

# Solving electronics reliability challenges using Ansys Discovery upfront simulation

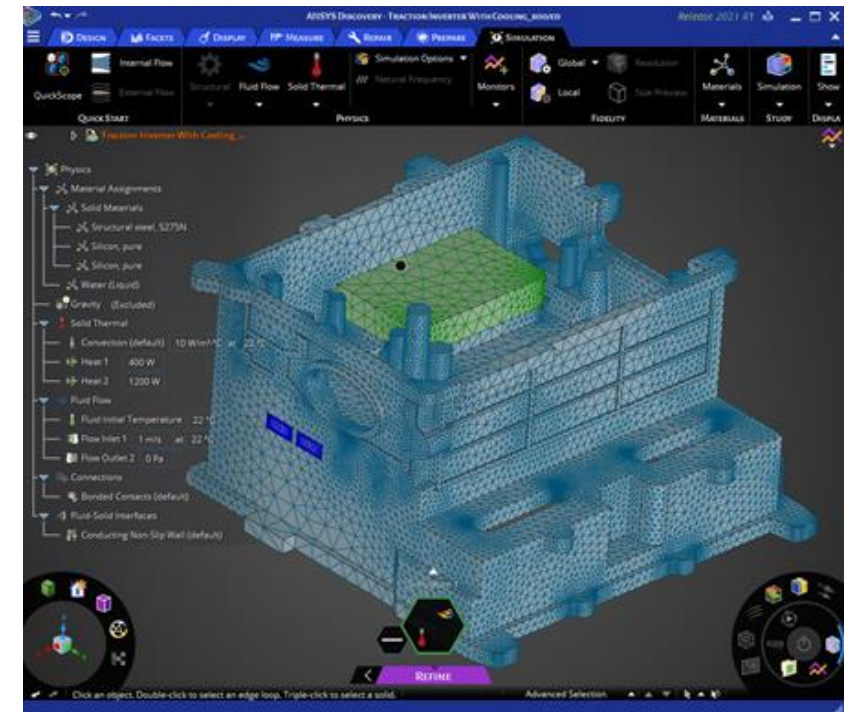
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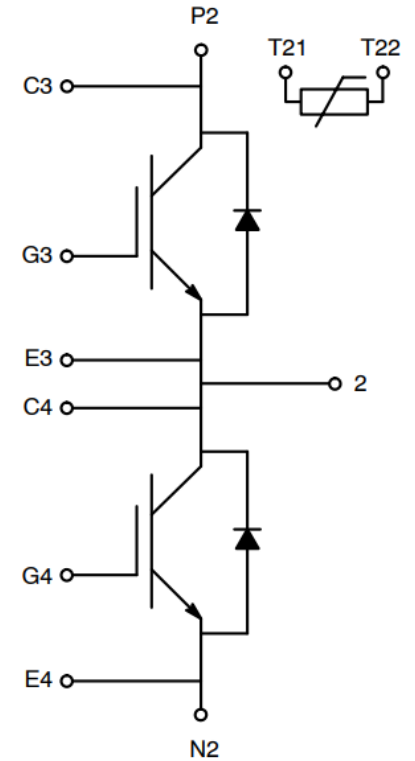
# / Agenda

- Problem description
- Solution approach - Bringing simulation upfront
- **Live Demo**
- Q&A



## / What are Traction Inverters?

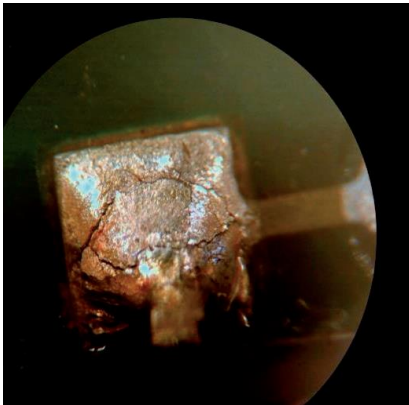
- Traction inverters convert the DC current from an EV's battery into the AC current required by the vehicle's motor.
- Inverters operate at 800V levels in the latest designs.
- For a safety margin, these devices need power semiconductor devices.
- Traction inverters can be built by paralleling discrete devices, or, as of late, from power integrated modules (PIM).
- Traction inverters need a powerful cooling system and may experience extreme structural loads and vibrations in the operating environment.



