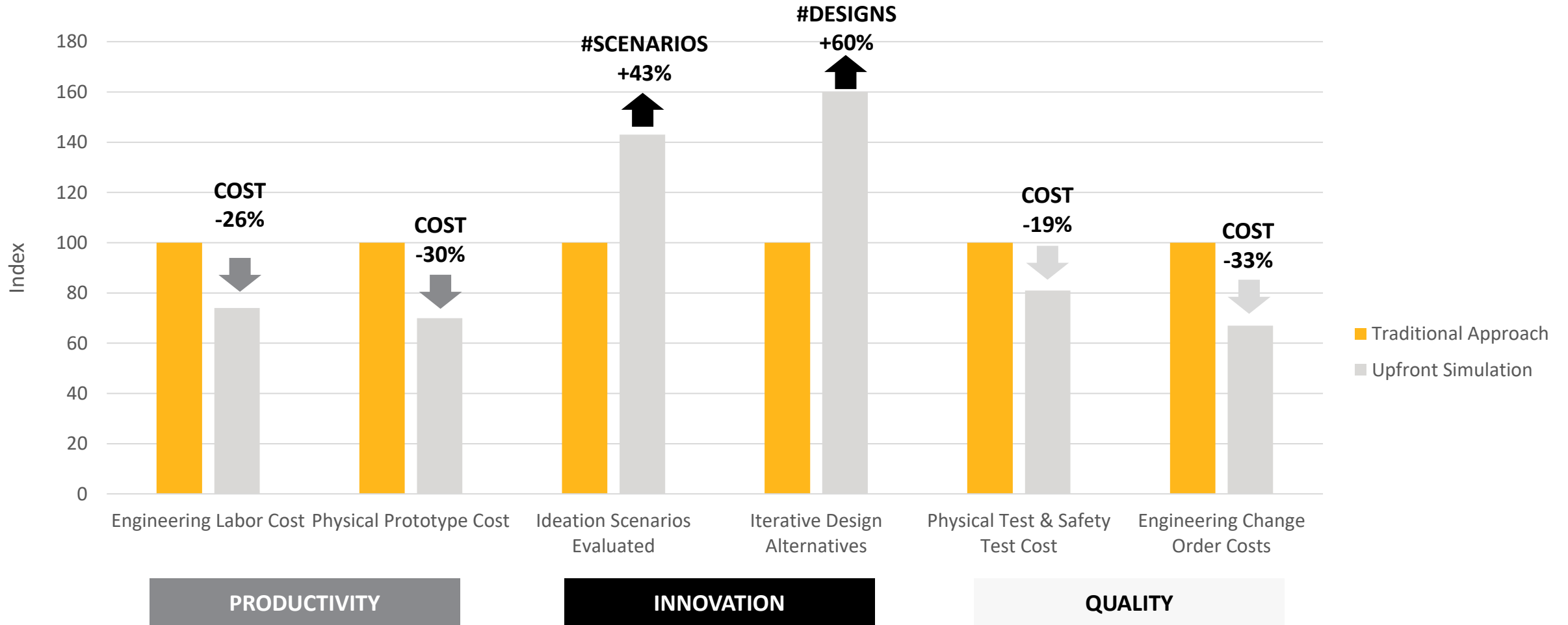


Ansys Discovery



Demonstrated return on investment in upfront simulation



Source: "Quantifying the Return on Investment in Simulation Lead Design Exploration", Mediafly, 2020



Fact

**Most (all) companies
are **under-utilizing**
simulation
early in their design process**

only some staff

only some of the time

for **only** some scenarios

Why?

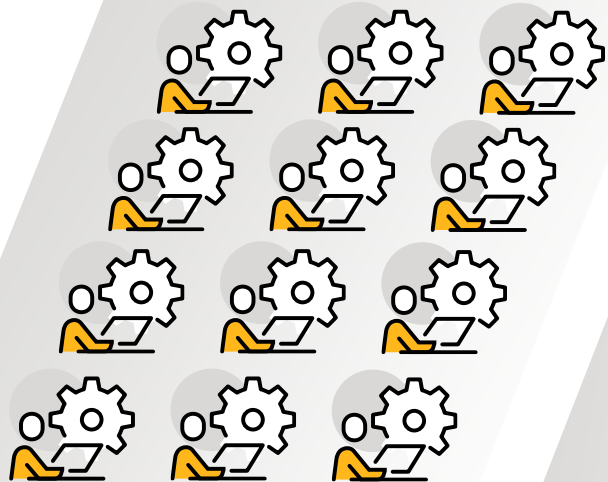
State of Simulation Today

PRODUCT DEVELOPMENT BOTTLENECK



Engineers

Simulation experts



~5-10 days Per iteration

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

How can we help Experts & Engineers speed up their simulation workflows?

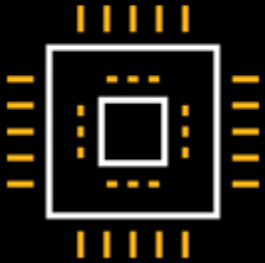
“We believe that the quality of the analysis is already doomed by what was created in CAD. I expect my people to spend 80% of the time preprocessing before opening Ansys at all.”
-Simulation Expert



**Discovery brings the power of simulation to
every engineer and product**

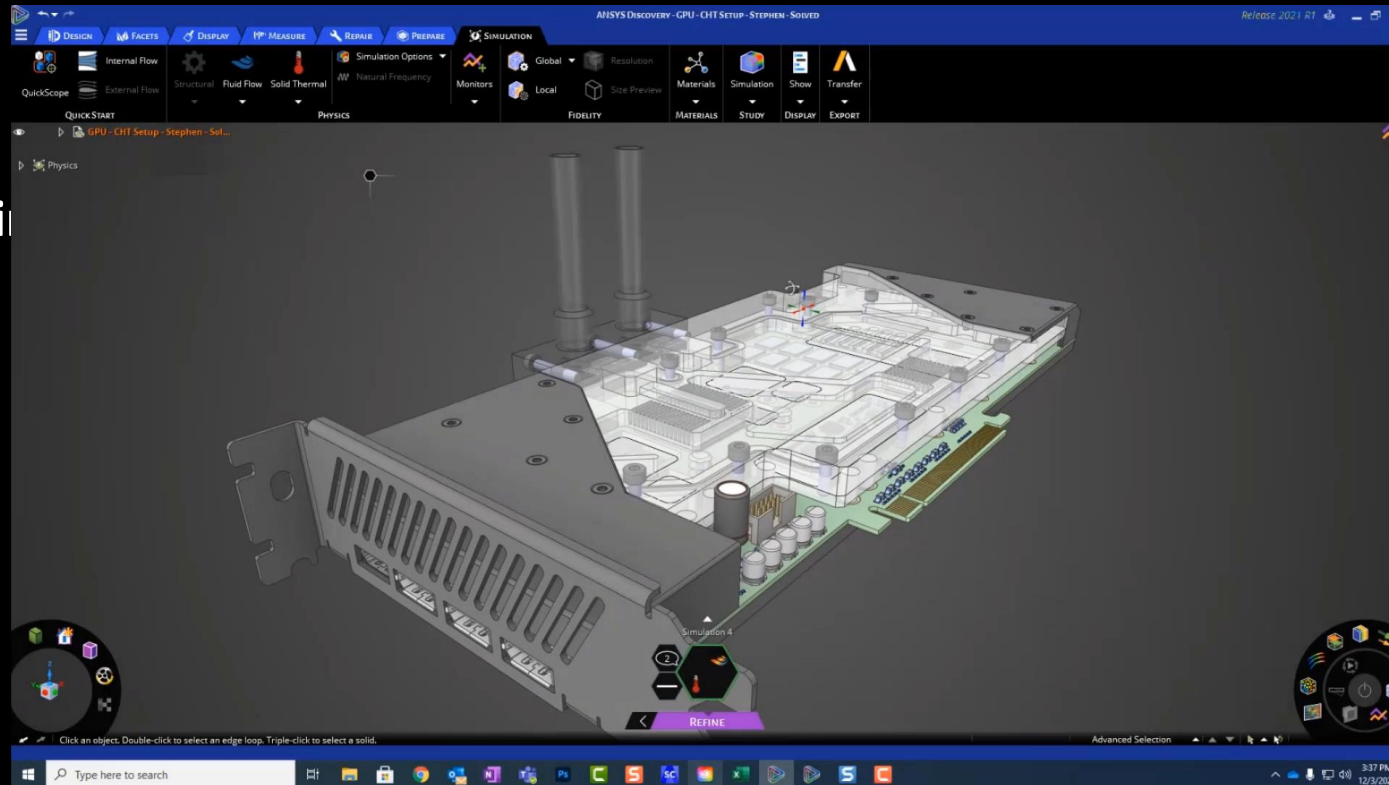
Discovery brings the power of simulation to every engineer and product

