Geometry Prep and Rapid Design Iteration in Discovery

2023 R2

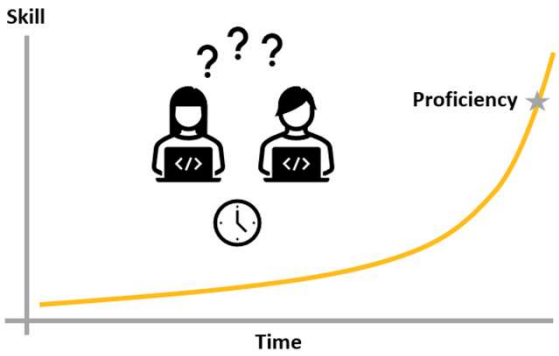
Ansys

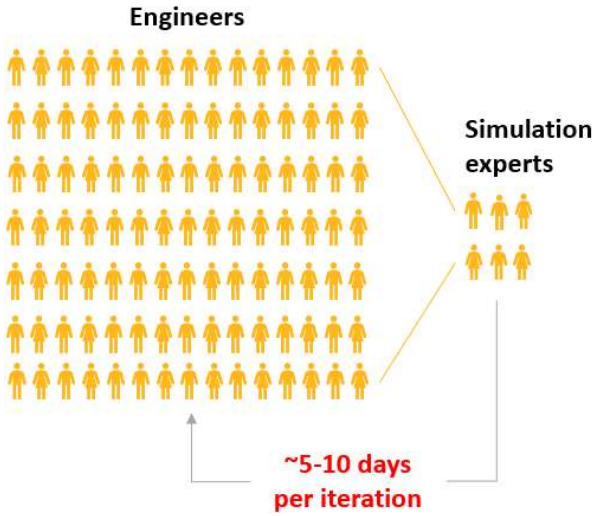
State of simulation today

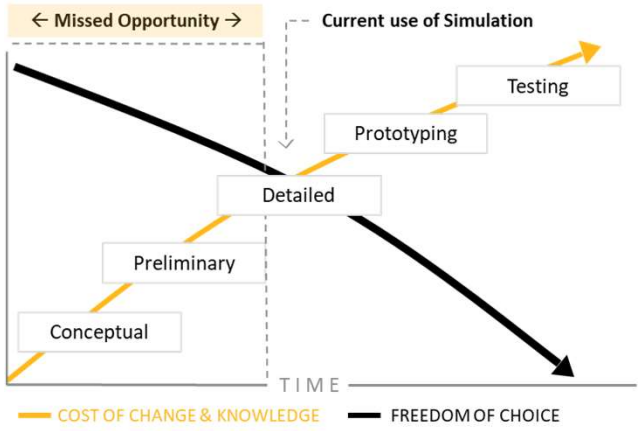
HIGH BARRIER OF ENTRY FOR NEW USERS
Traditional simulation tools & technologies are too hard to use & too time consuming

PRODUCT DEVELOPMENT BOTTLENECK
Limited resources results in lengthy turnaround times & reduced use of simulation

IDEATION MISSED OPPORTUNITY
Majority of costs locked in the early design phase, but simulation is often not used here







How can we empower more engineers to use simulation?

How can we help experts speed up their simulation workflows?

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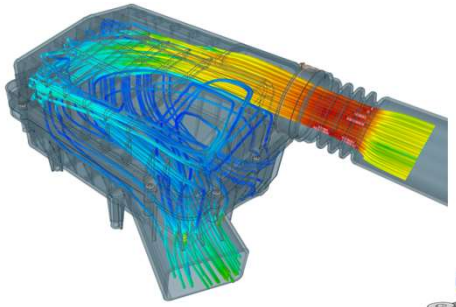
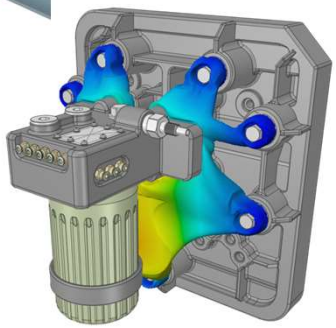
Discovery brings best in class capabilities

Upfront Simulation

- Enables design engineers & new users to easily perform simulation on their own
- Enables simulation experts to obtain quick results before committing to a detailed analysis

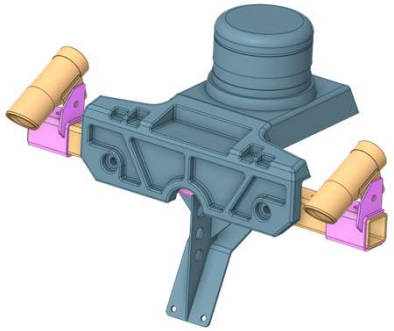


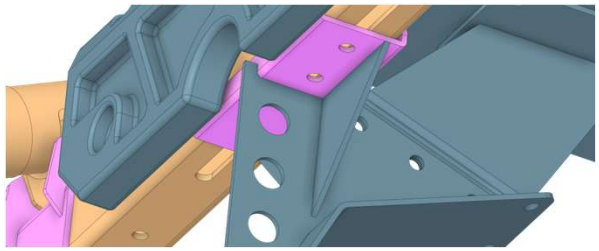


Ansys Discovery

Geometry Prep for Simulation

- Accelerates simulation by enabling fast clean-up and simplification of CAD models





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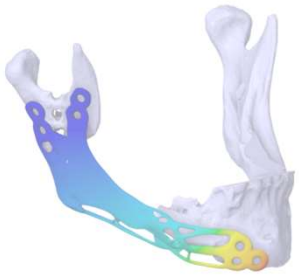
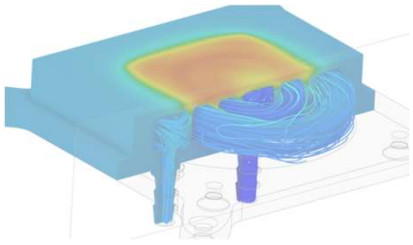
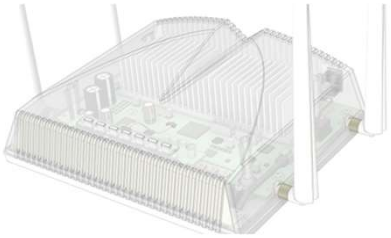
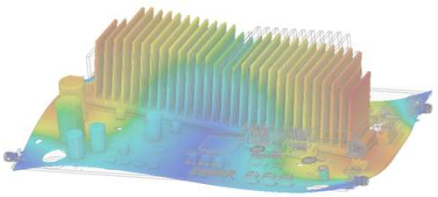
Simulation for both Experts and Design Engineers

