

AeroNautique Flies through Jet Interior Modeling with SpaceClaim

AeroNautique was founded in the late 90's with an emphasis on stress analysis for corporate and head of state aircraft. Today, stress analysis remains one of AeroNautique's technical cornerstones. Due to the increasingly competitive aerospace marketplace, AeroNautique has strategically evolved into a full-service turnkey design and certification solution provider.

AeroNautique's expertise includes all facets of design and certification including technical project management, FAA project administration, and design and analysis for structural/mechanical. It also consists of avionics/electrical systems integration related to completions and refurbishments, as well as airframe modifications and repairs.

AeroNautique's experience includes the full spectrum of airframes ranging from small general aviation aircraft to wide-body transport category aircraft.

Go to AeroNautique's website for more information at www.aeronautique.us.

ABOUT AERONAUTIQUE

AeroNautique provides a full range of aircraft design, analysis, and certification services for the aerospace industry with facilities located in Texas and Arkansas.

Aircraft Design & Analysis
AeroNautique

THE 3D DESIGN CHALLENGE

Over the last decade, AeroNautique has developed broad capabilities including certification for structural alteration and installations. To do so, they've leveraged Finite Element Analysis (FEA) to assess the impact of major installations such as galleys, bulkheads, lavatories, and closets. Structural analysis of these interior components is vital to the safety of the aircraft. AeroNautique tests and optimizes models using FEA, and documents the results to obtain certification from the FAA.

The challenge for AeroNautique was to shorten the time required to simplify and prepare the complex CAD models for FEA, which required removing unnecessary features and extracting mid-planes.

Michael Lieblich is AeroNautique's on-staff FAA Designated Engineering Representative (DER). He heads a team engaged in structural design and testing. He and his team had

been using AutoCAD and Autodesk ALGOR simulation software to prepare models and perform FEA.

In the preparation process, the modelers first remove many non-structural components. Then they extend and trim surfaces as necessary to form continuous seams. This process of CAD design-to-model preparation for FEA had been time consuming and frustrating. The team struggled to share and edit each others' data because that data was coming from several different CAD systems.

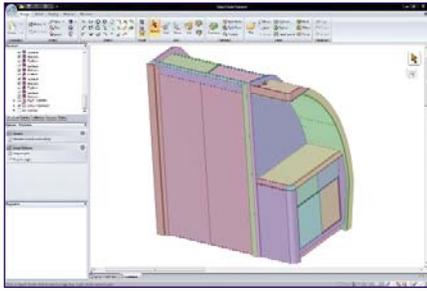
"We design for structural integrity for installation, where accuracy, flexibility, and speed are critical. We felt we were being constrained by maybe not having the right tool for model preparation and other general needs such as creating 3D models from 2D data." Michael Lieblich, FAA Designated Engineering Representative, AeroNautique

SPACECLAIM EVALUATED TO STREAMLINE MODEL PREPARATION FOR FINITE ELEMENT ANALYSIS

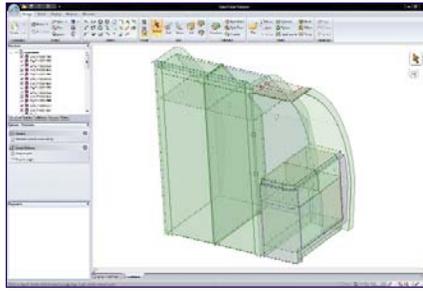
Michael shared his frustrations on not having the right tool with his Autodesk ALGOR representative. He needed a tool that could quickly and easily de-feature and prepare models for structural stress analysis, regardless of the CAD system that had originally created the data. Fully understanding Michael's concerns, the representative advised him to evaluate SpaceClaim® because of its ease at tackling the types of challenges Michael and his team were facing.

"A customer sent us a solid model of aircraft cabinets that was created in CATIA V5. We tried SpaceClaim to translate the data from CATIA and we were amazed at how quick and easy the process was with SpaceClaim and how successful we were in using the software the first time out. Clearly, we had found the right tool for the job." Michael Lieblich

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3D model of an aircraft entryway closet within SpaceClaim.



Midplane closet model created within SpaceClaim from the 3D design model.

TACKLING 3D DESIGN ISSUES WITH SPACECLAIM

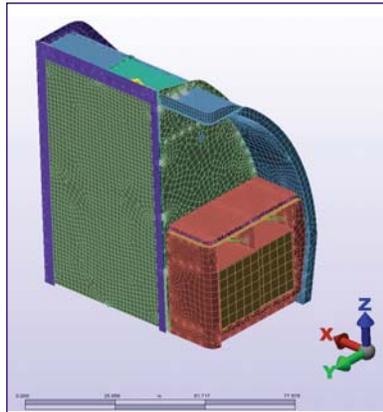
After the floor plan of a customer aircraft has been designed, AeroNautique details the structure of the interior, maximizing strength while minimizing weight and cost. Materials selection is particularly important, and AeroNautique must regularly choose between honeycomb composites, plastics, and sheet metal. Leveraging SpaceClaim, AeroNautique has found it easy to explore different concepts to optimize designs against weight and cost without sacrificing performance and longevity.

“Every aircraft is different and every customer has their own requirements on the placement of the major interior components, which are often documented in 2D. So, we need the ability to quickly create 3D models from 2D data. For simulation, we often move back from 3D to 2D for stress analysis on using shell elements. Flexibility was instrumental in our selection of SpaceClaim.” Michael Lieblich

During the design and structural analysis process, Michael and his team often have conversations with customers to review designs and validate decisions. By using SpaceClaim, they have been able to send accurate solid models and 3D renderings electronically to customers, making the communications much easier and faster, and the decision-making process smoother.

With SpaceClaim, AeroNautique can quickly reduce 3D solids to mid-plane surfaces and bring them into ALGOR FEA for meshing and stress analysis. With accurate 3D models in SpaceClaim, the mechanical fabrication shop can manufacture directly off the model.

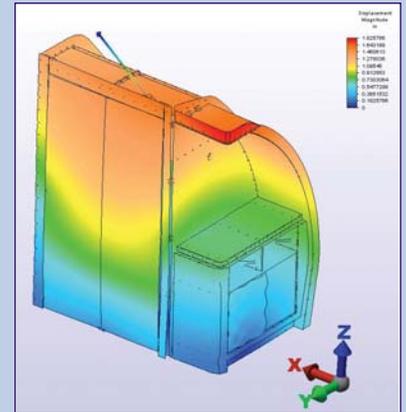
“We’ve been using SpaceClaim for about 17 months and have more than recouped our investment in time saved, error reduction, and faster time-to-market. SpaceClaim is extremely easy to learn. Even our interns, without training, can be productive in just two weeks. You just can’t beat that.” Michael Lieblich



Mesh of the SpaceClaim midplane closet model using FEA software.

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Michael Lieblich
FAA Designated Engineering Representative, AeroNautique



FEA displacement results of the closet model within the FEA software.



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