HIGH-PERFORMANCE
COMPUTING



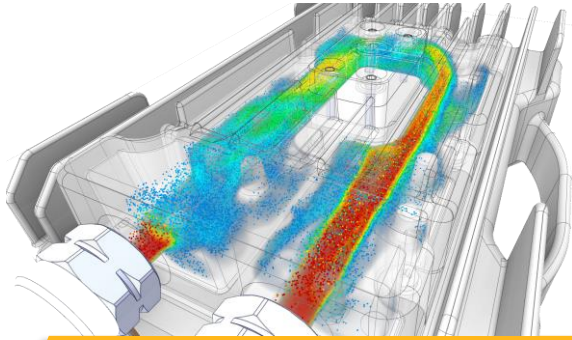
It is the first sim

CLOUD AND
EXPERIENCE

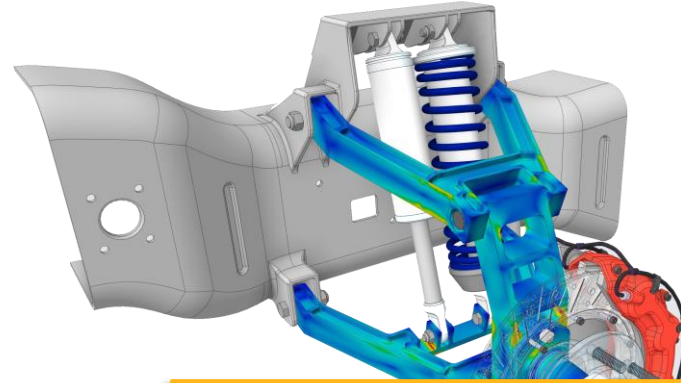


sys portfolio

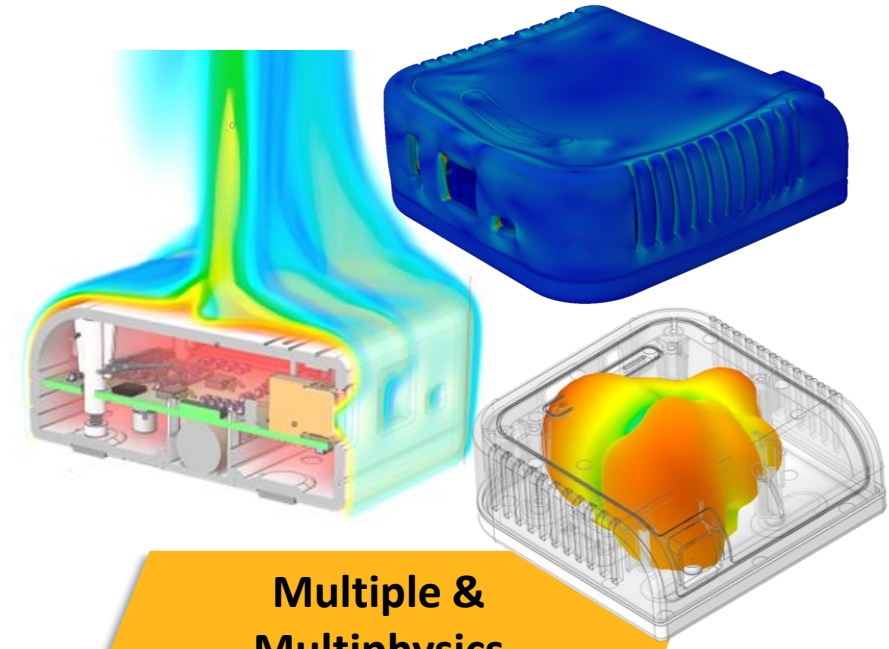
5 Key Differentiators



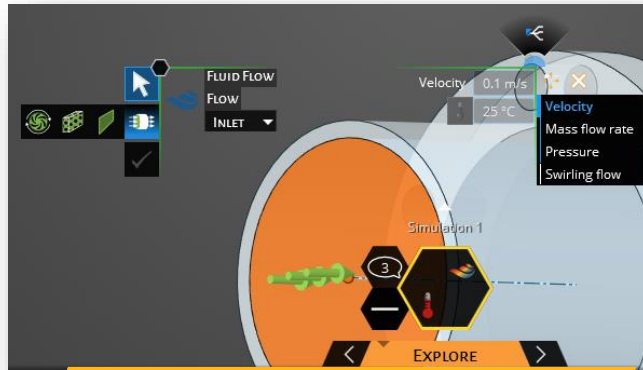
**"Just works"
Simulation**



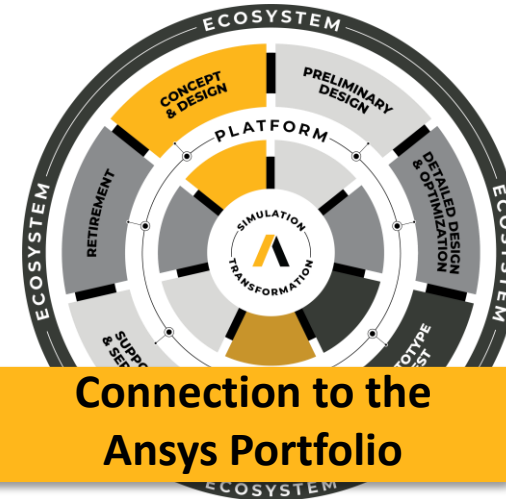