Simulation Experts

- **Offload routine simulation to design engineers**
- **Faster and more robust geometry prep *accelerates simulation turnaround time***
- **Rapid upfront simulation with Live Physics *increases simulation speed and bandwidth***

Design Engineers

- **Obtain routine simulation results on their own**
- **Increased use of simulation results in *better designs* at a *lower cost***
- **Reduced wait time for simulation data *accelerates time to market***

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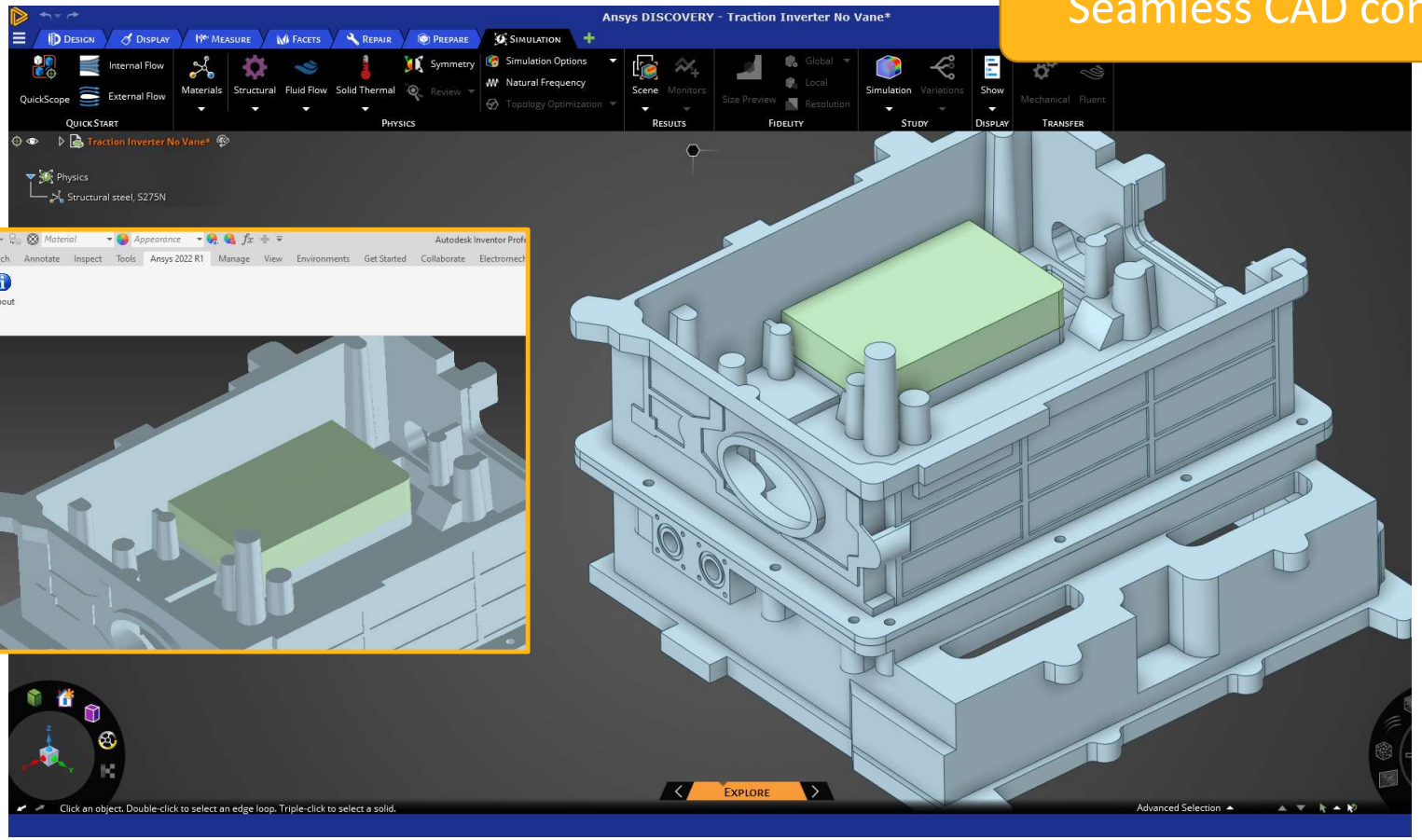
Geometry prep for simulation

Seamless CAD connection



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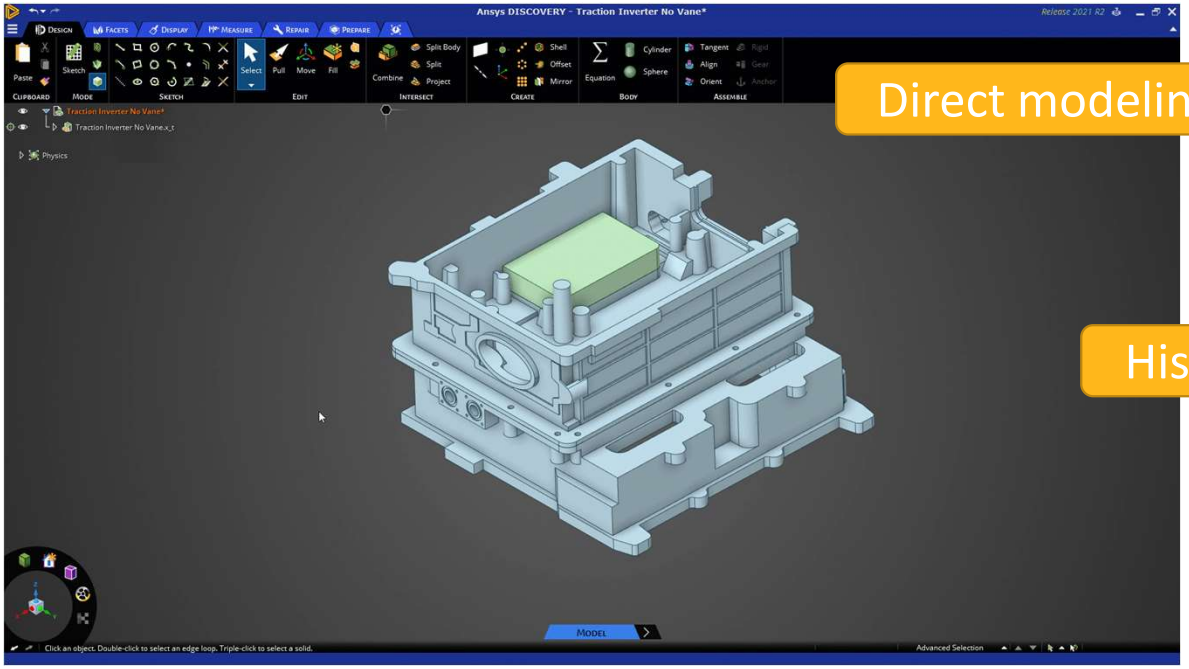
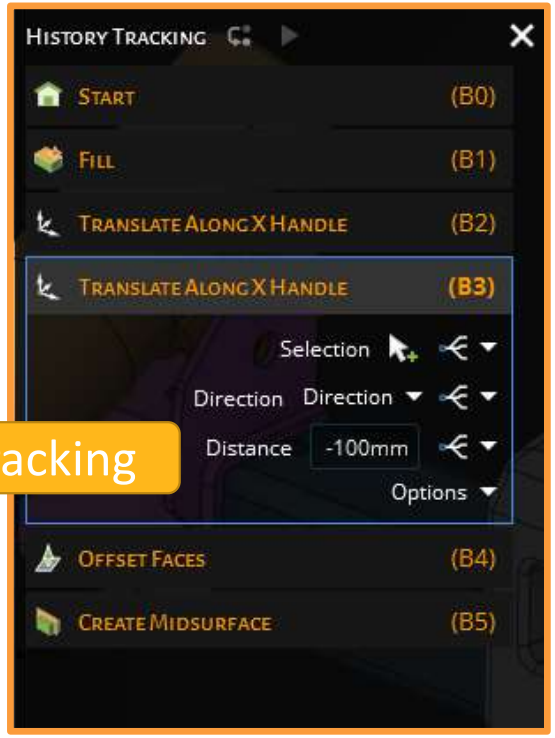
Geometry prep for simulation





