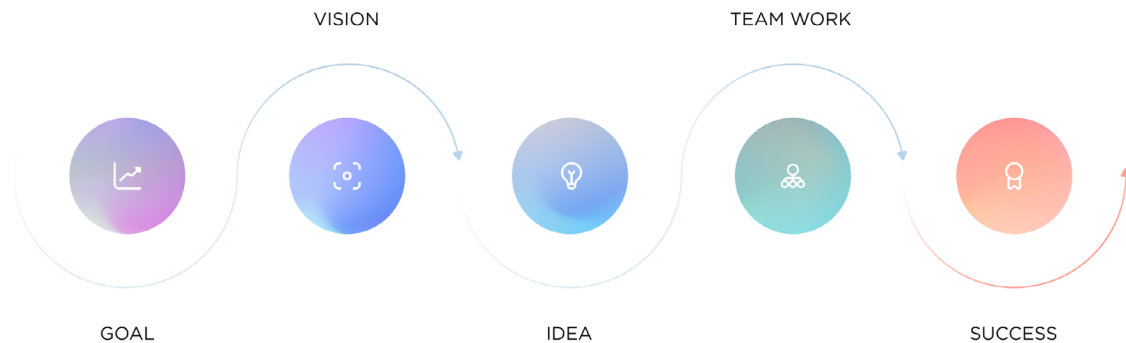
This whitepaper is for executives and designers whose companies design electromechanical products with printed circuit boards (PCBs) and who are looking for ways to increase the quality of their designs while eliminating wasted effort.



Mechanical and PCB designers share in the success of the final design. The problem is how to work together effectively. It is like they speak different languages; well, they do. And the data exchange is not easy. It is time-consuming and problematic.

The solution is to enable better collaboration.

## The Pressure is On



When did your management team last say, “take your time with that design”? That, of course, never happens. Companies are constantly under time-to-market pressures. Better, faster, cheaper is the mantra.

The lack of communication and collaboration between the two teams can lead to errors, delays, and increased costs.

To compete, companies want the best designs of the highest quality while being quick to market. Inefficient design practices erode all of these. The mechanical designer has difficulties collaborating with the electrical designer responsible for the PCB. This is a critical interface, yet each designer speaks their own language and uses different tools.

The key is enabling designers from both sides to work more efficiently. By reducing or eliminating the tasks that waste time while participating in collaborative design so that each side can perform at their peak. This is how the team designs the best products.

## Inefficient PCB–Mechanical Workflows Hurt Quality and Waste Time

For most companies, the workflows are much worse than just inefficient. Inefficient design flows waste the precious time of both your electrical and mechanical designers. And still, with all of this investment of time, the results are non-optimized designs because they focus on the basics rather than improving the overall design.

Often, the communication is informal, perhaps in an email. For instance, the mechanical designer changes the mechanical enclosure and then communicates the change details in an email to the PCB designer, requesting a modification of the PCB to fit the enclosure. A better method is transferring data with formats like DXF and STEP, which are time-consuming and not collaborative. IDF and IDX are more advanced but leave a lot to be desired when it comes to enabling true collaboration.

## What If Collaboration Can Be Better?

What if each designer could work solely in their native tool (PCB or MCAD) and initiate a data transfer on demand? What if each file transfer landed the data into their counterpart's native design tool? And what if the changes were highlighted?

No intermediate file formats. No time wasted setting up a transfer.

A truly collaborative environment enables the mechanical designer and the PCB designer to focus on creating the best designs for the most competitive products.

