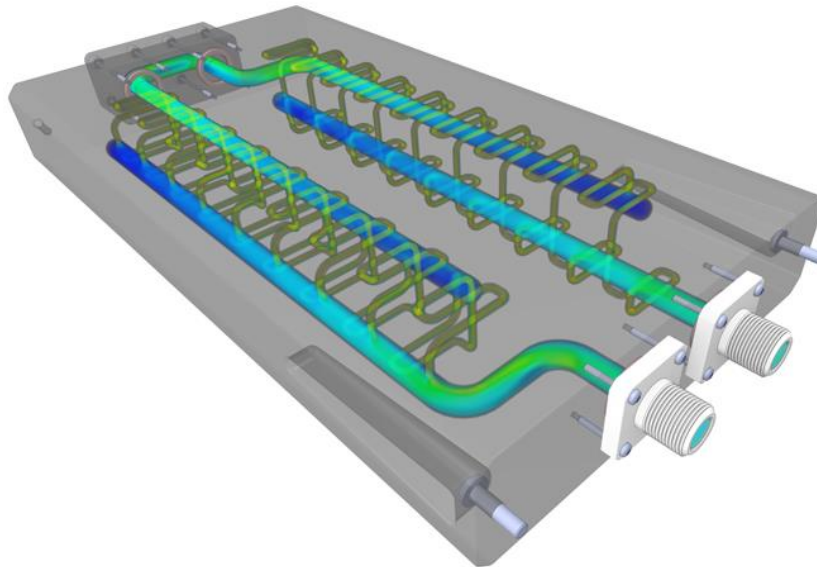


ANSYS 3D DESIGN Update in 2020 R1

Explore more designs quickly in ANSYS Discovery Live with changes to the structural solver to improve accuracy for thinner geometries, and with a newly introduced steady-state fluids solver. Get upfront design insights with the addition of manufacturing constraints and multi-analysis optimization for topology optimization capabilities.

With ANSYS Discovery AIM, you can now simulate rubber components with an easy-to-use, guided workflow. Structural materials data have also been expanded to include orthotropic elasticity and simulation of composite laminates.

New autoskin features in ANSYS Discovery SpaceClaim enable you to easily combine analytic geometry with autoskinned patches during reverse engineering. In addition, new minimal surface lattices increase efficiency in additive manufacturing applications.



Rapid 3D Design Exploration:

Explore ideas, iterate and innovate with unprecedented speed early in your design process with ANSYS Discovery 3D design software. Delve deeper into design details, refine concepts and perform multiple physics simulations — backed by ANSYS solvers — to better account for real-world behaviors.

Streamlined Product Development:

Improve engineering productivity and accelerate development time.

Improved Product Performance:

Create higher-quality products while reducing development and manufacturing costs.

Market Leading Products:

Respond quickly to changing customer demands and bring new products to market faster than your competition.

ANSYS Discovery SpaceClaim:

Multipurpose 3D Modeling for faster engineering results:

ANSYS Discovery SpaceClaim is a multipurpose 3D modeling application providing efficient solutions to common modeling tasks. Built on the direct modeling technology, Discovery SpaceClaim removes geometry problems associated with various 3D CAD operations, such as design or concept modeling, repair of translated CAD files, general model defeaturing, and complete model editing. With its premise of ease of use and simplicity, you'll find Discovery SpaceClaim to be extremely valuable in tackling small to large modeling problems.

A new way of 3D Modeling:

Discovery SpaceClaim's unique user interface, modeling technology and versatile toolset enables you to easily create and modify geometry without the complexity associated with traditional CAD systems. When working with existing CAD models, you can de-feature and simplify geometry with automated, easy-to-learn tools. Discovery SpaceClaim is ideal for engineers who don't have time for heavy CAD tools but want and need to get fast answers using 3D.