Scripting & customization

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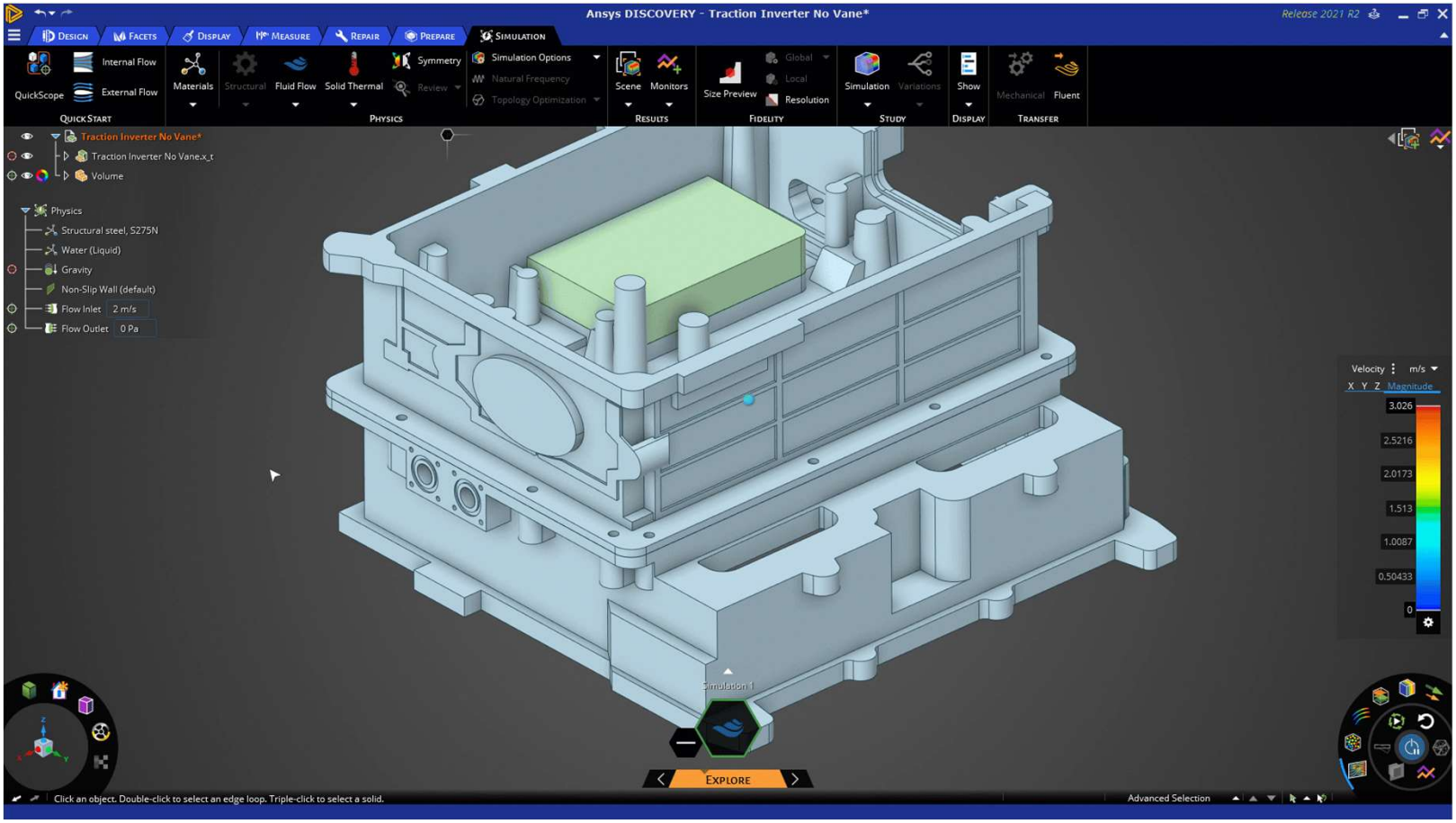
Upfront simulation: Live Physics Solver