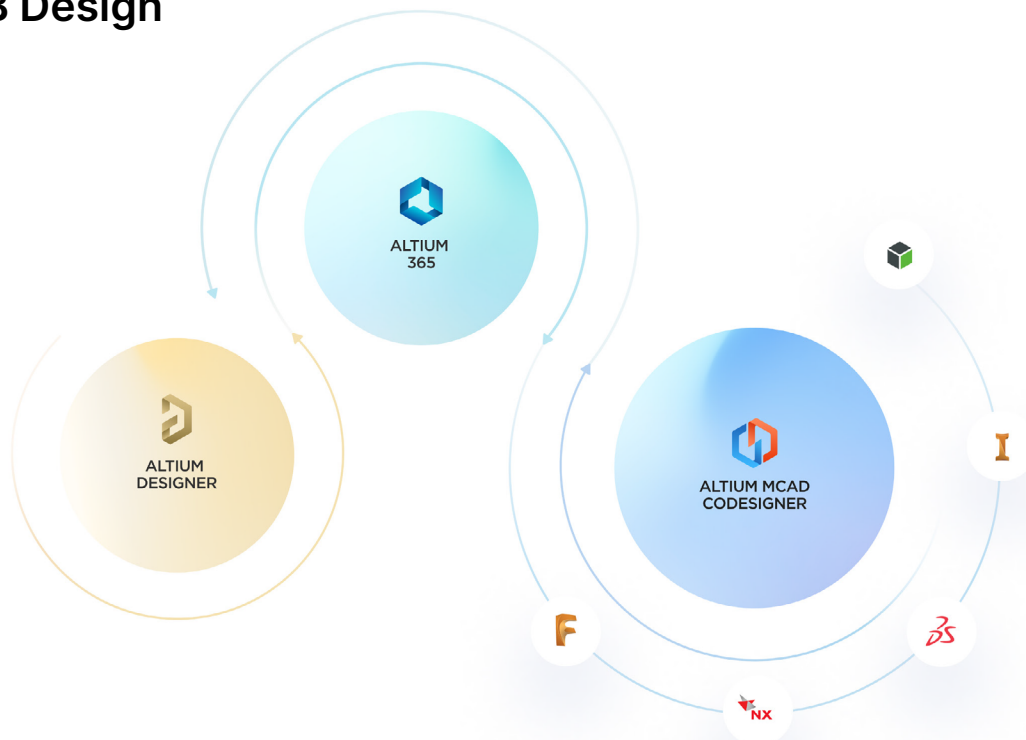
## Altium MCAD CoDesign Capabilities Break Barriers Between ECAD & MCAD

MCAD CoDesign is a powerful capability within Altium Develop and Altium Agile Teams, enabling seamless collaboration between mechanical and electrical designers within a world-class PCB design tool.

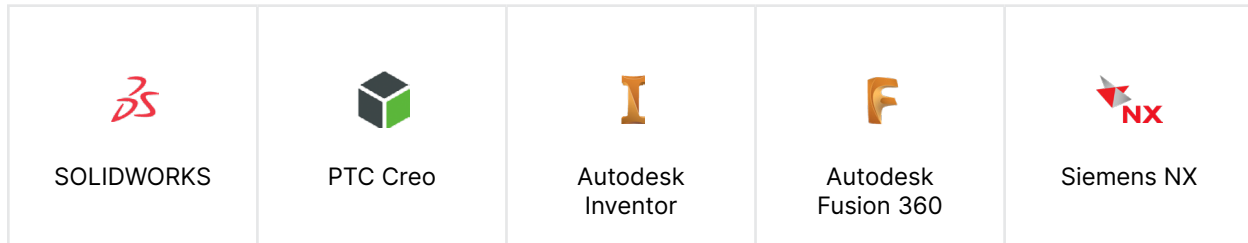
Altium's hardware development platforms unite mechanical and PCB designers in a collaborative workspace—without forcing them to abandon their chosen design tool.

Outdated file exchange methods waste valuable design time for the team and limit collaboration.

## The Altium Collaborative Workspace for Mechanical & PCB Design



The MCAD CoDesign capability in Altium solutions includes plug-ins for the most popular mechanical CAD systems. Those pre-built connections deliver PCB design from the Altium Designer ECAD workspace directly in the preferred native MCAD workspace. Mechanical designs flow back to the PCB counterpart just as easily.



## True ECAD-MCAD CoDesign

MCAD CoDesign automatically converts design data between electrical and mechanical CADs, ensuring that both aspects of the design are accurately represented. In addition, it synchronizes design changes in real-time between ECAD and MCAD, ensuring that modifications made by one team are immediately communicated to the other. This reduces the risk of errors.