Ease of Use:

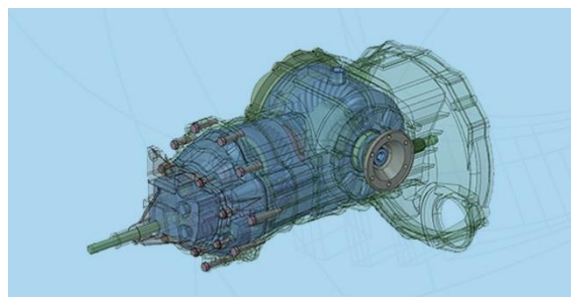
We believe that technology should work for you, not the other way around. Technology should make your job easier, not more complicated. Discovery SpaceClaim enables you to create, edit, or repair geometry without worrying about underlying technology. With Discovery SpaceClaim, working with 3D modeling software becomes fast, easy, flexible, and rewarding, no matter where in the workflow you need it. Regardless of a model’s origin, you can open the file in Discovery SpaceClaim and add or subtract geometry in any way you visualize. With streamlined commands and workflows, operations that previously took hours can be completed in minutes. You’ll find learning Discovery SpaceClaim easy -- weeks instead of months – and realize a return on your investment that’s faster than expected.

Ways to Access SpaceClaim Technology:

The SpaceClaim technology can be accessed as ANSYS Discovery SpaceClaim through the ANSYS Discovery Essentials, Standard, or Ultimate bundles. It is also available as [ANSYS SpaceClaim Direct Modeler \(SCDM\)](#) standalone or through the [ANSYS Mechanical Enterprise](#), [ANSYS CFD Enterprise](#), and multiphysics bundles.

Applications:

- DESIGN AND CONCEPT MODELING
- REVERSE ENGINEERING
- SIMULATION AND ANALYSIS
- MODEL PREP FOR MANUFACTURING
- 3D PRINTING
- SHEET METAL DESIGN AND MANUFACTURING



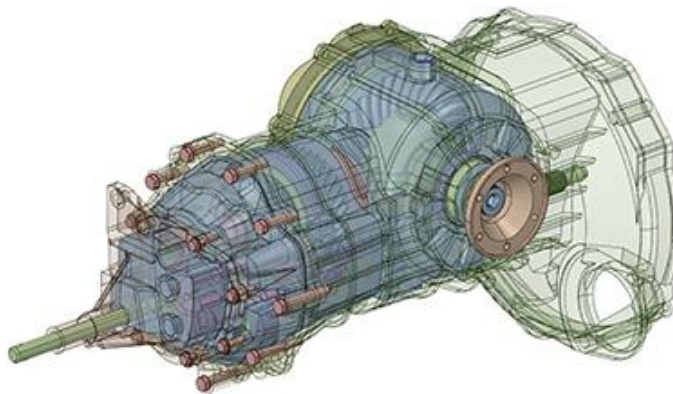
Discovery SpaceClaim's direct modeling meets instant simulation with ANSYS Discovery Live

Capabilities:

Rapid Geometry Creation:

SpaceClaim removes a common geometry bottleneck by putting the power of easy and fast geometry creation into the hands of any designer, engineer, manufacturer or analyst.

This new modeling paradigm will free you from the constraints of history-based concept modeling, allowing you to focus on the creative process and not on the technology. With an expanded use of 3D in the early modeling phase as well as throughout the entire product design and development workflow, you can increase your innovative ideas while also increasing productivity.

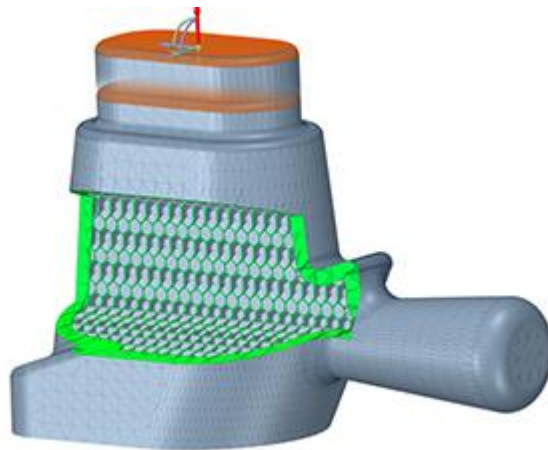


With SpaceClaim you can create new concept models quickly and easily, and further share them with your customers, R&D engineers, CAE analysts, manufacturing and others on a CAD team. And with its universal nature, it's easy to Work with any imported geometry, no matter where it came from - suppliers, in-house library, online resources - and merge them together in one environment.