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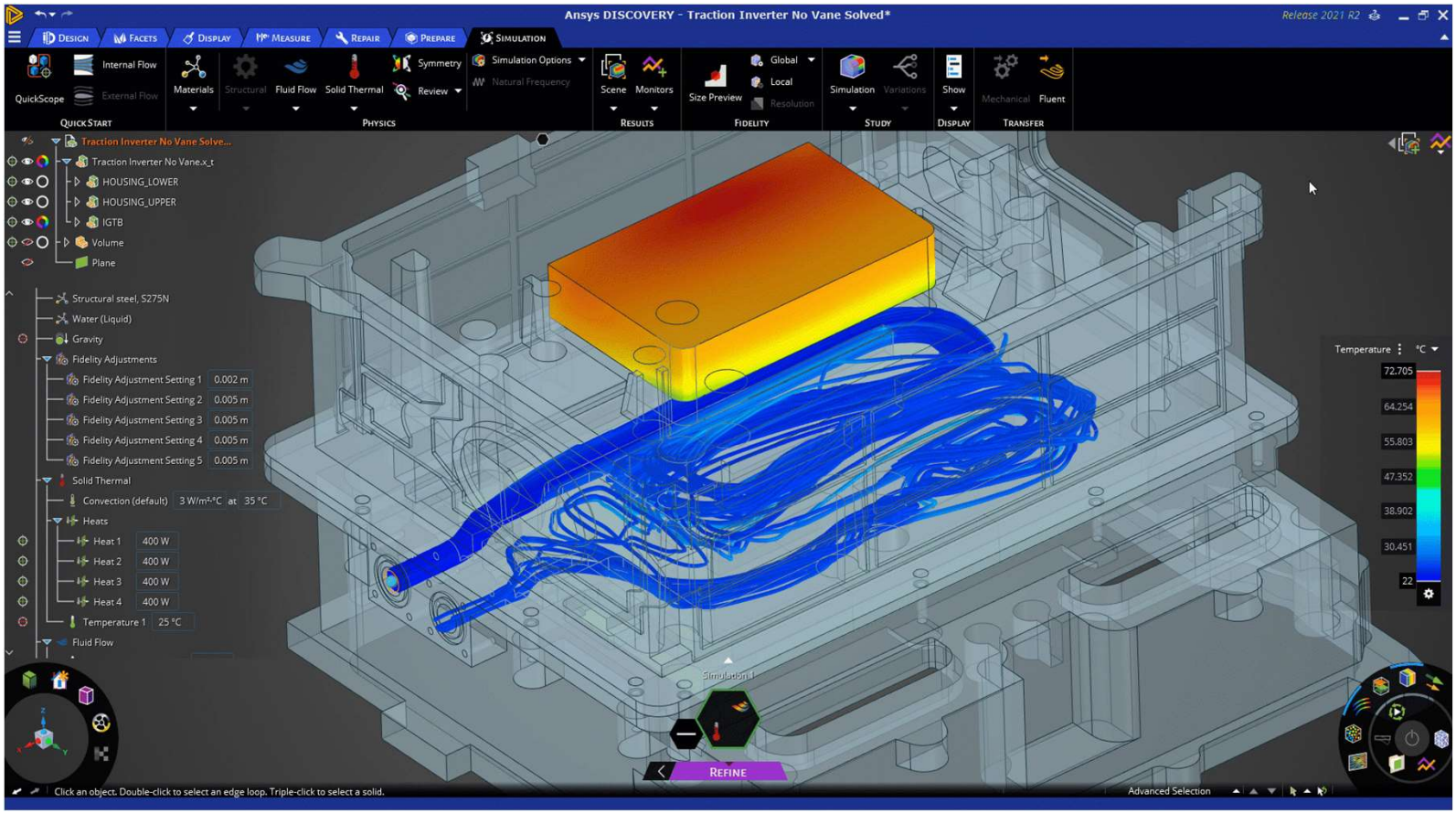
Upfront simulation: Fluent and Mechanical Solvers



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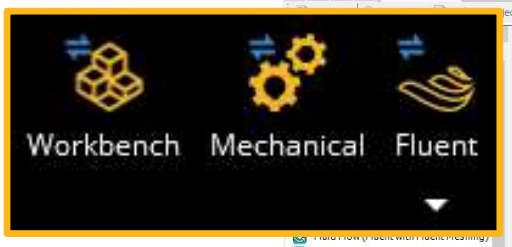
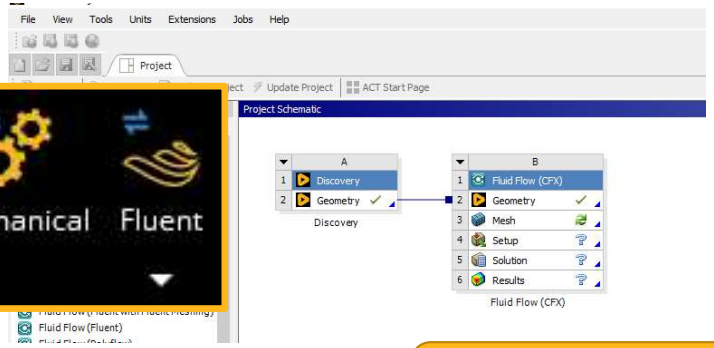
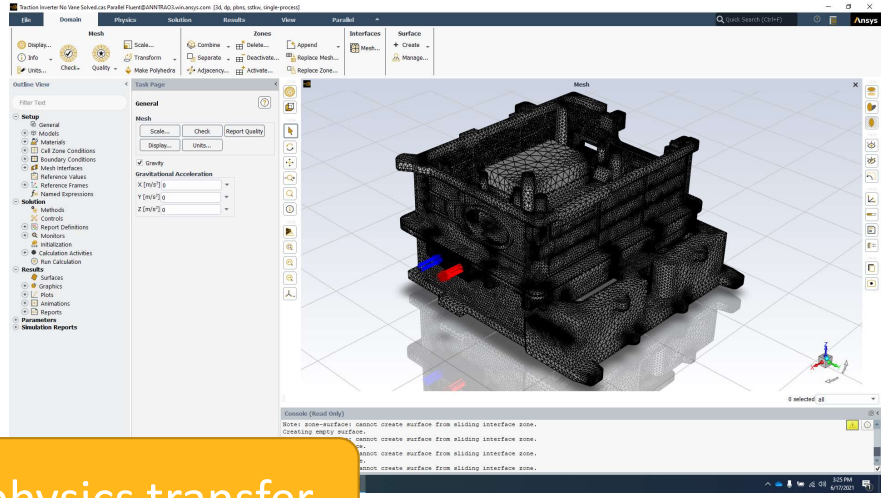
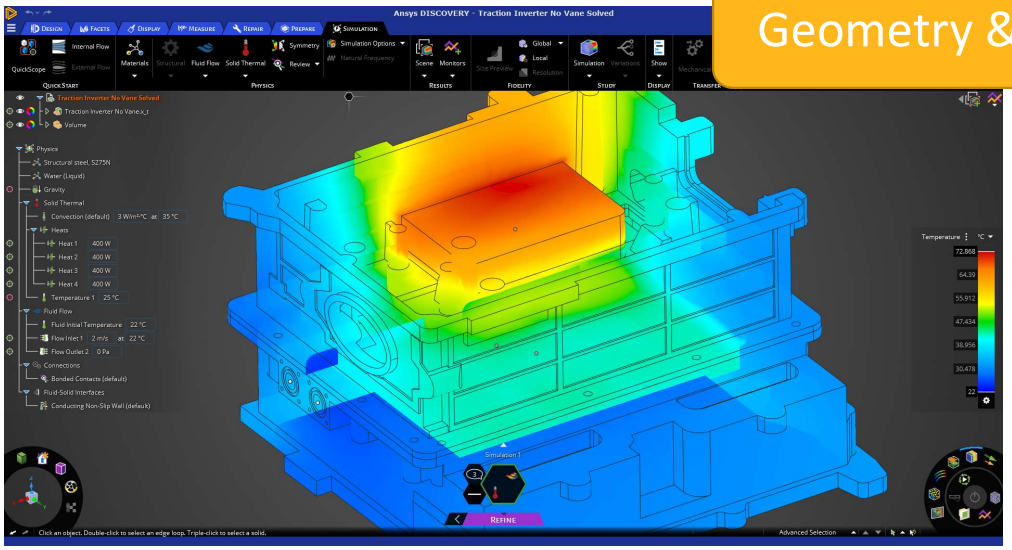
Easy transfer to Ansys expert tools