## Digital Twin on One Platform

The innovative features of MCAD CoDesign allow designers to visualize and version-control both mechanical and electrical designs in one workspace, providing a comprehensive view of the entire design process. MCAD CoDesign also supports design reviews for combined mechanical and electrical designs, allowing the team to examine all aspects of the design together and find every opportunity for optimization. Additionally, it provides visibility to non-engineering stakeholders, such as project managers and executives, facilitating improved collaboration, communication throughout the design process, improving design efficiency, and reducing time-to-market.

## Fit, Form, and Function with Accurate PCB Data in MCAD

With its advanced capabilities, MCAD CoDesign is able to transfer detailed copper geometry into MCAD for thermal, vibration, and other mechanical analyses. This allows for a comprehensive understanding of how the board will perform in various mechanical scenarios. Additionally, MCAD CoDesign enables designers to achieve a precise board shape for enclosures of any complexity, ensuring a perfect fit within the product. Another key feature of MCAD CoDesign is its ability to transfer flex and rigid-flex board designs into MCAD, ensuring an accurate fit and optimal performance.

Designers accomplish more in a given unit of time, without compromising anyone's design objectives.

## The Hidden Costs of Traditional ECAD-MCAD Handoffs

Manual handoffs via static files and emails create significant risk for complex designs. These disconnected methods introduce friction that static formats cannot resolve.



### Scalability and Rework

Manual tracking fails as complexity grows. Engineers waste time on file translations rather than spending that time designing. The resulting bottlenecks and frustration invite human error.



### Outdated Specifications

Without a live link, teams work on obsolete data. Enclosures are often optimized around "zombie" outlines, leading to errors only discovered during physical prototyping.



### Administrative Overhead

Valuable time is lost to data entry and version verification meetings. This burden forces senior engineers to act as data administrators rather than innovators.



### Siloed Workflows and Friction

Disconnected handoffs prevent early interference detection. This forces teams to fix clashes that could have been identified and resolved days or weeks earlier.



Small miscommunications can snowball. A board outline gets tweaked after export. A connector is added at the last minute. You don't find out until it's too late. Design data shouldn't be lost in translation, yet file-based collaboration introduces silos and version confusion that no one wants. The cost isn't just in hours; it's in missed opportunities and stressed-out teams.

## When to Move Beyond Manual ECAD-MCAD Collaboration

Manual file handoffs eventually hit a wall as designs become more integrated. Look for the following as indicators that your current workflow is no longer adequate for your design complexity.

### Recurrent fit issues

Frequent PCB respins or enclosure modifications due to physical interference are impacting your schedule and budget.

### Scaling pains

Informal coordination is failing as your team grows, leading to version confusion and conflicting design intent.

### Complex geometry

Tight clearances and non-standard board shapes are leaving zero margin for error with manual dimensioning.

### File management overhead

Engineers are losing valuable design hours to the administrative burden of exporting, importing, and verifying static files.

### Late-stage clash discovery

Your team is discovering interferences during physical assembly—proving that your digital verification process is disconnected.