**Geometry Changes
During Simulation**



**Multiple &
Multiphysics**

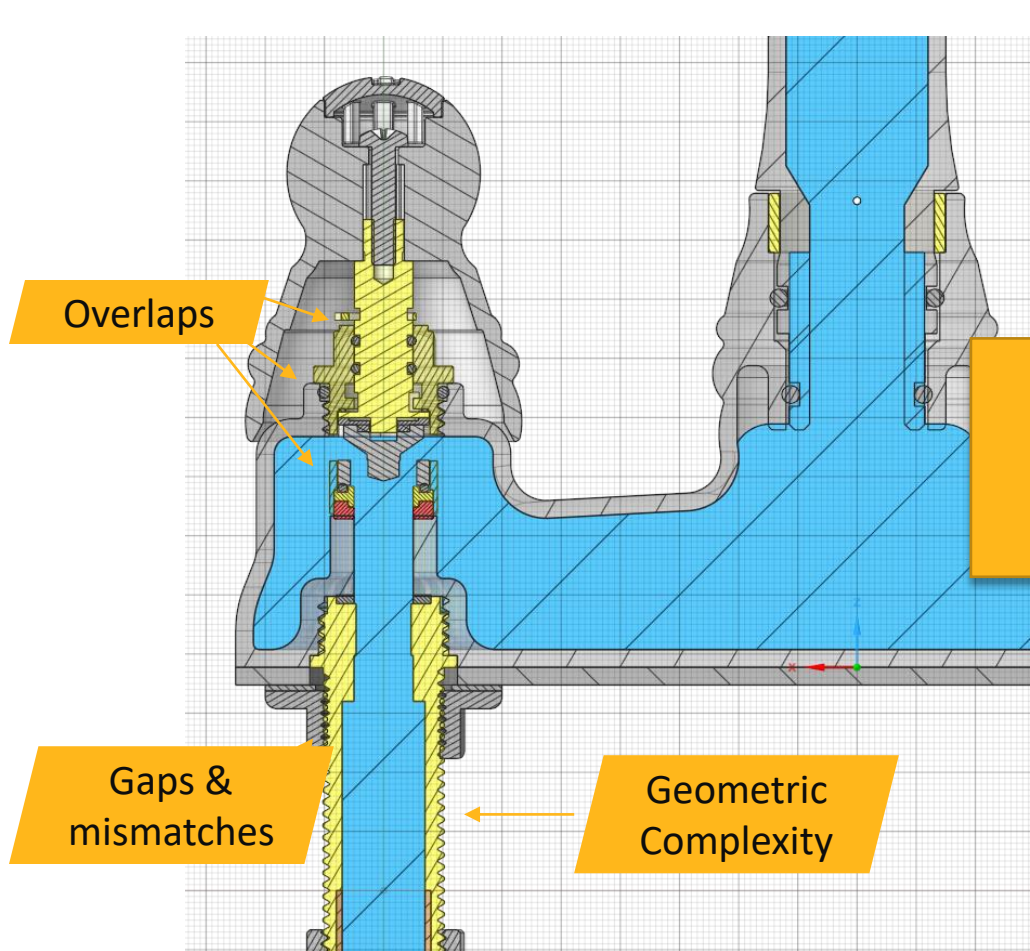


**Innovative User
Experience**



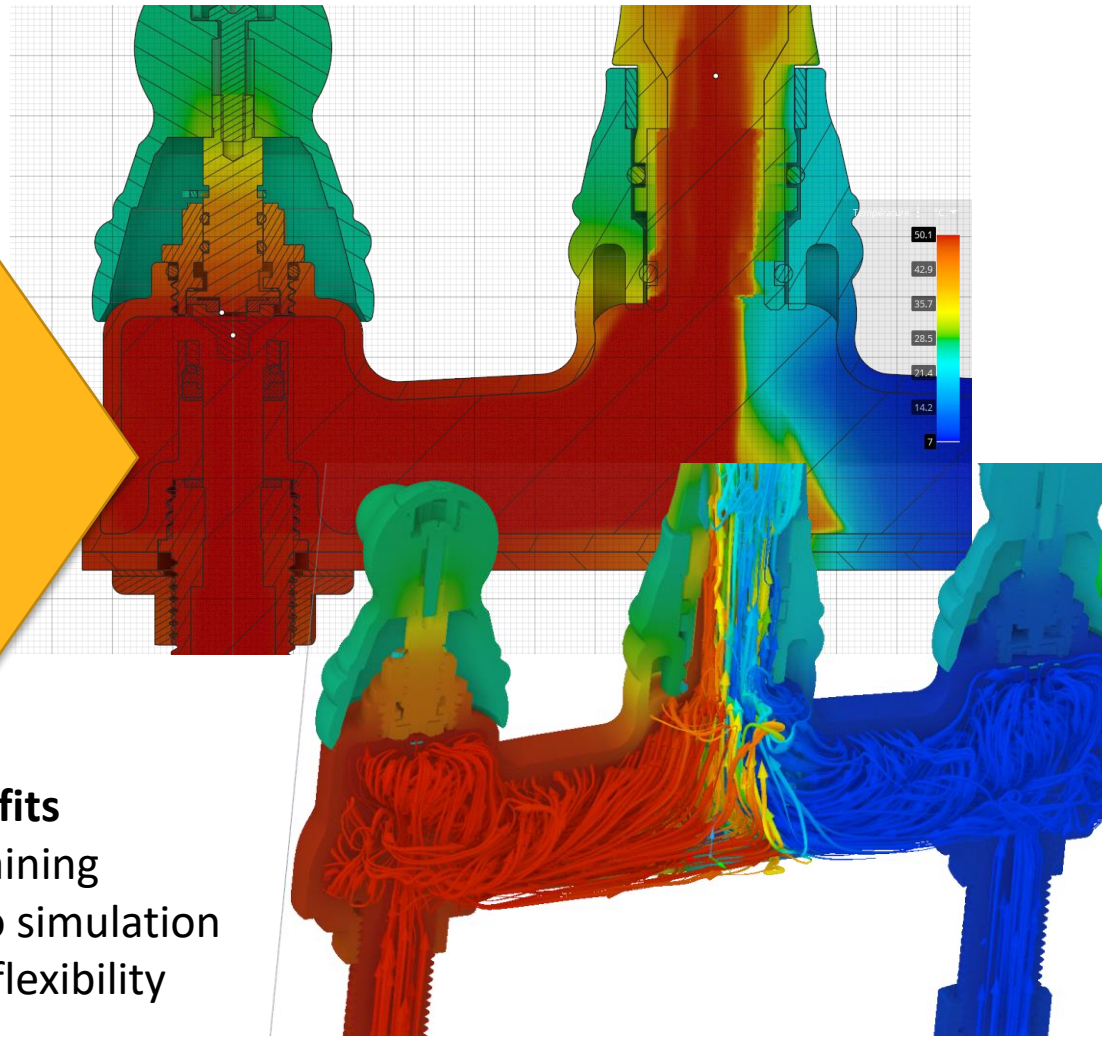
**Connection to the
Ansys Portfolio**

Key Differentiator #1: "Just Works" Simulation

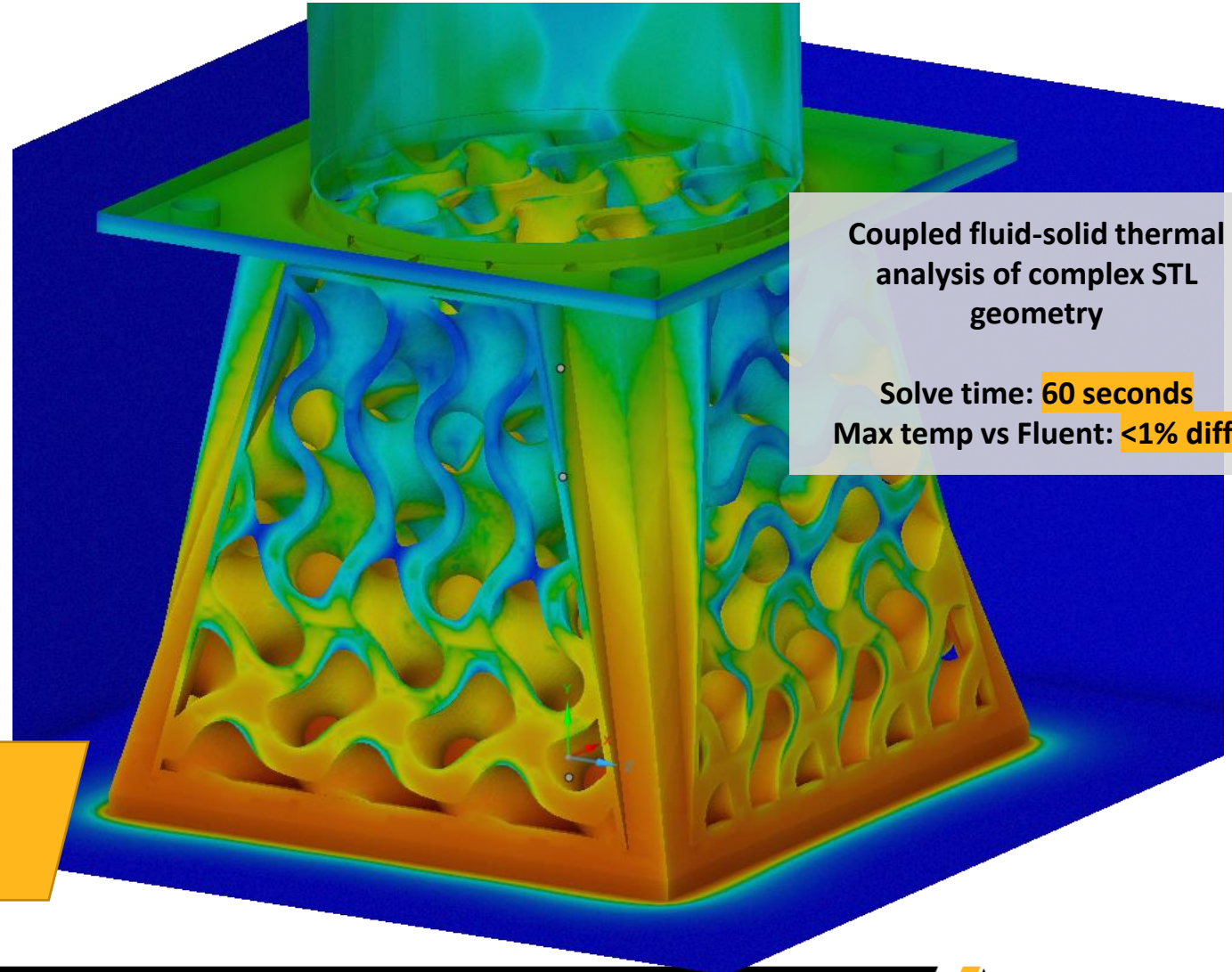
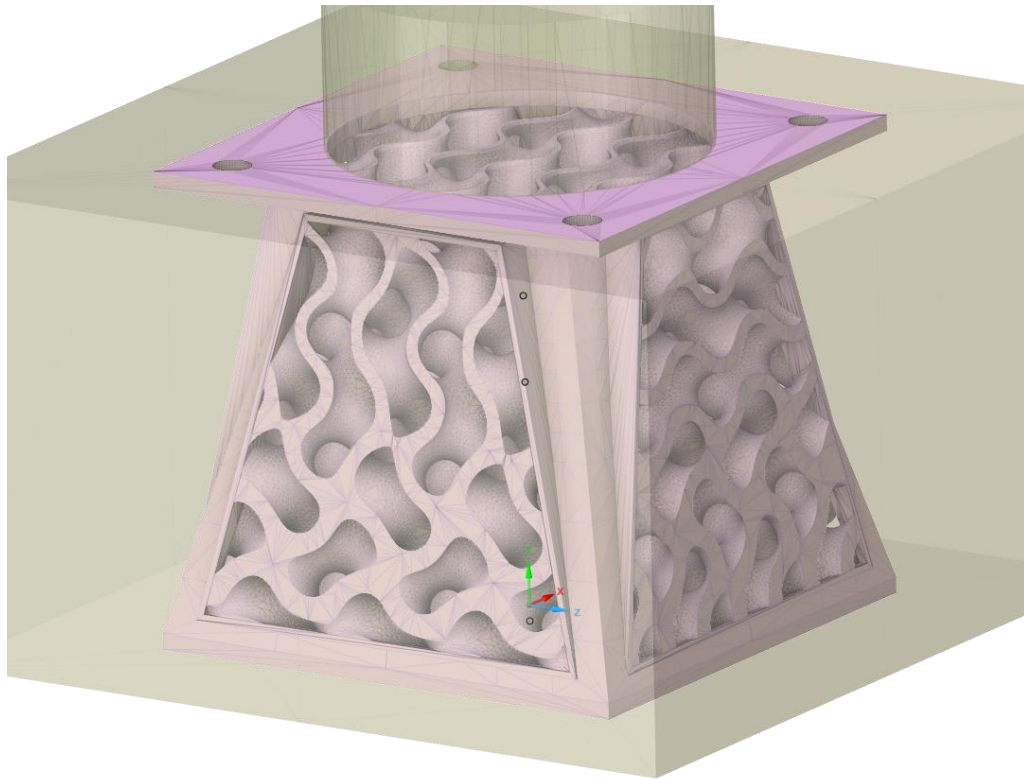


