CUSTOMER STORY

ACCELERATING AEROSPACE COMPONENT ENGINEERING

3DB ENGINEERING DELIVERS FLIGHT-CRITICAL SYSTEMS FASTER WITH ALTAIR

About the Customer

3dB Engineering provides integrated mechanical design, analysis, and systems engineering support for fast-moving aerospace programs, especially those racing toward flight. They specialize in helping spacecraft and launch vehicle teams de-risk flight-critical systems while accelerating schedules and staying aligned with certification requirements. Their work spans from structural integration and rapid mechanical design to test readiness, certification documentation, and lean process development.

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>
> Gabriel Gehrig,
> principal engineer

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3dB has built real hardware, under real pressure, supporting defense programs, orbital launch, and aerospace STCs. Their team embeds alongside their clients, providing diagnostic engineering and milestone planning that is startup-agile but certification-aware.

Their Challenge

According to principal engineer, Gabriel Gehrig, "The lack of flexibility of the toolsets we were using was a significant challenge to the company in our early days. A familiar statement of 'If all you have is a hammer, everything looks like a nail' becomes a reality which is not a good position to be in to provide high-level results." One of the major challenges they faced was the time it took to obtain results since existing tools were not intuitive and time-consuming when working with large model sets, which is a common issue in the aerospace industry. Additionally, a significant challenge was the time it took to design a ball grid array (BGA) for use in thermal simulations. A BGA is an application of solder balls to connect an integrated circuit to a printed circuit board (PCB). This process is typically time-consuming to design correctly to achieve accurate simulation results.

Our Solution

To meet aggressive timelines without compromising on fidelity, 3dB Engineering turned to Altair's solutions to remove analysis bottlenecks and compress iteration loops.

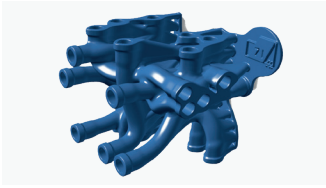
While their projects span everything from electronics to high-fidelity aerospace vehicle models, often exceeding 10 million degrees of freedom, the focus of this project was on BGAs, complex components where failure prediction is critical. The team used Altair® HyperMesh® to gain full control over preprocessing. Additionally, new element types, mesh refinement tools, and flexible property definitions gave their team the precision needed to reduce iterations and zero-in on results faster. To automate model setup and prepare geometry, they also leveraged Altair® SimLab®, a leading multiphysics simulation environment for structural, thermal, electromagnetic, and fluid domains. Integrated solvers like Altair® OptiStruct® and Altair® Radioss® helped streamline everything from static to impact loading analyses, all within one cohesive environment.

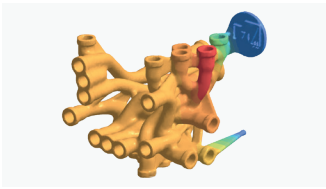
When working with large, detailed assemblies (think thousands of small, machined parts needing several contact sets each for accuracy), they relied on Altair SimSolid® to completely bypass traditional meshing. "This kind of geometry would typically take a team weeks to prep. With Altair SimSolid, we were getting results in days," said Gehrig. "That's a game-changer when client milestones are measured in hours, not quarters."

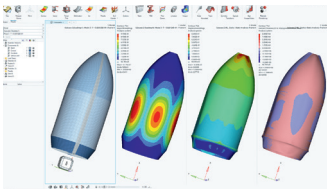
Results

Because of the flexibility of the Altair Units licensing model, 3dB Engineering was able to use SimLab at no additional cost. SimLab's modules for automatic BGA creation reduced design time from hours to seconds, delivering an accurate, simulation-ready representation. Getting up to speed with a new toolset can be a hurdle, but the combination of Altair's online training and hands-on support from Altair Reseller, TrueInsight, helped them adopt the platform quickly, even while actively delivering on customer work. As Gehrig stated, "It took discipline, but the payoff in cycle time and modeling flexibility was immediate."

To learn more, please visit altair.com/aerospace







TOP: Aerospace intake manifold structural concept created with Altair® Inspire™ as part of Leap 71, the client's, computational engineering demonstration. **MIDDLE:** Model of an aerospace intake manifold in Altair SimSolid®. **BOTTOM:** Aerospace payload fairing structural concept results using Altair® HyperMesh®.

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