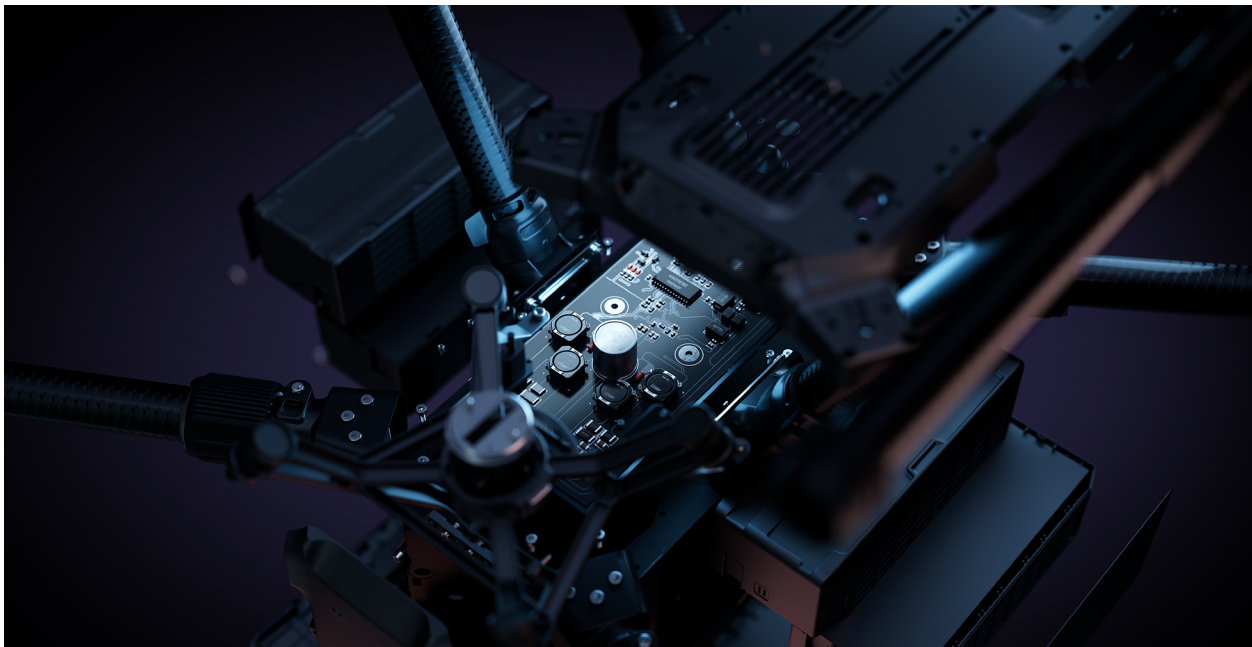
### Strict performance requirements

Safety-critical or high-performance designs are requiring a level of precision that static models cannot guarantee.

### Parallel development needs

Concurrent engineering schedules require a live link to maintain a single source of truth across departments.

The ROI for a professional co-design solution is usually met by avoiding just one unnecessary respin. Shifting to a synchronized environment moves your team from reactive troubleshooting to proactive, collaborative engineering.



## For the Mechanical Designer



**It's almost like when people use email to communicate. The tone of the other person is missing, and critical information is missing with that. Before, we used 2D DXFs to exchange info, and were still missing so much key information – that's been improved now, dramatically. We can work together and understand each other's needs so much better now.**

**Laine McNeil**

Senior Mechanical Designer, Quantel Laser



When a mechanical engineer receives an update from their PCB counterpart, they see a preview of the changes presented graphically and also as a list in their native MCAD tool.

In addition, MCAD CoDesign provides automated warnings for potential design conflicts. For example, Altium will highlight potential problems with the PCB definition on the MCAD.

Mechanical designers have a new degree of control and input over the PCB design process while using their preferred MCAD solution.

Designers can easily change component placement, board shape, and mounting holes and push these changes to their electrical counterpart.

Open accurate board assemblies directly inside your mechanical workspace, complete with copper information, to get a more complete picture of the finished product design.

For CAE workflows, MCAD CoDesign provides the high-fidelity PCB and mechanical data required for complete analysis from thermal to mechanical simulations, enabling you to develop a more intelligent design.

Skip the hassles of importing/exporting intermediate file formats to determine form, fit, and function. Easily confirm the board design without ever leaving your existing mechanical workflow. And have accurate PCB data with your mechanical design for CAE analysis.