STL File Manipulation:

SpaceClaim’s intuitive interface allows you to create, edit, optimize, and prepare models for 3D printing and reverse engineering faster and more efficiently than before.

With this module you have automated capabilities to inquire of problem areas in STL files, such as holes, interfering facts, and spikes. Using automated repair tools or manual techniques, watertight or clean STL files are easy to achieve.

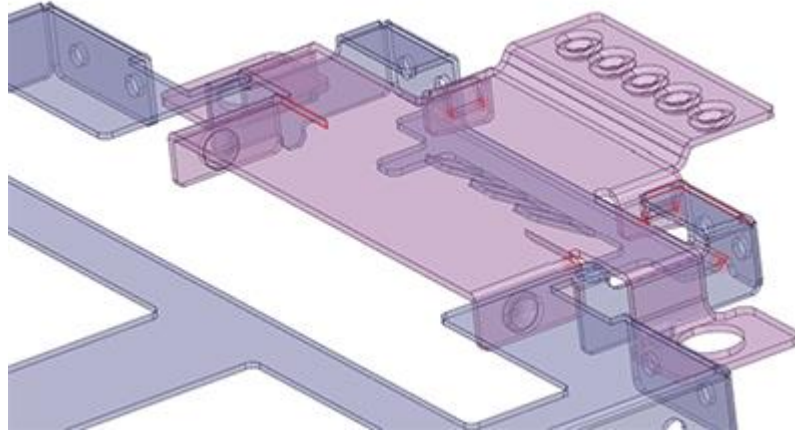


You can also perform complex boolean operations with ease, making it simple to combine details of several data sets into one. For 3D printing optimization tools, you can shell any STL body in seconds and select one of several infill types to improve strength while reducing weight. Several impressive smoothing algorithms rapidly turn dirty scanned data into clean, watertight STL bodies ready for printing. In SpaceClaim you’ll notice the similarity of solid and STL editing tools, with no difference between the power and ease of use in each.

In addition, these same STL cleanup tools will enhance the reverse engineering workflows by streamlining the STL to CAD conversion process.

Model Repair:

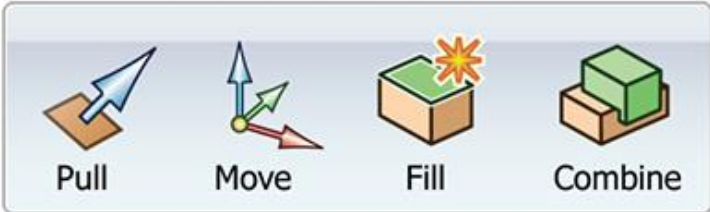
Many CAD tools output corrupt 3D data and are in desperate need of repair. Whether importing models for a new design, generating toolpaths on a solid body, or needing a high-quality mesh for simulation, the input requirement of clean geometry is still the same.



SpaceClaim's automated repair tools are designed to target problem areas of any model and provide instant options for healing and repair. Whether a model is full of holes, gaps or corrupt surfaces, these tools quickly recreate models to their intended state. Spellcheck-like tools provide feedback on location and possible remedies, but you always have the option of accepting automated repairs or providing further control of surface contours or repair types. The end result is clean surfaces and watertight solids.

Simple Tools:

With only 4 tools that perform 80% of the common modeling tasks, you'll find SpaceClaim the easiest CAD tool you'll ever learn. Designed to be a tool that anyone could begin using with minimal training, you'll be amazed how easy it is to create or modify any 3D file just as rapidly as your mind can conceive a change.



As your mind conceives a 3D solid, or you need to stretch and distort a model, the Pull tool suites these tasks. The Move tool does exactly as it implies; moves or rotates geometry to the location of your choosing. For undoing operations or simplifying models, the Fill tool was designed to defeature models in seconds. And finally, with finesse the combine tool will either boolean subtract or merge bodies, regardless of complexity of quantity of bodies involved.