No defeaturing
No cleanup
No meshing

Benefits
Less training
Faster time to simulation
Increased flexibility



Key Differentiator #1: "Just Works" Simulation



Coupled fluid-solid thermal analysis of complex STL geometry

Solve time: **60 seconds**
Max temp vs Fluent: **<1% diff.**

On any geometry
Faceted, sub-division, lattice

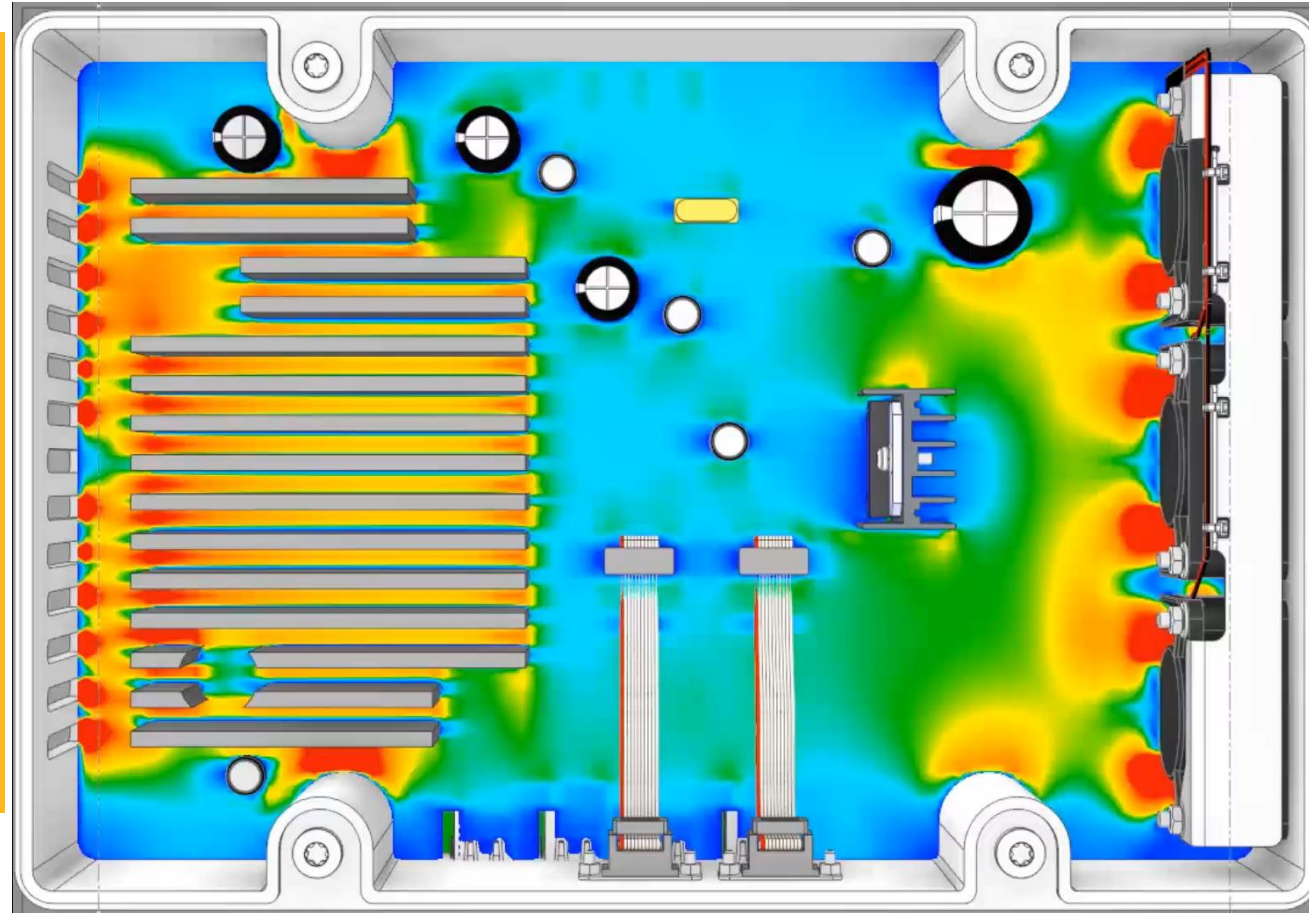
Key Differentiator #2: Geometry Changes During Simulation

What?

Unique capability to make geometry changes *in the simulation context* where you can visualize and understand behavior

Unprecedented speed and workflow around change

Identify and validate improvements *before* going back to CAD



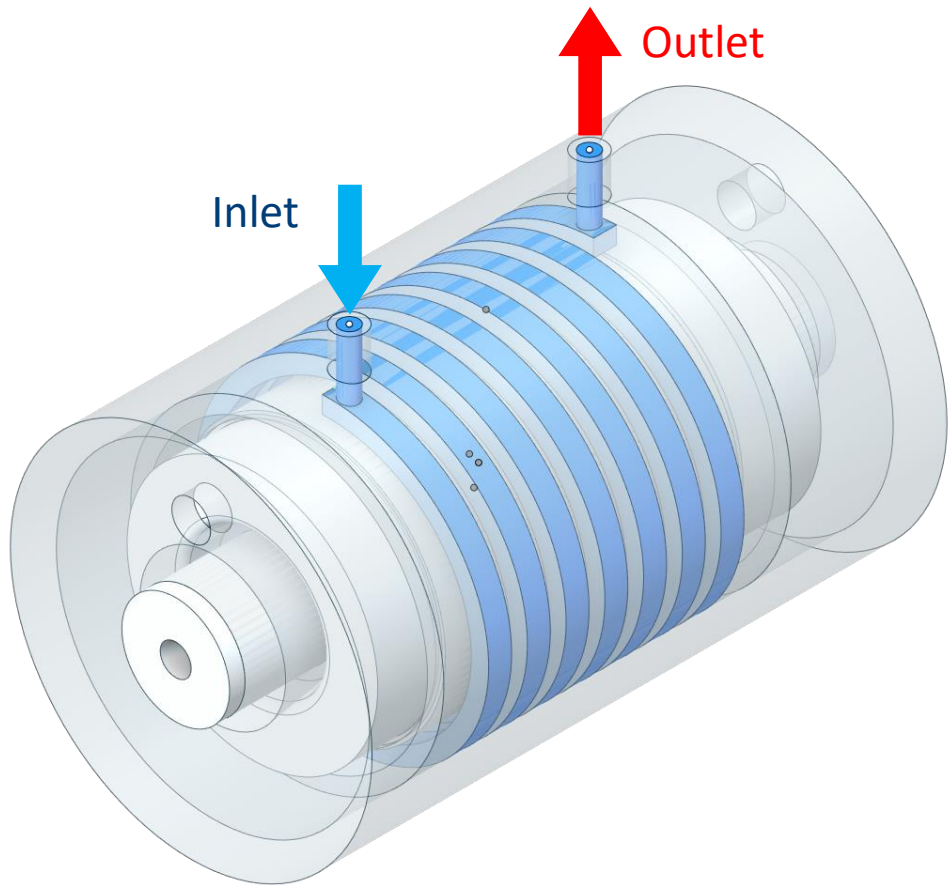
Benefits

- Test more ideas - 10-100X faster cycle times
- Innovation – Discover new ideas through immersive experimentation
- Inclusion - Allows any engineer to ask and answer, “what if?”

“Ansys Discovery gives us the incredible possibility to modify the modeling live and to visualize the effects instantly, a perfect tool for designers.”