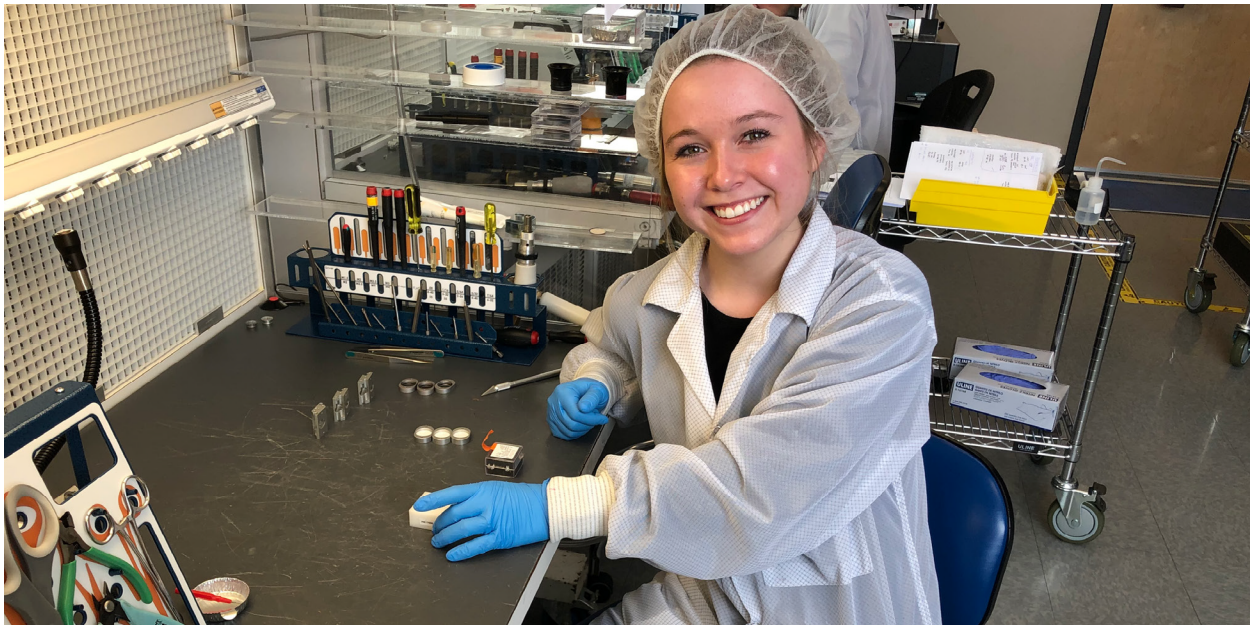
## For the PCB Designer



With the CoDesigner capability, we can detect potential problems like we couldn't before. We can see silkscreens, hidden vias, make sure polarities are correct, where copper traces are—our models are now 100% complete, including overlay and copper. I don't have to worry about board shapes, or connector placements, even in very tight spaces. With the CoDesigner capability, we have the confidence that everything will fit exactly as planned when it goes to manufacturing.

**Jeremie Waller**

Senior Electrical Engineer, Quantel Laser



The initial board design is started in Altium Designer. The design is transferred to the mechanical designer with a single button push. And the mechanical designer will be notified of a new board design.

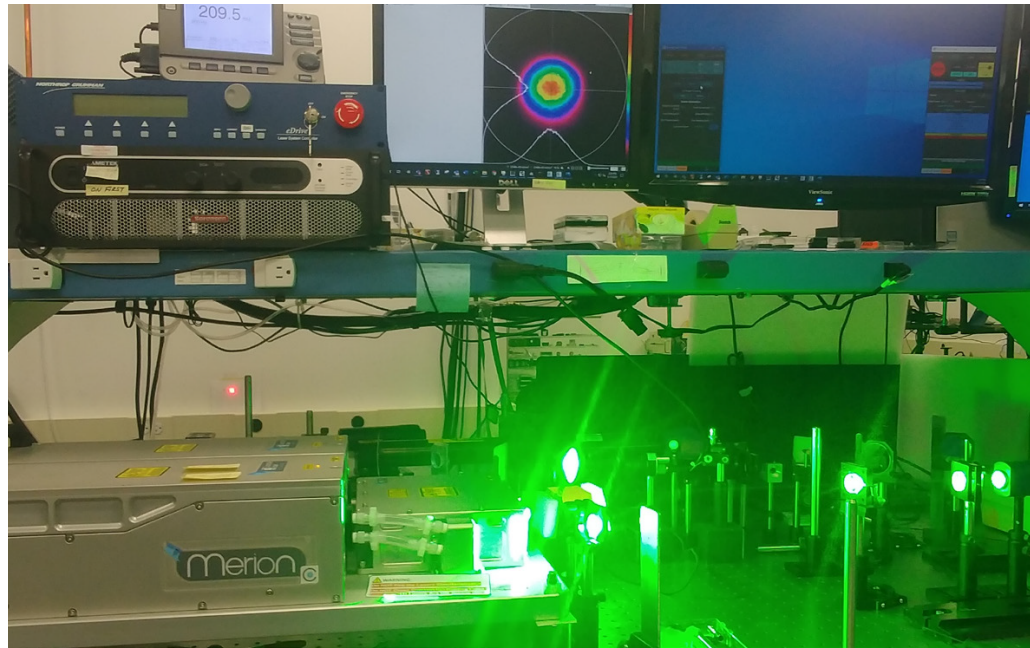
After that, either design side can initiate a data transfer.