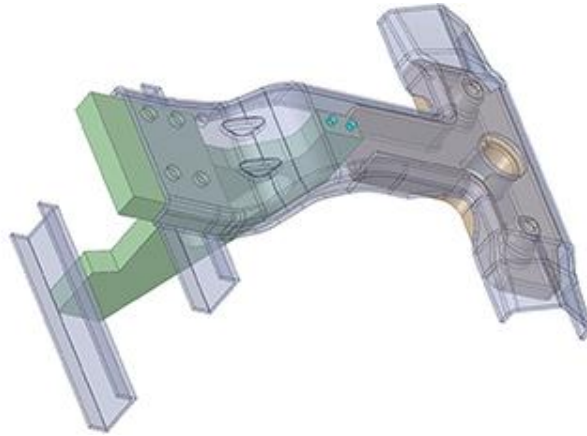
CAD Import and Editing:

SpaceClaim's simple and powerful tools defeature both parts and assemblies prior to meshing and solving, and in a fraction of the time of traditional CAD tools. Geometric problems such as small sliver faces, gaps, raised text, and unnecessary small features that once prevented an acceptable mesh or drastically increased solve time are now remedied in seconds. Remove stubborn, intricate rounds, including those that overlap or have complex intersections. Automatically detect and remove small holes, faces, edges and other irrelevant geometry. Because SpaceClaim is built on direct modeling technology, you can defeature and edit your file without regard for rebuild errors or needing to understand how a file was initially constructed.



Versatility:

The geometry centric nature of SpaceClaim means that the same powerful tools are used across different use cases, regardless of complexity or scope of modeling task. For example, you might use the Pull tool to create a fixture for manufacturing, but it is versatile and powerful enough to aid in the repair of geometry by extending surface bodies. Regardless of the modeling task or your formal training, SpaceClaim's unique toolset enables you to create rough concepts, detailed designs, or edit 3D data created in any other CAD system. In addition, things like common PC shortcuts such as copying, cutting, and pasting also provide you with an extremely efficient method of data reuse, as well as easy and familiar workflows.



ANSYS Discovery Live

Design Exploration for Every Engineer:

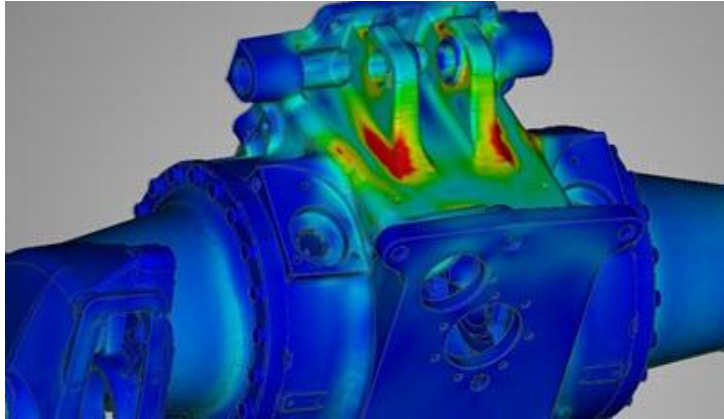
ANSYS Discovery Live delivers instantaneous 3D design simulation with direct geometry modeling, for interactive design exploration and rapid product innovation. You can easily manipulate geometry, material types or physics inputs to see real-time changes in performance.

Use Discovery Live to test more design iterations in a shorter amount of time, perform feasibility studies on new concepts and bring products to market faster.