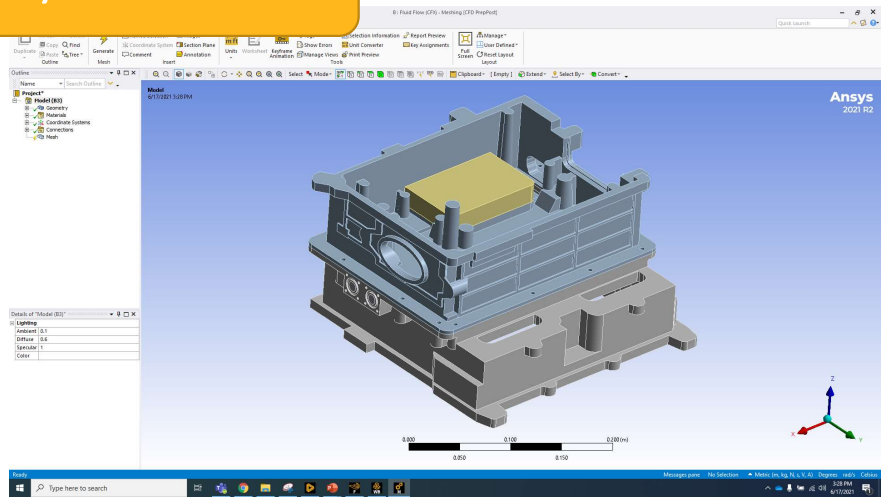






Geometry & physics transfer





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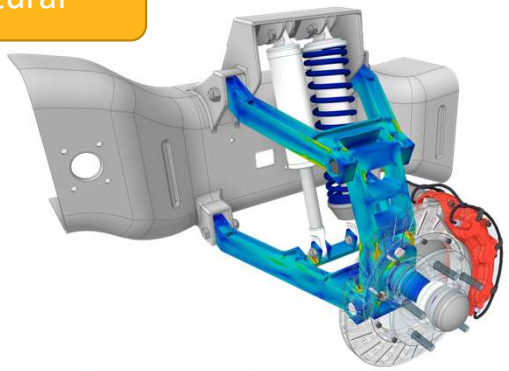
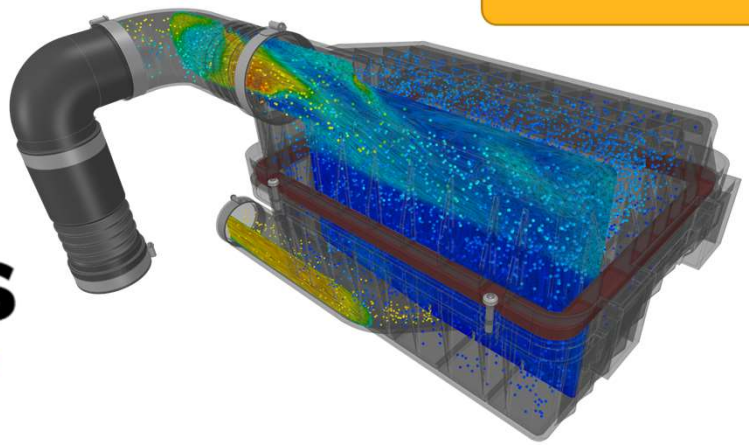
Multiple physics capabilities