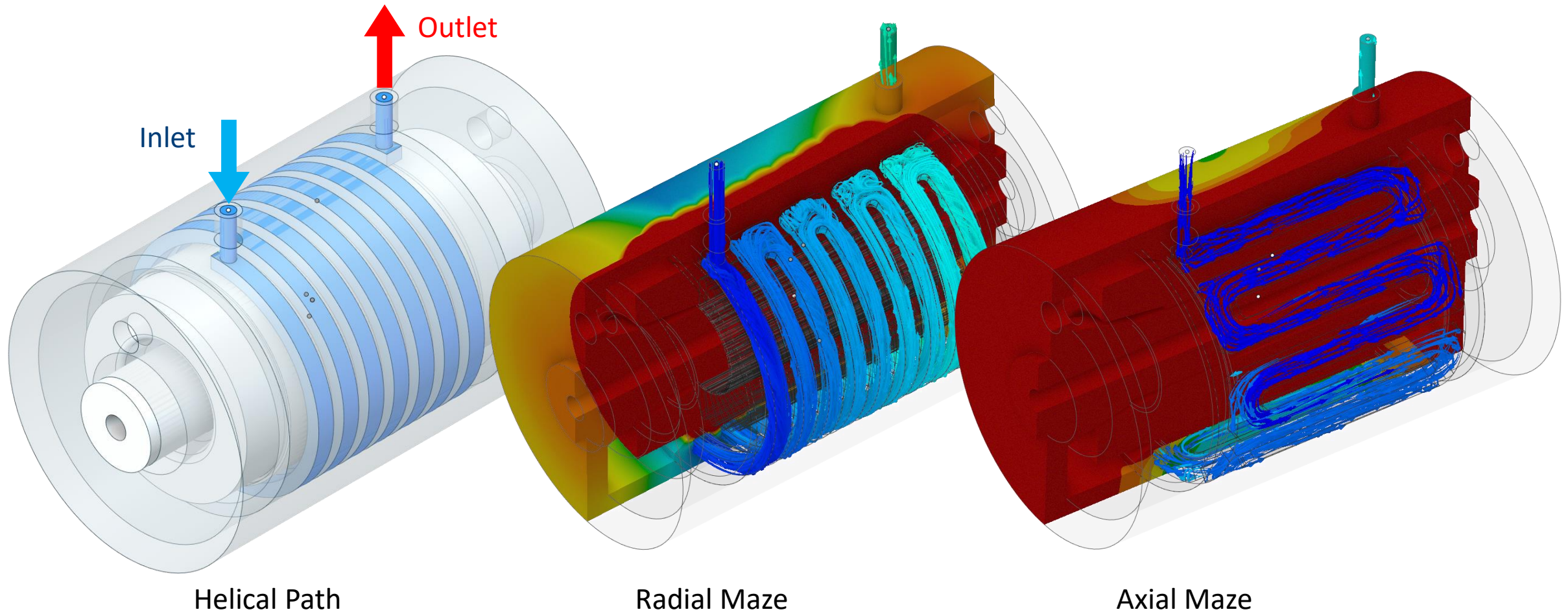
Philippe Boichut
OWNER / QUALUP SAS

Key Differentiator #2: What if Geometry Changes



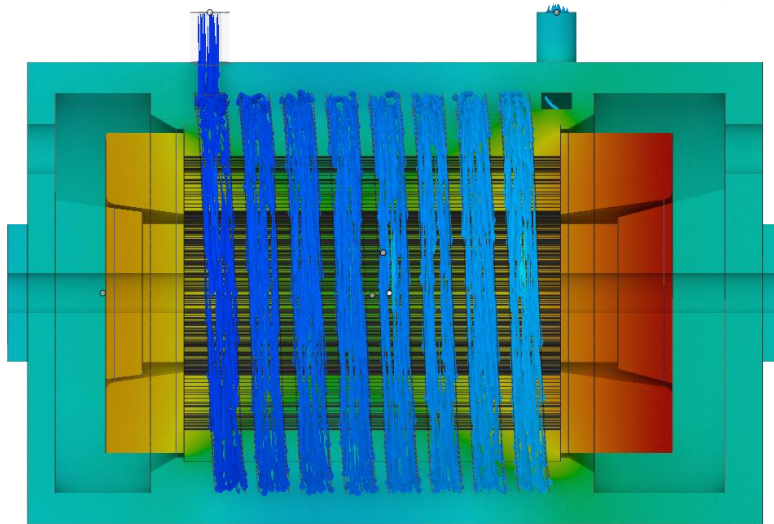
- Passive cooling sufficient? → No
- Design of cooling concept
 - Requirements (cooling capacity, pressure drop, ...) met?
 - $T < T_{Limit}$?
- Evaluation with simulation
 - Conjugate Heat Transfer (CHT) analysis for structure fluid interaction
 - Long computation times (hours to days)
- Many adjusting screws
 - Coolant & flow rate
 - Channel geometry

Key Differentiator #2: What if Geometry Changes

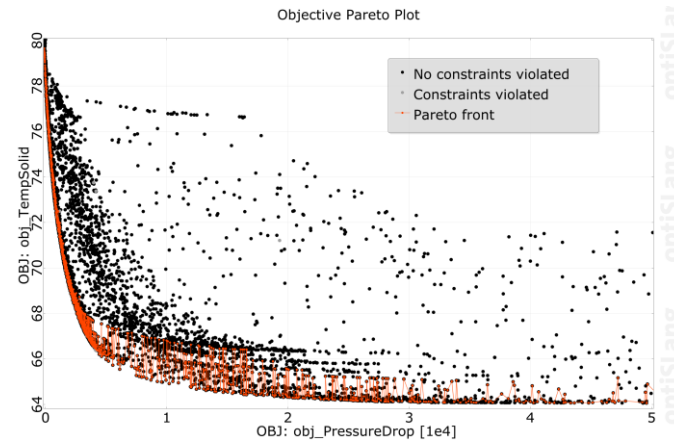


Key Differentiator #2: Geometry Changes via optislang

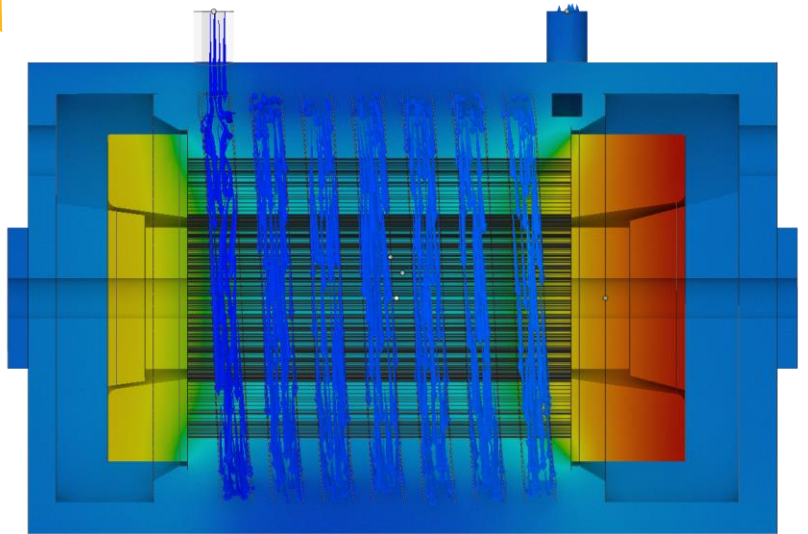
Initial design



76°C max. temperature
0.11 bar pressure drop

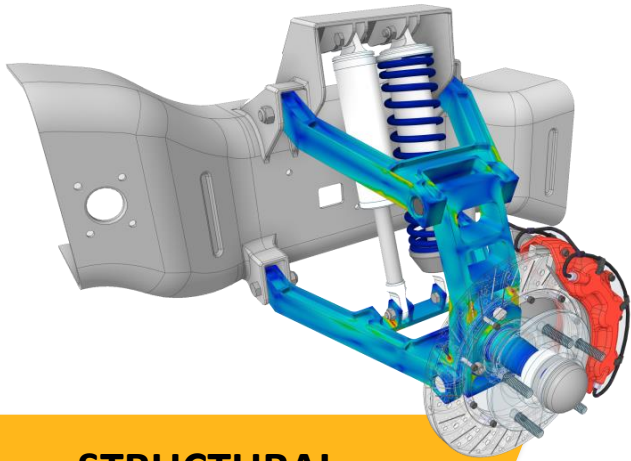


Optimized design



65°C max. temperature
0.10 bar pressure drop

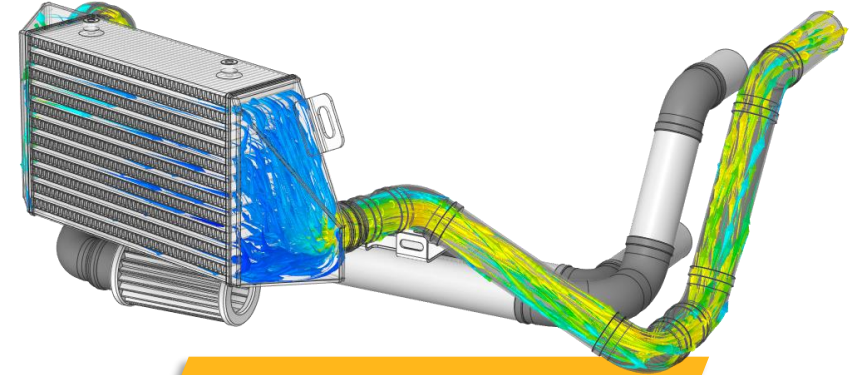
Key Differentiator #3: Multiple & Multiphysics in One Tool