Discovery Live Capabilities

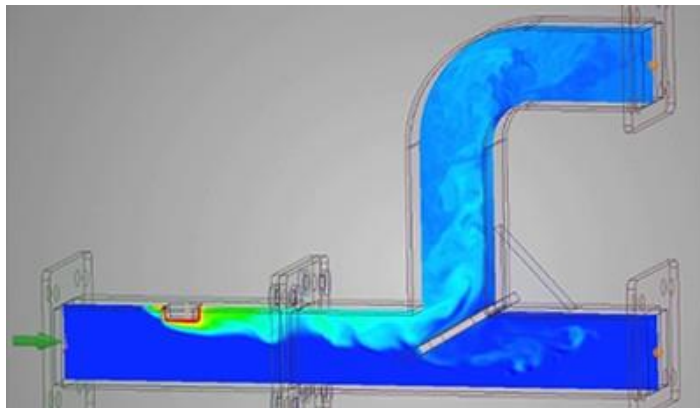
Structural Analysis:

ANSYS Discovery Live is breaking down the barriers that once prevented any engineer from using engineering simulation. For example, consider the difficulty involved with performing a structural analysis on complicated geometry. In Discovery Live, near-instant simulation results appear once loads have been established. And, because Discovery Live is interactive, you can test several design ideas in a few seconds and receive immediate insight around the structural performance of a design.



Internal Fluid Analysis:

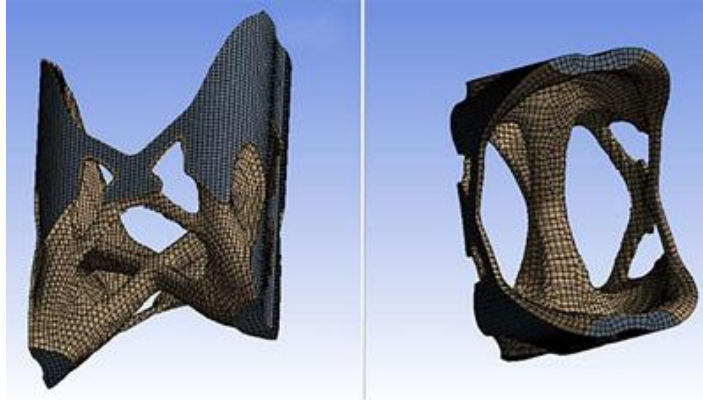
Finding meaningful internal flow characteristics in a reasonable amount of time can be challenging. Discovery Live provides not only invaluable feedback so you can understand trends, but also near-instant solving and visualization capabilities. What’s more, you can create new geometry within the flow, or edit existing features, and your updates will occur live. No other system in the world provides this type of information and functionality.



Topology Optimization:

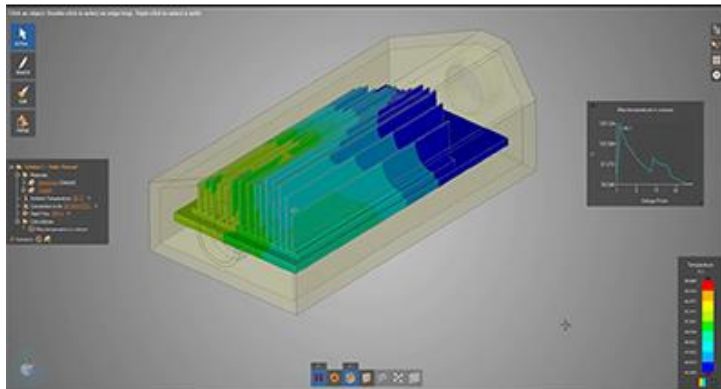
ANSYS Discovery Live introduces the first-ever, interactive topology optimization tool for generative design. Easily evaluate a broad spectrum of product behaviours and uncover optimal design solutions in record time. Topology optimization capabilities account for manufacturing

constraints and can be applied to multiple load cases and physics, including modal and structural simulations.



Thermal Analysis:

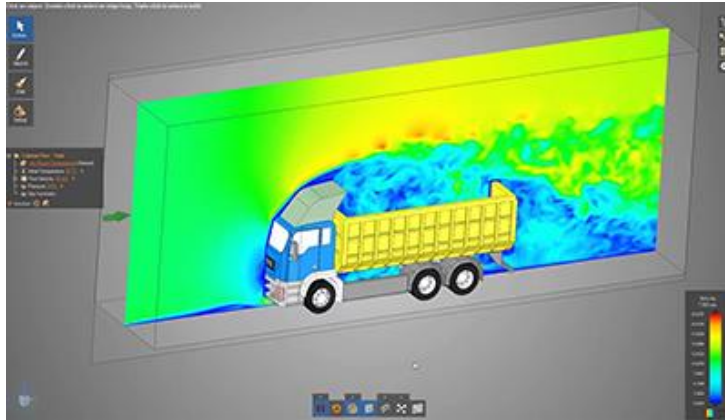
With Discovery Live you can spend more time exploring questions and answers and less time negotiating traditional simulation processing steps. It provides real-time data on temperature distribution as you make 3-D model changes, or change input characteristics like heat flow and material type. Most importantly, Discovery Live lets you test your ideas in real-time to achieve your design goals in a fraction of the time.



External Aerodynamics:

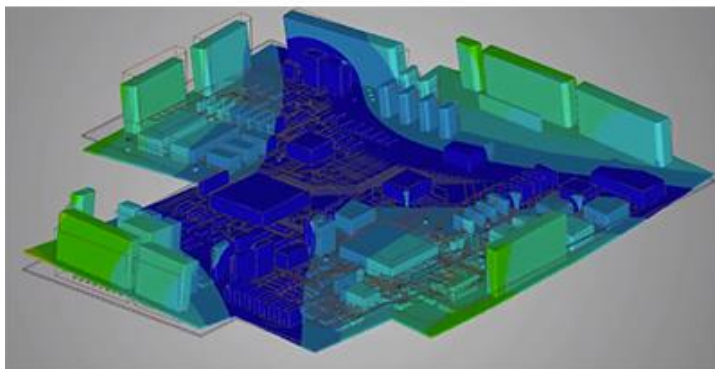
Getting started with ANSYS Discovery Live requires little more than a few mouse clicks. The engineering simulations are instantaneous as you change boundary conditions or make quick,

3D modeling changes. You can observe velocity, external forces, pressure, flow lines, particle flow and more to make physics-directed design decisions.



Modal Analysis:

Discovery Live's instant engineering feedback extends to even complex modal analyses. You can quickly observe the different modes of vibration and get a quick understanding of problem frequencies. With the rapid, direct geometry editing powered by Discovery SpaceClaim, you can make adjustments to your model and instantly see the impact. Discovery Live's simulation-guided design will accelerate your product development, help avoid delays, and ensure you are designing the best products possible.



ANSYS Discovery AIM

Upfront Simulation:

Up to 80 percent of the cost of a product's development is determined by the decisions you make early in the design process. Upfront simulation is digitally exploring design concepts and testing critical design choices early in the product lifecycle using simulation. Upfront simulation gives you the information to make informed decisions, reduce costly physical prototypes, and avoid unworkable designs down the road. Upfront simulation helps you bring innovation to market faster and less expensively.

Design Engineering:

ANSYS Discovery AIM makes upfront simulation easy by combining intuitive, guided workflows, accurate simulation results and optimization in a complete simulation tool. Integrated geometry modeling based on ANSYS Discovery SpaceClaim technology helps you create new 3D concept models, or edit/repair existing geometry. Whether a simulation includes electromagnetics, thermal, structures, or fluids or combinations thereof, all aspects of simulation workflow are included in the single-window design, which enables you to predict complete product performance with results you can trust. Discovery AIM's powerful parametric and optimization capabilities can automatically explore the design space thoroughly and find the best design faster.

Customized Solutions:

ANSYS Discovery AIM makes it easy to deploy simulation throughout an engineering organization. You can customize Discovery AIM's user interfaces to comply with your company's standards for simulation, and create simulation templates for your unique industry applications. Because Discovery AIM includes fluids, structures, thermal and electromagnetics simulation capabilities, engineers only need to learn one tool, reducing training time and costs.