When using Altium Designer, critical physical board design data is transferred to your mechanical counterpart seamlessly and effortlessly. This data includes the PCB shape definition with the board outline, mounting holes, cutouts, keep outs, enclosure, and placement of critical electrical components.

Accurate simulations can be performed for thermal, electromagnetic, and others, with complete design information transferred to the mechanical designer.

## Simplify & Enhance Design Collaboration

Mechanical and PCB designers work using different languages, which is a problem that degrades the design process. That degradation might result in extended design time or errors that go undetected until later. This hurts overall design quality.



**With the MCAD CoDesign capability, we can detect potential problems like we couldn't before. We can see silkscreens, hidden vias, make sure polarities are correct, where copper traces are—our models are now 100% complete, including overlay and copper. I don't have to worry about board shapes, or connector placements, even in very tight spaces. With the CoDesigner capability, we have the confidence that everything will fit exactly as planned when it goes to manufacturing.**

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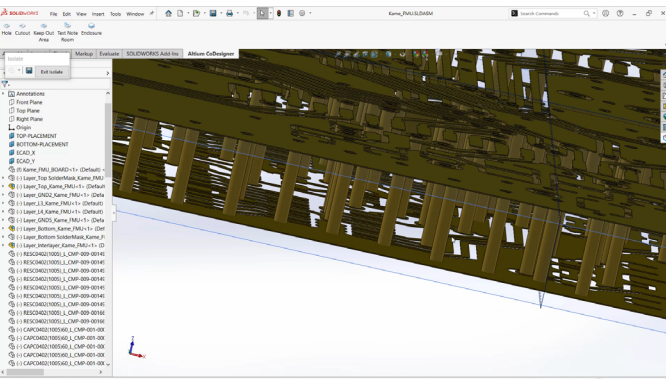
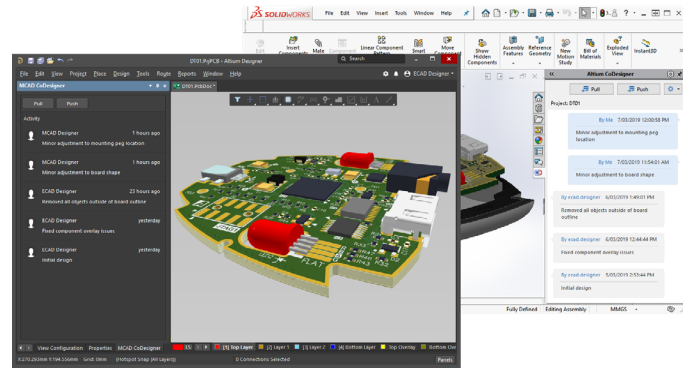
When used with MCAD CoDesign, Altium Designer empowers you to focus on creating the best designs in collaboration with your mechanical counterpart.

# Capabilities Overview

## Bi-directional Synchronization

Keep everyone in sync by linking Altium Designer directly to your MCAD tool, ensuring both teams always work on the latest revision without the risk of version errors.

Develop Agile



## Supporting Advanced Copper Geometry in Mechanical Designs

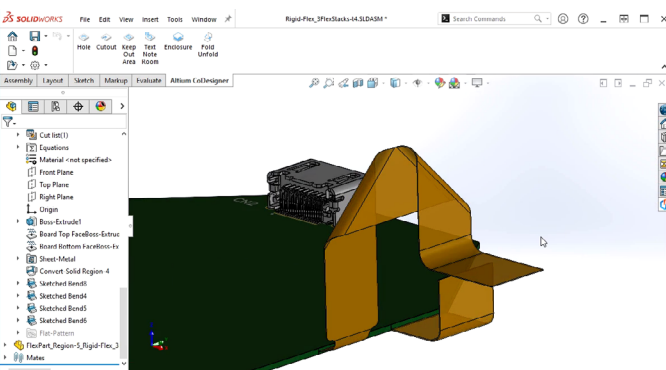
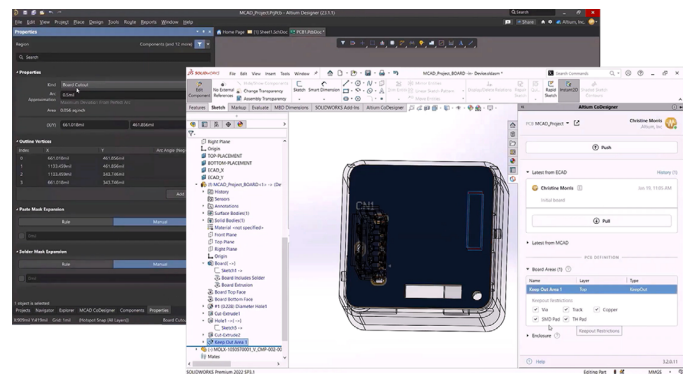
Include 3D mask layers and extruded copper in your MCAD assembly to get a realistic view of clearances and ensure a perfect fit inside the enclosure.