# / The challenge

- Deployed equipment was showing intermittent 'turn-on/off' faults repeatedly resulting in isolation.
- The equipment was being returned to the OEM, only to be returned 'NFF\*', despite the fault continuing to be present when returned to service.
- The issue was compounded by 12 weeks lead time for repair, resulting in sets running without a full complement of working inverters.
- Need for a quick exploration in order to pinpoint the source of the faults.

*(Transportation Company)*



**\*No Fault Found**

# / How Ansys Discovery addresses such a challenge?

- Enabling designers and analysts fast multi disciplinary design exploration.
- A user-friendly environment to perform structural, thermal and flow analysis early in the design – moving simulation up front!
- **EXPLORE** - provides a fast solve Live simulation based on the GPU only and using a non-explicit meshing method based on a meshless technology. This provides an approximated result in a few seconds.
- **REFINE** - traditional method based on an explicit mesh and CPUs provides an accurate result and can manage more complex physics and scenarios.
- Discovery is based on the traditional FEM methods for the structural and thermal-stress simulations.
- Discovery is based in the Navier-Stokes equation for the CFD simulations and use a K- $\epsilon$  turbulence model by default (can be changed).

# Live Demo

Please type your questions in the Q&A box



Q&A





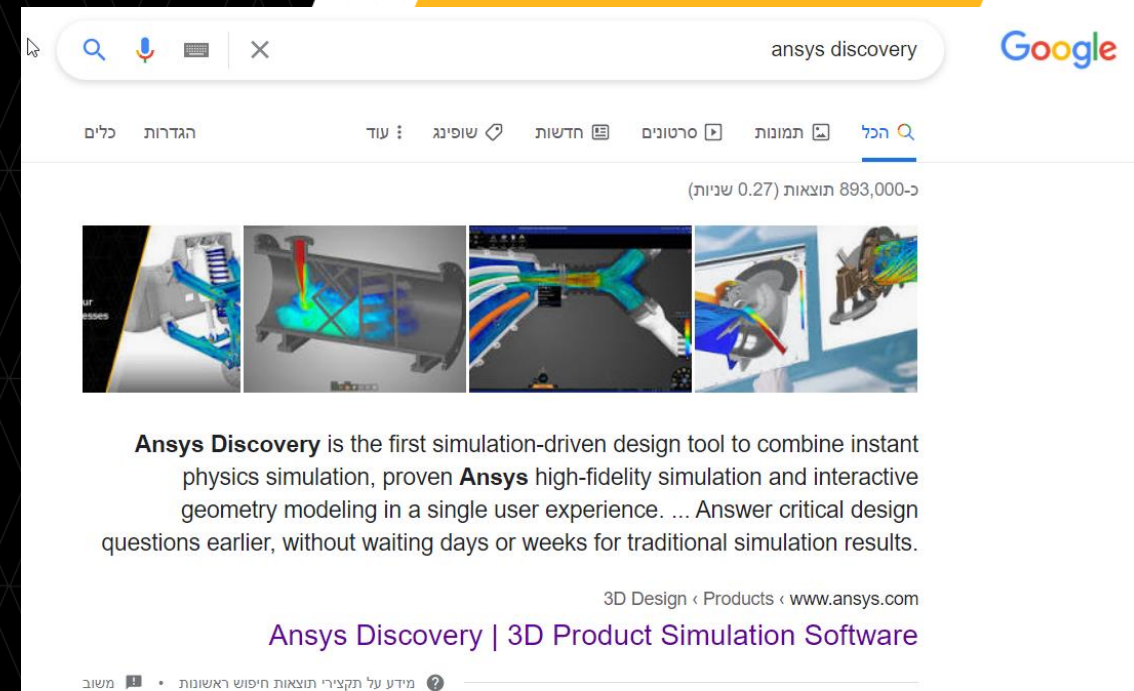
# Thank You!

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The Ansys logo, consisting of a stylized 'A' followed by the word 'Ansys' in a bold, sans-serif font.