Ways to Access AIM Technology:

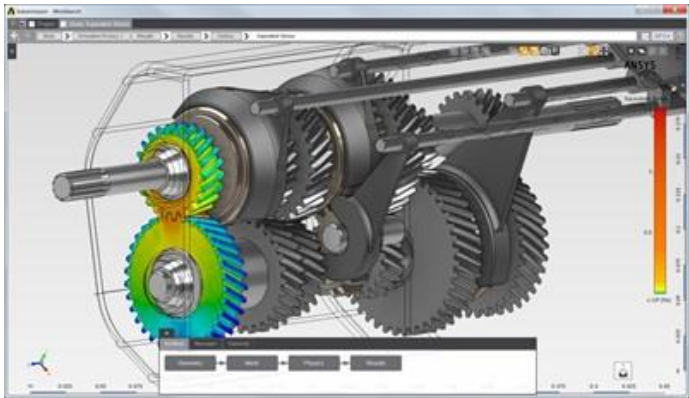
The AIM technology can be accessed through the ANSYS Discovery Ultimate Bundle to get all the benefits and features of Discovery AIM, along with Discovery Live instant simulation and Discovery SpaceClaim geometry modeling in one package. It can also be accessed through the [ANSYS Mechanical Enterprise](#), [ANSYS CFD Enterprise](#), and Multiphysics bundles.

ANSYS Discovery AIM Capabilities

Guided Simulation Workflows:

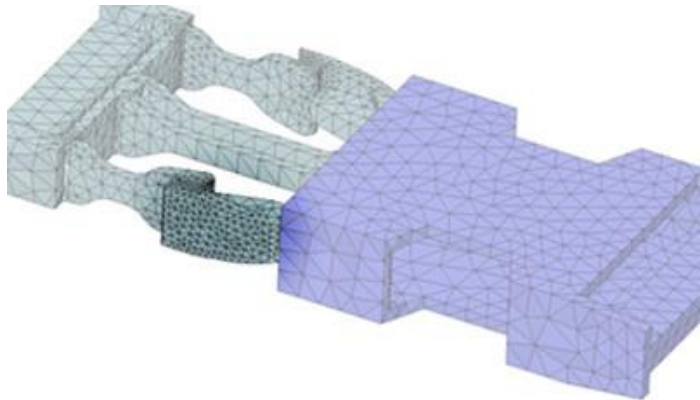
Simulation is more than Software®

Discovery AIM’s guided simulation workflows and highly intuitive user interface streamline the setup and execution of engineering simulation, making it easy to apply simulation early in the design process, when it can be used for critical design decisions. Discovery AIM’s templates guide you through the entire simulation process and automate many of the routine steps, enabling you to focus on the engineering. The visual cues and guides included in Discovery AIM user interface help you to quickly identify and navigate to model inputs that require attention. You will spend less time learning — or, for infrequent users, relearning— and operating the software, making you more productive.



Physics Aware Meshing:

Based on the desired type of physics solution and setup, AIM intelligently creates an appropriate mesh. Depending on whether you are solving nonlinear contact, fluids or topology optimization; AIM will automatically refine the mesh for contact surfaces, create boundary layers for fluid walls or create an optimized, uniform mesh for topology optimization, which streamlines the workflow, saves time and improves solution accuracy.



Proven Simulation Technology:

Discovery AIM is based on trusted ANSYS technology for all the steps of upfront simulation — model setup, meshing and physics solution — enabling reliable and accurate fluid, structural, thermal, electromagnetic and multiphysics simulations.

Fluid Flow: Accurately simulate key fluid flow problems such as reducing pressure drop, calculating lift and drag coefficients, evaluating fluid loads and predicting flow behavior.

Static stress: Analyze static deflections and stresses for complex parts and assemblies using static stress analysis, including nonlinear contact, structural joints and large deflections.