Structural



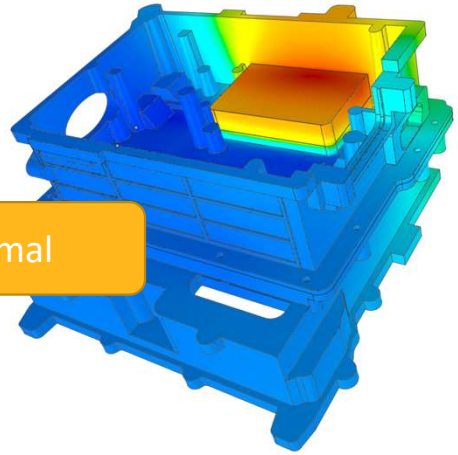
Fluids

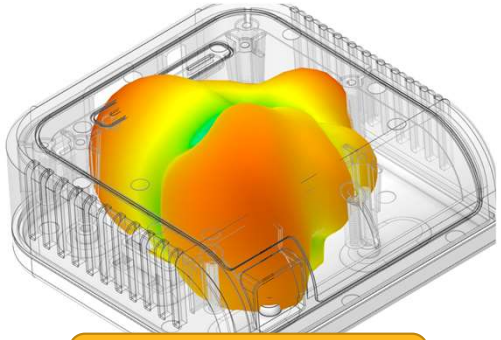


Ansys

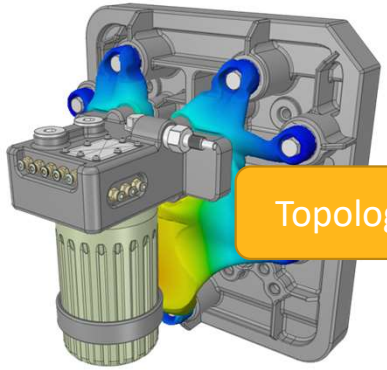
Discovery

Thermal





Electromagnetics



Topology optimization

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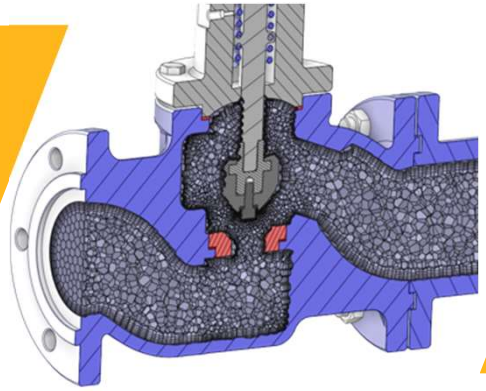
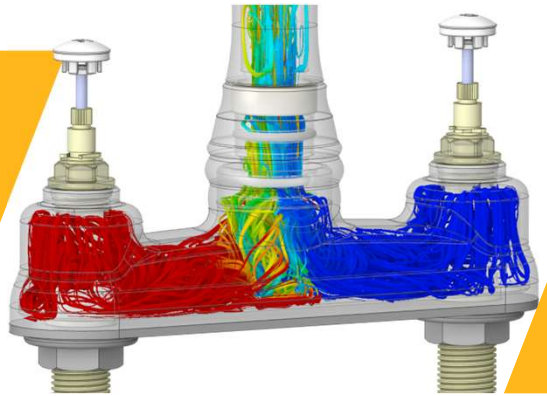
3D Design Top 3 Release Features



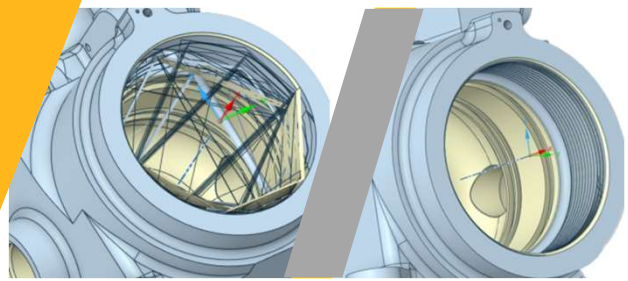
Live-GX and Poly Meshing

- Makes it possible to have **both speed and accuracy** while at the same time **dramatically reducing GPU** hardware memory requirements. Additionally, support for native polyhedral meshing has been added, further improving mesh quality leading to **faster and more optimized simulations**.



Cutter Bodies

- The time consuming and frustrating challenges of working with complex assemblies for CFD studies are **eliminated** with Cutter Bodies. By moving the creation of fluid region details onto the GPU where **subtraction of overlapping parts can be performed robustly and quickly**, a simple exterior fluid region is the only input geometry required.



Check Geometry

- Common geometry issues that previously derailed the simulation process are now automatically identified, visualized, and grouped into easy-to-work-with categories. In addition, our powerful new repair engine automatically corrects issues, resulting in clean, **ready to simulate geometry the first time! No more wasting time** manually identifying and fixing errors

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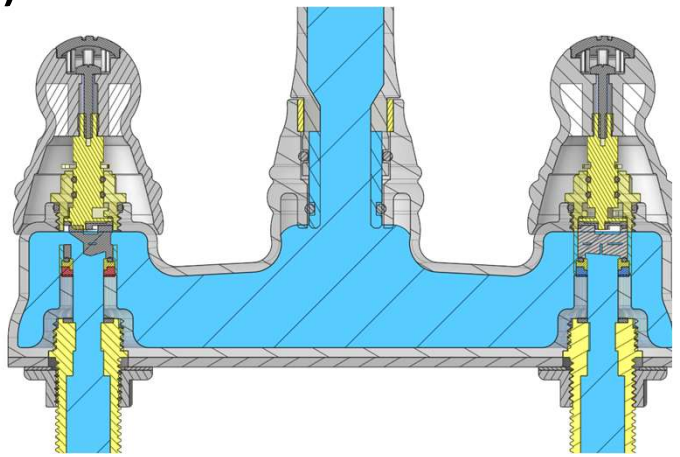
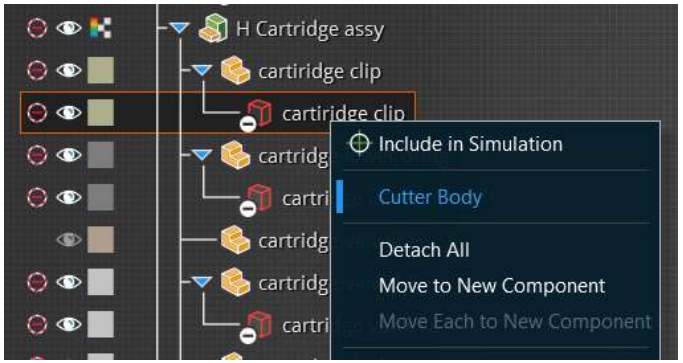
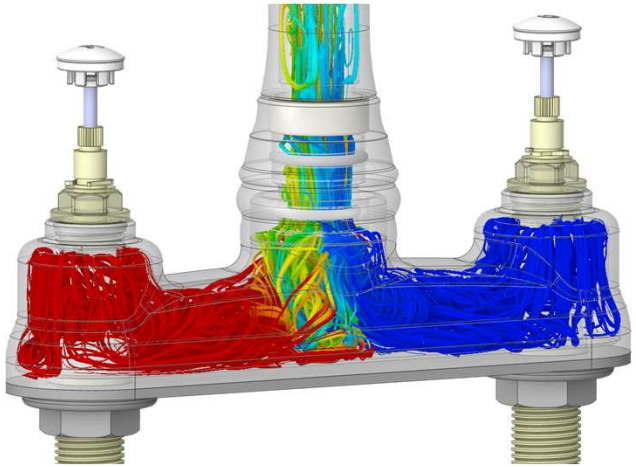
Cutter Bodies for Fluids and CHT (Explore)

- New option to subtract overlapping parts during simulation without modifying original geometry
  - Significantly simplifies fluid volume extraction by no longer needing to include internal details
  - Use context menu in model tree to convert a body to a cutter body, removing material in overlapping regions
  - Cutter bodies can be included as solids for CHT







Using cutter bodies simplifies fluid volume extraction for complex faucet assembly