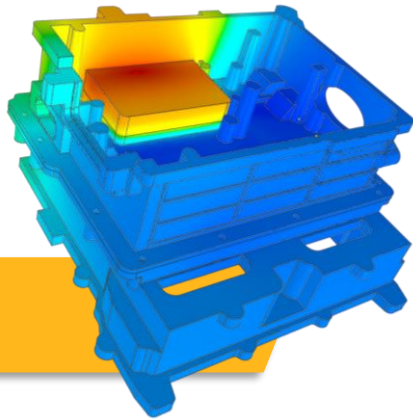
STRUCTURAL



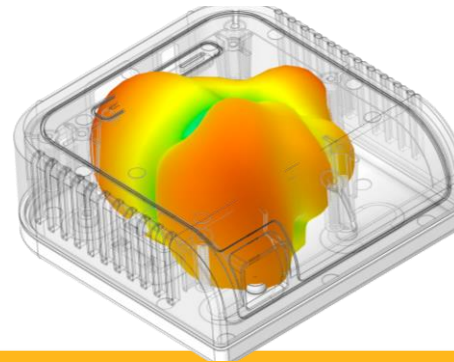
DISCOVERY



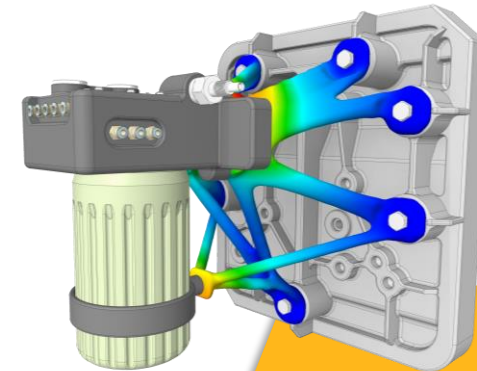
FLUIDS



THERMAL



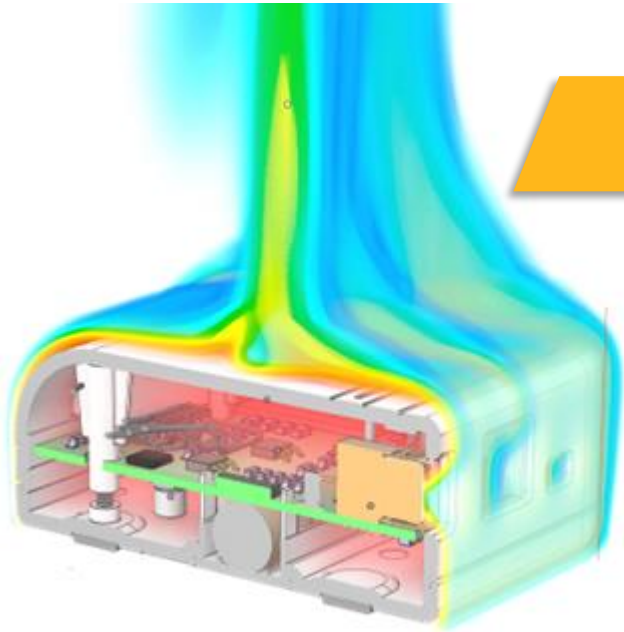
ELECTROMAGNETICS



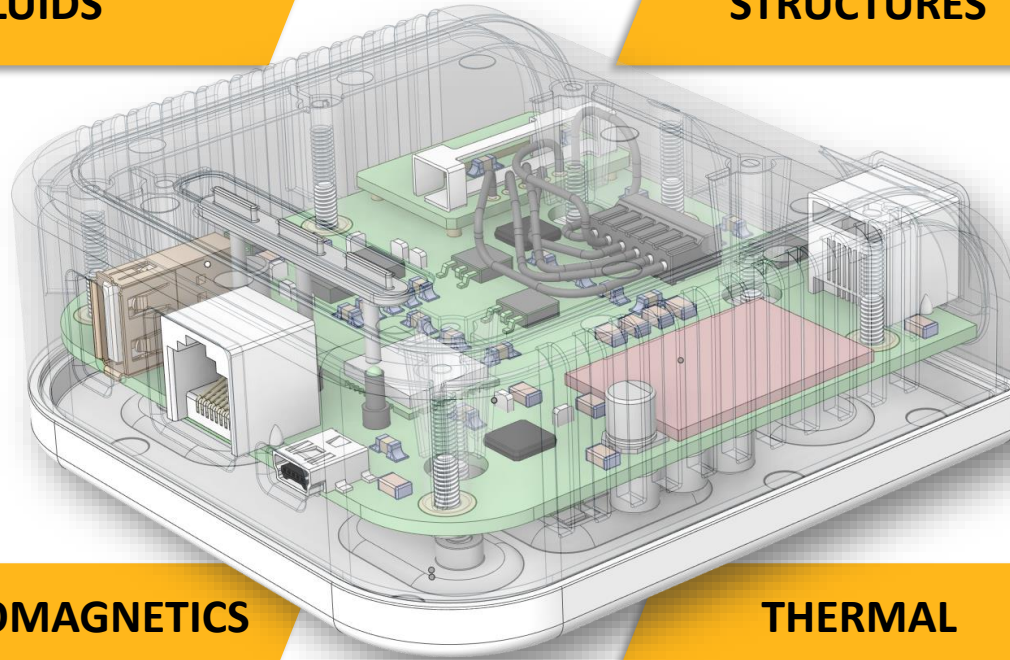
**TOPOLOGY
OPTIMIZATION**



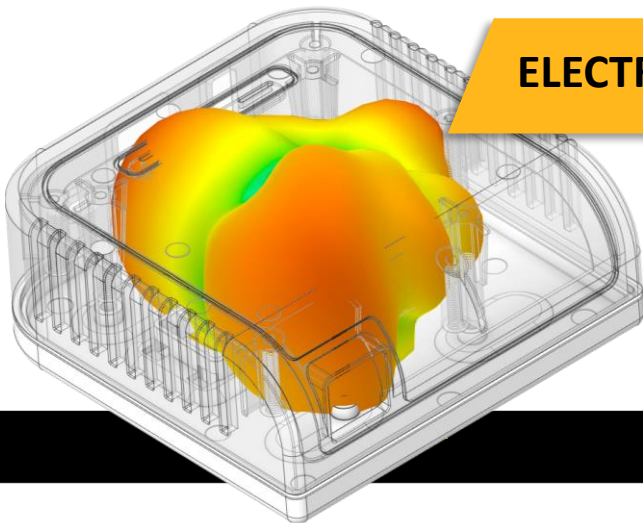
Engineers Don't Think in "Physics Domains"