Develop Agile

## Synchronizing Keepouts & Rooms Across Tools

Define keepouts and placement zones in your own CAD software and sync them instantly so the electrical team sees physical boundaries as they route.

Develop Agile



## ECAD-MCAD Rigid-Flex Synchronization

Define rigid and flexible regions in your layout and sync them to MCAD to verify folds and fitment within complex 3D assemblies.

Agile



## Capabilities Overview



### ECAD-MCAD Synchronization on Harness

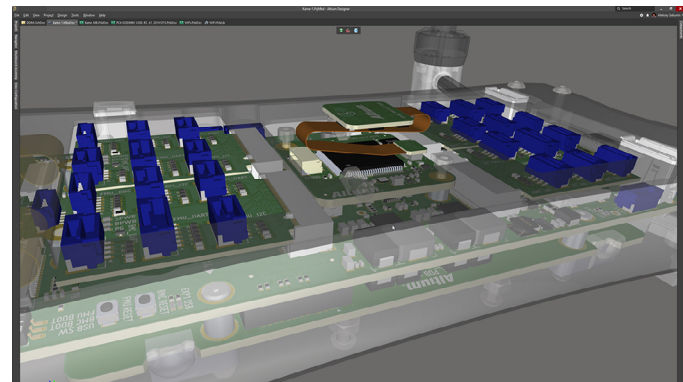
Connect electrical netlists to physical 3D routing to capture accurate wire lengths and update your manufacturing documentation automatically.

Agile

### MCAD-ECAD Synchronization on Multiboard

Bring full MCAD assemblies into the electrical workspace to perform electromechanical checks across the entire product, not just a single board.

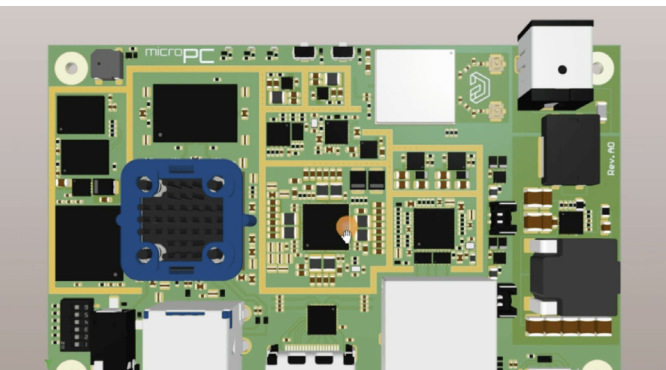
Agile



### ECAD-MCAD Native Component Linkage


Use native CAD models instead of generic files to keep design data accurate and ensure your fabrication outputs and BOMs are consistent.

Agile



## ECAD-MCAD Collaboration in Altium

MCAD CoDesign is a core capability of Altium Develop and Altium Agile Teams. It replaces static file exports with a live, bi-directional link that ensures electrical and mechanical designs stay in perfect alignment throughout the development lifecycle.




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The background of this card features a golden, glowing sphere with a blue circular path of dots around it, set against a background of a circuit board.




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The background of this card features a blurred image of a person's hands working on a complex mechanical assembly, with a blue circular path of dots overlaid.



Altium is the best software for engineers with different specializations. Mechanical and electrical engineers can work on the different stages of the whole design process. Definitely recommend it to other people to use. It is just the industry standard.

**Igor Horoschak**  
Senior Electronics Engineer, Crover

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