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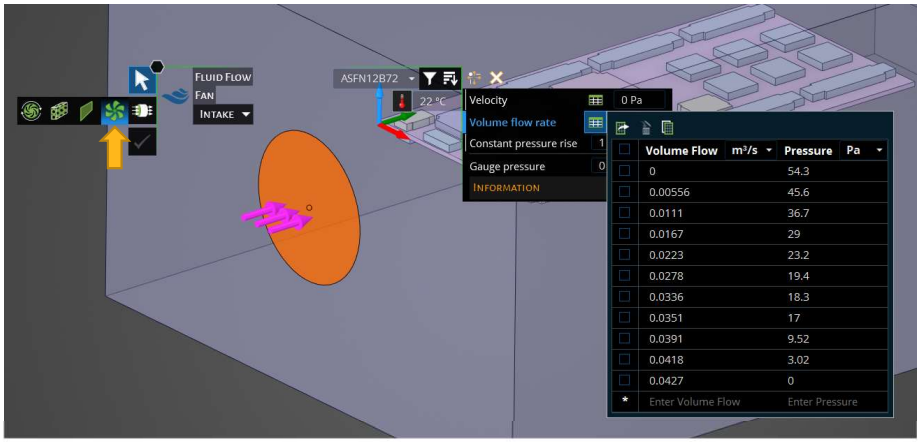
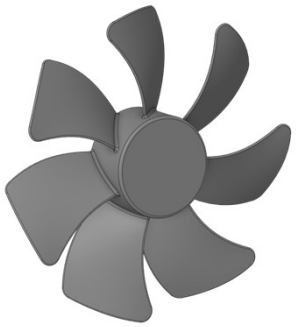
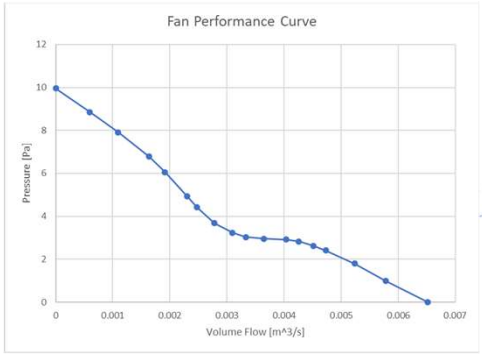
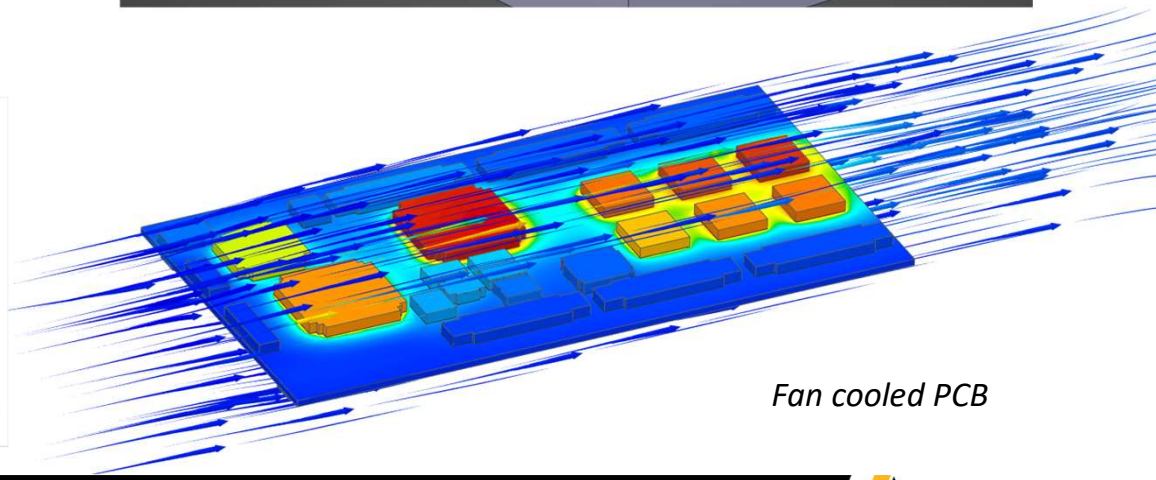
Intake and Exhaust Fans (Explore & Refine)

- New intake and exhaust fan conditions
  - Specify fan curve based on volume flow rate or velocity versus pressure or constant pressure rise
  - Fan library with common electronics cooling fans
    - Based on Icepak fan library with ability to add user-defined fans
    - Ability to filter fan selection based on library, manufacturer, or fan area
  - Fan operating pressure monitor
    - Determines if fan is operating in the stable portion of the fan performance curve









