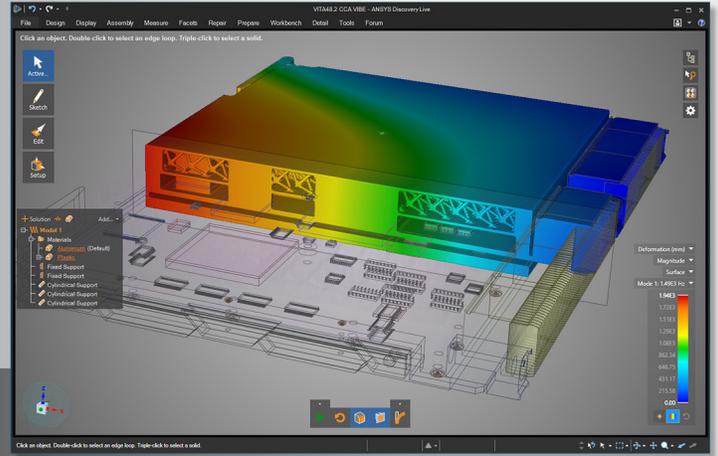


Case Study

ANSYS® + TEN TECH LLC



“The first time I saw ANSYS Discovery Live, I didn’t believe it could deliver on its instantaneous-design-feedback promises. Then, when I tried it, I thought it was nothing short of magical. There were things I knew would take days – even weeks – to achieve, yet I was able to complete them in three clicks.”

William Villers

*Co-founder, CTO & VP of Engineering
TEN TECH LLC*

TEN TECH Thinks Inside the Box to Create Innovative Single-Board Computer Packaging

Introduction

As an engineering services company, we use simulation to analyze and qualify the operational performance of our A&D customers' products. These include defense electronics, weapons and radar systems, drones, etc. — with safety-critical components and systems that must be optimized for harsh environments. We also use simulation in our own R&D efforts to help us design innovative, rugged embedded electronics packaging for aircraft onboard computers.

Challenges

The trend in electronics is to pack greater power and functionality into the same footprint. In A&D, as more electronics are added to aircraft, the packages that protect them must support more weight and expel more heat. They must also conform to a regulated form factor and withstand extreme shock, vibration and thermal constraints — without exceeding aircraft weight limits or compromising fuel-efficiency.

Technology Used

ANSYS Discovery SpaceClaim — for geometry cleaning (regardless of file format) and designing new product from scratch.

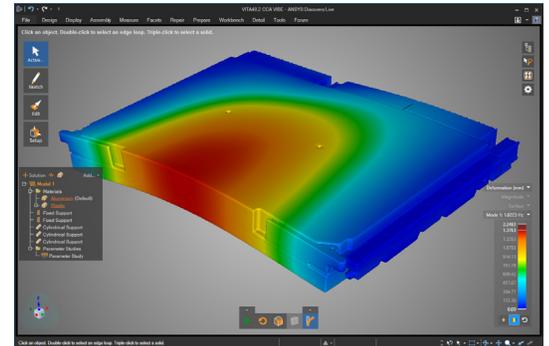
ANSYS Discovery Live — for quickly assessing if a vision has chance of becoming a reality, design exploration and finding new, organic solutions with only a handful of input parameters.

Engineering Solution

We looked at existing aluminum packages — full blocks of machined aluminum that weigh around 3 pounds. We wondered if we could eliminate 2 pounds by creating a lattice structure that would provide the same stiffness and thermal performance, while remaining modular, removeable and replaceable. Using ANSYS Discovery Live, we were able to explore this idea and get answers to our what-ifs in 30 seconds, instead of wasting weeks of work time. Sometimes, the answers weren't the ones we wanted, and other times they were completely, and wonderfully, unexpected. On occasion, we also rearranged board components to correct overheating or excessive stress identified by Discovery Live.

Benefits of Discovery Live

- It meshes complex, messy or organic geometry, which would be beyond the scope of a traditional finite element mesher.
- It's intuitive to use. It does what we need it to do; we don't have to "fight" with it.
- It enables 3D printing of lighter, organic shapes that would otherwise be difficult to manufacture.
- It provides real-time design feedback, so we can run through many more design iterations, without having to start from scratch each time and suffer through tedious hand calculations.
- It fosters collaboration: We can visualize our ideas and see results in colorful 3D images.
- Without it, we couldn't have continued to pursue our lattice design due to resource constraints.



Modal analysis in ANSYS Discovery Live



Image of lattice structure in ANSYS Discovery SpaceClaim

Company Description

At TEN TECH LLC, we provide manufacturing companies with high-end engineering design, analysis and physical testing support services. We are also currently developing a revolutionary protective package for aircraft onboard computers, which is 40% lighter than (but as rugged as) conventional aluminum designs.

ANSYS, Inc.

www.ansys.com
ansysinfo@ansys.com
866.267.9724

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