FLUIDS

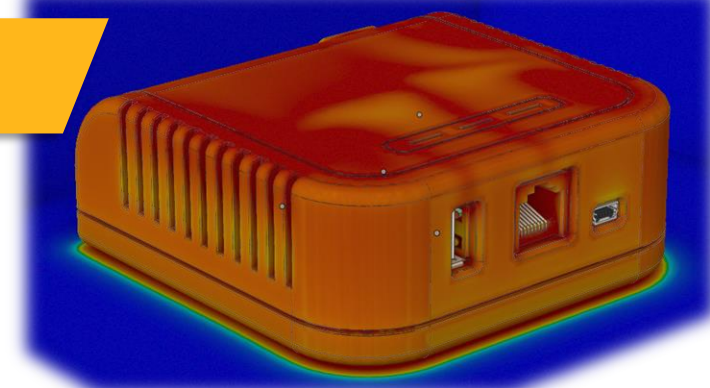


STRUCTURES



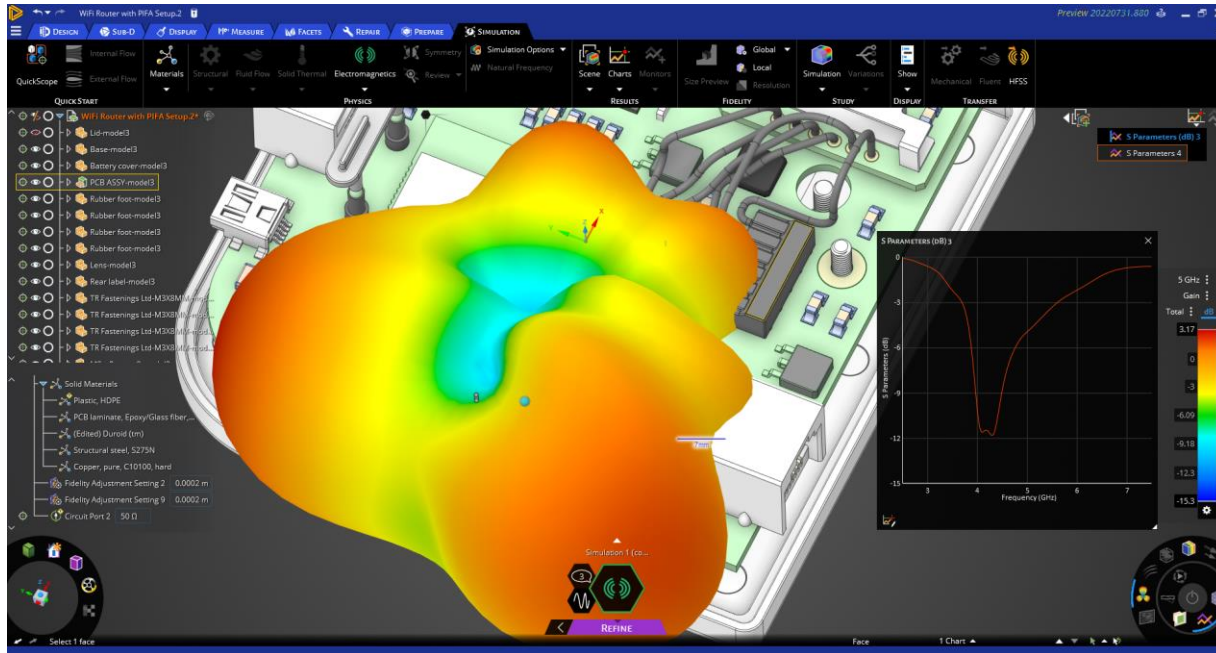
ELECTROMAGNETICS

THERMAL

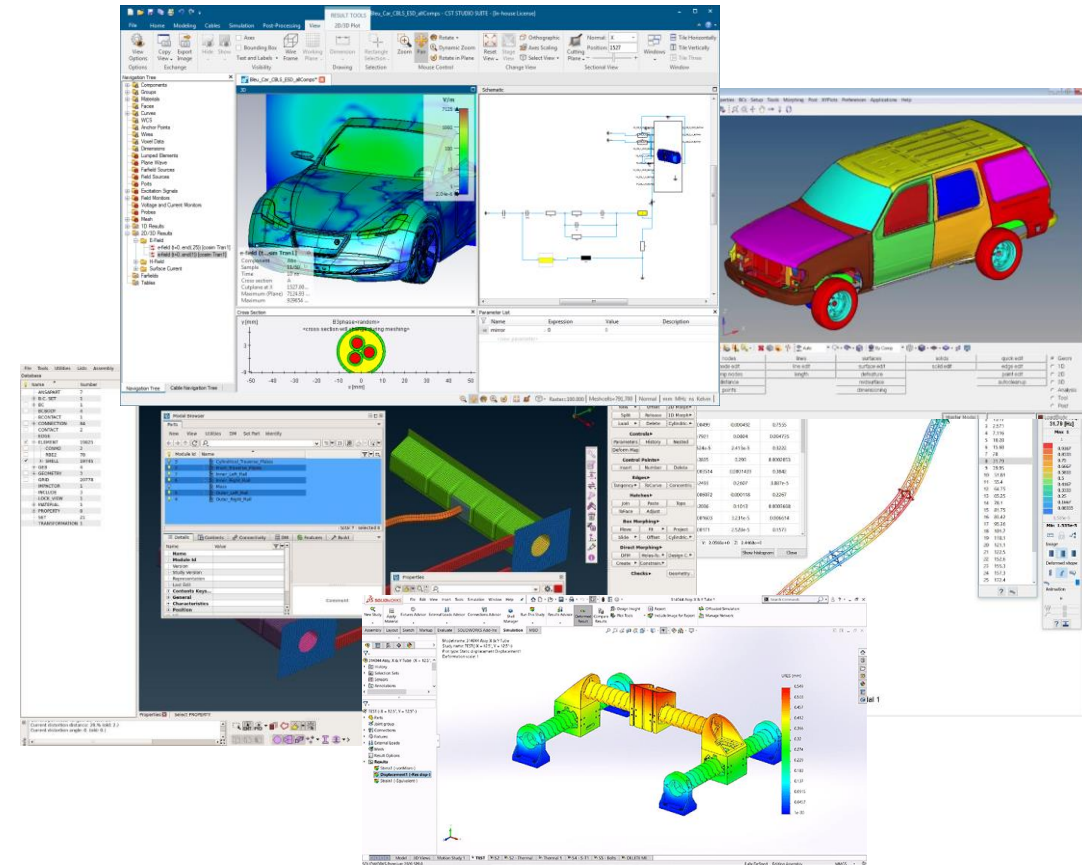


Key Differentiator #4: User Experience

Discovery



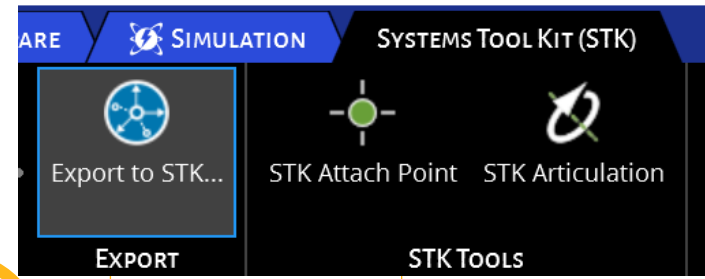
Others



“It is very sleek and has fast multi-simulation GPU solvers for different types of physics within a single and easy to use GUI. Ansys Discovery has enabled us to improve our efficiency through use of its integrated environment.” -AWE