Fan cooled PCB

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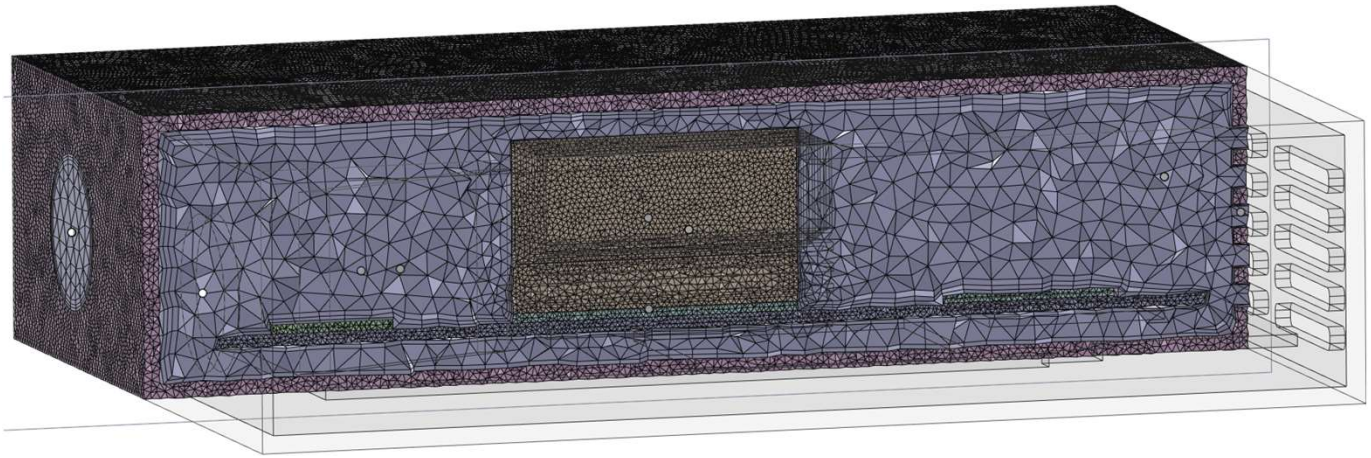
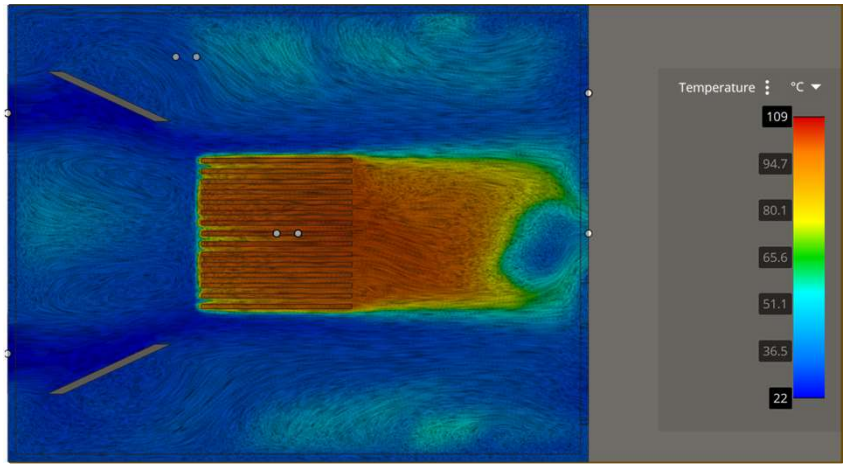
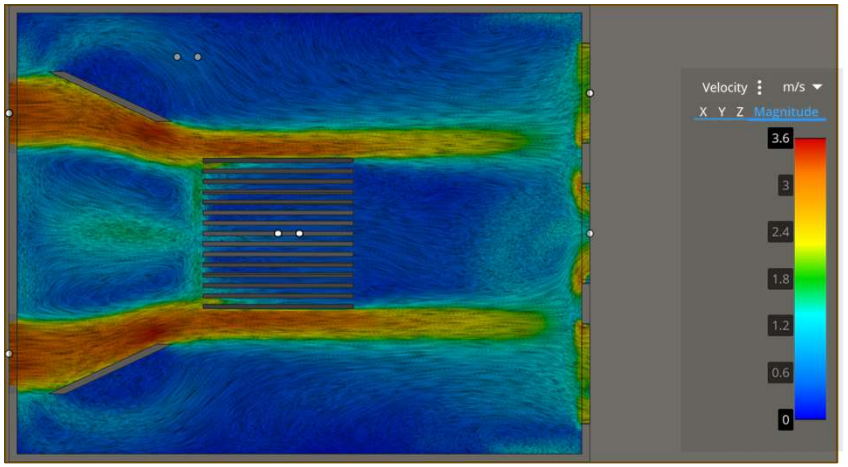
Electronics Enclosure – Refine with LiveGX







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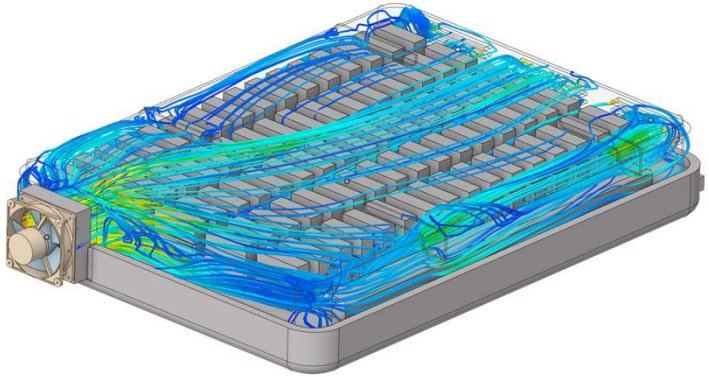
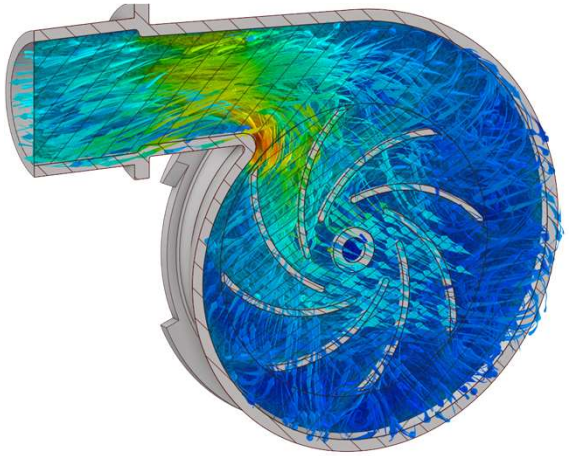
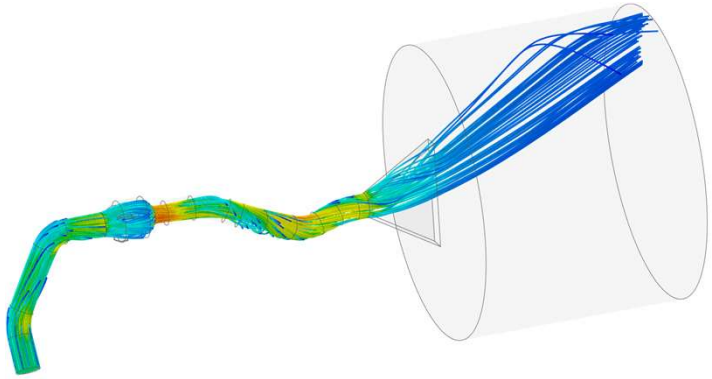
LiveGX Applications



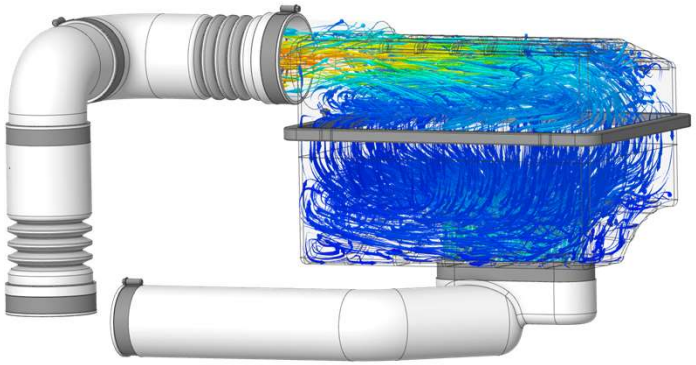
Fan cooled fuse box CHT



Centrifugal pump with rotating fluid zone



Stability bleed system with compressible flow



Air intake with porous media

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