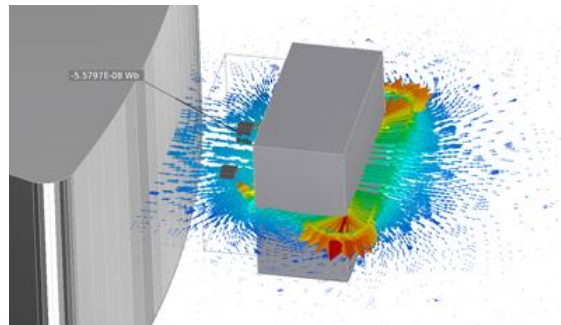
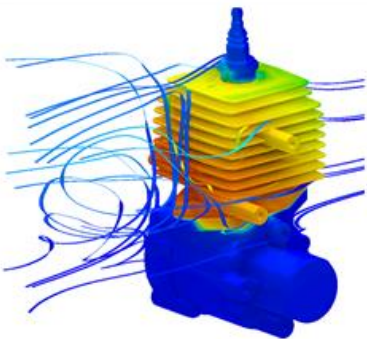
Topology Optimization: Create novel shapes that optimize material usage, which either maximize the strength of a design or minimize the response to free vibration.

Modal Analysis: Determine, with proven modal analysis, the natural frequencies and vibration characteristics of your product designs to fully understand product longevity and durability.

Electromagnetics: Rapidly simulate static magnetic fields and current conduction to accurately evaluate the electromagnetic performance of your designs.

Thermal: Ensure your designs perform properly within their expected temperature ranges by accurately simulating thermal performance.

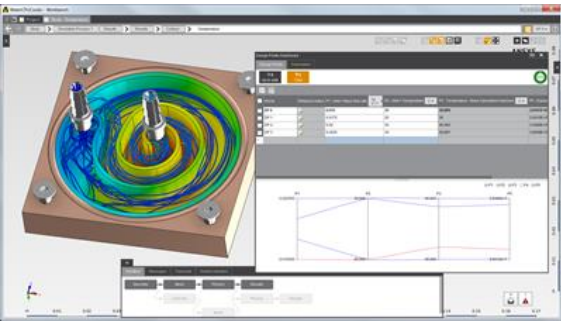
Polymer extrusion: Reduce trial-and-error iterations and quickly troubleshoot unexpected problems when simulating polymer extrusion processes and evaluating die designs.



Robust Design Optimization:

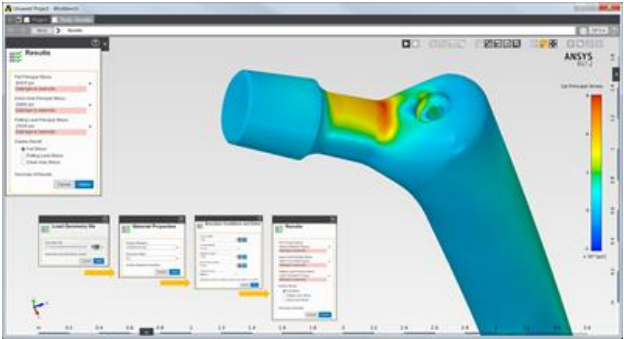
Simulation is more than Software®

Discovery AIM’s powerful design exploration and optimization capabilities help you to make informed design decisions and optimize your product designs. Discovery AIM includes ANSYS DesignXplorer technology, so you can explore your design space rapidly and thoroughly, and automatically optimize your product designs. By varying parameters from CAD, material properties, boundary conditions and simulation results, you can quickly set up and evaluate multiple design variations to drive design of experiments, goal-driven optimization and Six Sigma analysis.



Flexible Custom Applications:

With Discovery AIM’s customization capabilities, you can incorporate your company’s best engineering practices into your simulation process to ensure consistency and accuracy within your organization. Discovery AIM includes journaling and scripting based on Python, which enables you to record, customize and replay your simulation. Any simulation can be used as the basis for a replay able user-defined template, and custom physics objects and loads can be used to tailor the simulation definition to specific processes. Discovery AIM’s automation and customization capabilities are particularly useful for creating products that must adhere to safety or manufacturing standards.



Interoperability for Engineering Collaboration:

Discovery AIM uses the same proven ANSYS solver technology as ANSYS CFD and ANSYS Mechanical, so you can trust your results. Design engineers and simulation analysts can work closely together to troubleshoot problems or perform deeper investigations because both use the same ANSYS flagship products. Overall, Discovery AIM brings ANSYS solver technology to design engineers through easy-to-use, guided workflows and makes it simple for them — or the analysts they collaborate with — to overcome challenges using Discovery AIM model data.