Key Differentiator #5: The Simulation Digital Thread

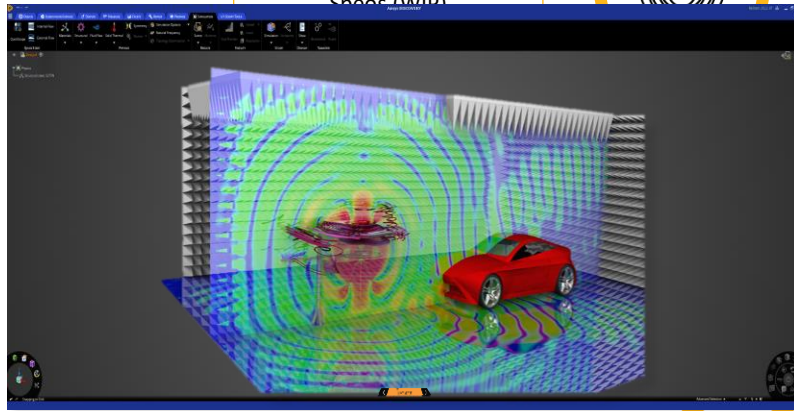
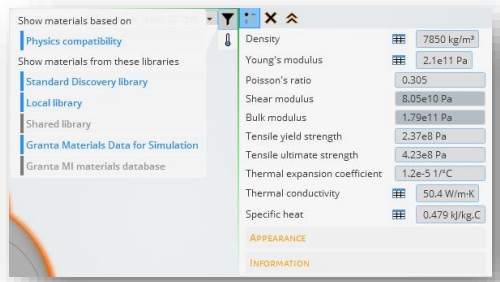
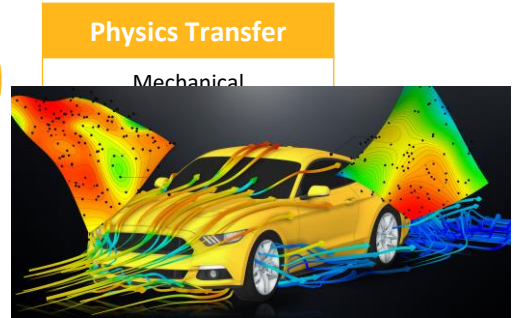
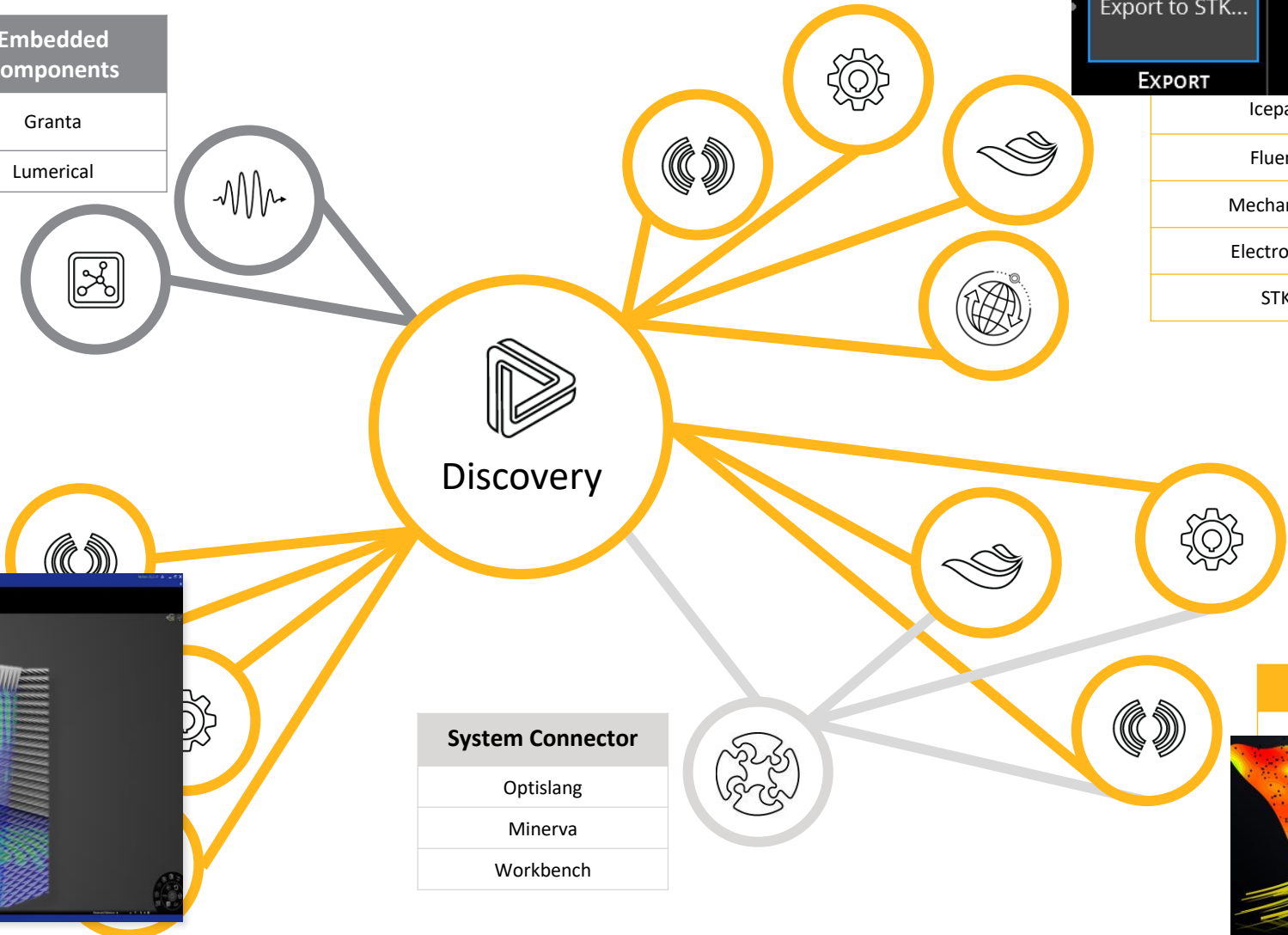


Icepak
Fluent
Mechanical
Electronics
STK

Embedded Components	
Granta	
Lumerical	

Solution Integration	
EMA 3D	
Motor-CAD	
BladeModeler (WIP)	
Space (WIP)	

System Connector	
Optislang	
Minerva	
Workbench	

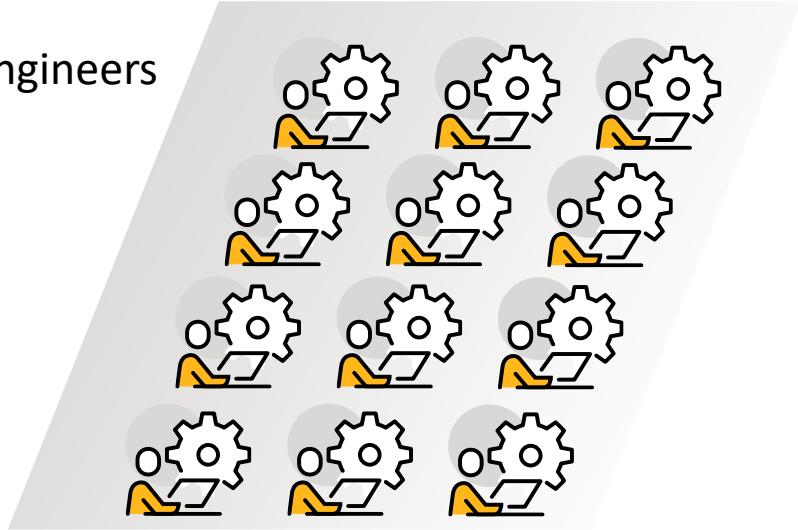


Key Differentiators in action



Two Target Groups for Discovery

Engineers

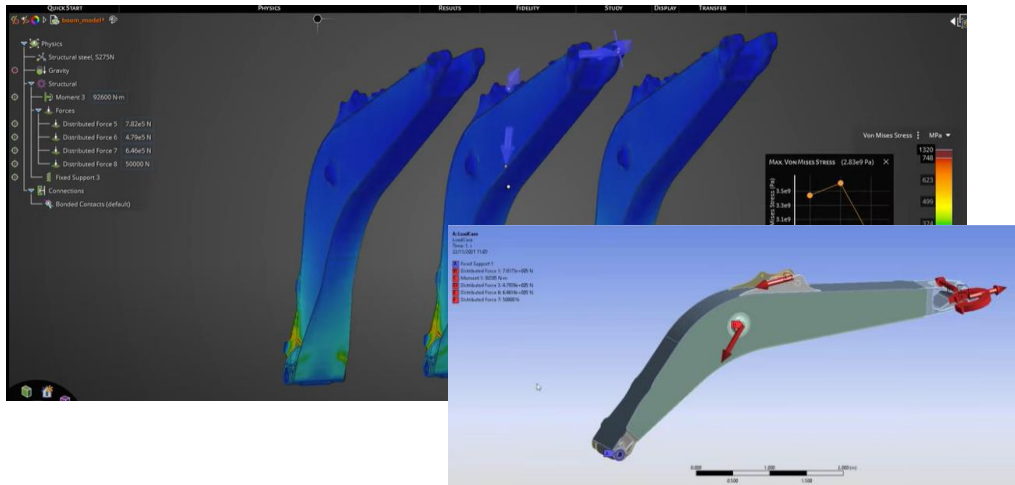


Simulation experts



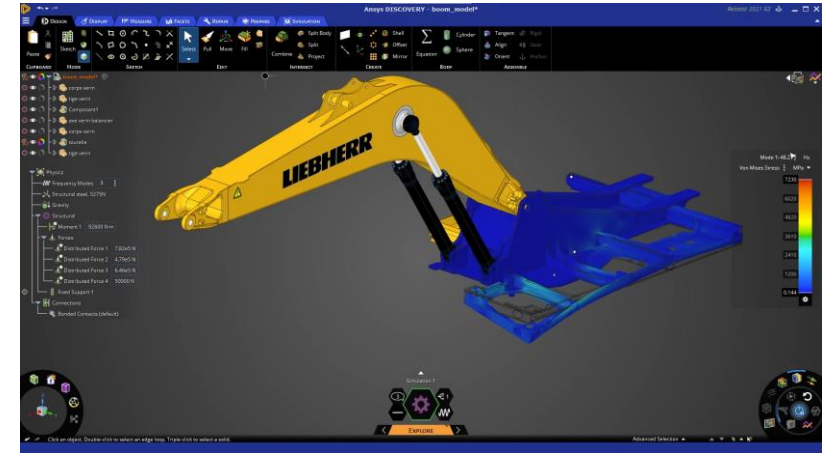
- **Obtain routine simulation results on their own**
- Increased use of simulation results in *better designs at a lower cost*
- Reduced wait time for simulation data *accelerates time to market*

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



“In Discovery I was able to compare different concepts and choose the one that was most promising and then validated the structure in Ansys Mechanical.”

Naomi Chapelier
Design Calculation Engineer



“With Discovery everything is going faster. We are able to make modifications in brainstorming sessions and the impact on the simulation within seconds”

Guillaume Elbel
Group leader Simulation Project Manager