

# SIEMENS

*Ingenuity for life*

Aerospace and defense

## AIM Altitude

Airline interiors specialist uses Femap to deliver challenging designs and speed up product development

### Product

Simcenter

### Business challenges

Harmonize engineering systems across the group

Minimize the cost of new software

Maximize global collaboration

### Keys to success

Ease of use of Femap

Provide flexible global licensing and technical support

Deliver CAD-independent solution

### Results

Provided comprehensive FEA capabilities

Delivered tangible cost savings over a three-year period

Reduced time required to create FEA by 50 percent

Enhanced ability to share workload across distant sites, facilitating 24-hour productivity

Improved individual user efficiency

**Siemens Digital Industries Software solution helps AIM Altitude enhance global productivity and save on licensing costs**

### Delivering both prestige and practicality

First-class passengers expect elegance and indulgence, and commercial airlines attract and maintain high-value customers with impeccable service. Cabin interiors that provide style and comfort for travelers and convenience for crew members are an integral aspect of service, so when airlines

want truly distinctive design, they approach AIM Altitude's Premium Cabin Interiors team.

With a reputation for thoughtful functionality, over the years AIM Altitude has delivered seating, storage and socializing solutions that range from magnificent splendor to reassuring simplicity. From its roots as a small United Kingdom (UK) coachworks founded in the early 20th century, AIM Altitude is now a global business serving the world's leading airlines. A member of AVIC International, the company also supplies original equipment manufacturers (OEMs), including Boeing and Airbus, manufacturers of regional aircraft and the UK Ministry of Defense.



"It is taking us 50 percent less time to create FEA models and it is less than a year since we implemented Femap in the UK."

Jeremy Pollard  
Chief Engineer, Structures  
AIM Cabin Interiors



#### From concept to construction

"We are known for delivering the integrity of the original concept," says Colin Thornton, group design and engineering director for AIM Altitude. "We find a way through the stress and material challenges to make highly customized premium products that have not been seen on aircraft before."

"Customers may want to impress through opulent lighting or spectacular shapes that require a really innovative approach to geometry and weight reduction," says Jeremy Pollard, chief engineer of structures for the premium cabin interiors business in Bournemouth, UK. "To meet safety and quality standards we are registered with OEMs and often liaise with them over some aspect of a demanding design. In one case, for example, Airbus advised us to hang an ornate partition from the ceiling rather than add load to the floor."

#### Leveraging licenses across the world

In recent years, the business has grown through acquisition and although all manufacturing takes place in the UK, design and finite element analysis (FEA) for premium cabin interiors is done in two countries: Bournemouth has 60 engineers and two New Zealand offices, Auckland and Christchurch, have 50. In addition, AIM Altitude has a galley business with 50 engineers based in the UK.

As a result of acquisitions, the teams were using different FEA solutions. Engineers in New Zealand were long-time users of Femap™ software from product lifecycle management (PLM) specialist Siemens Digital Industries Software. Another application was being used in the UK.

It was clear that the company needed to standardize on one of its engineering systems. As Thornton explains, "We recognized that we might face future

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Colin Thornton  
Group Director, Design and Engineering  
AIM Altitude



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Mike Hoey  
Senior Structural Engineer  
AIM Cabin Interiors

workload issues if we were not able to share analysis work between the New Zealand and UK offices so we did a head-to-head comparison with Siemens Digital Industries Software and the UK incumbent software provider.”

Siemens Digital Industries Software could offer licensing and support that would apply to users in the UK and New Zealand. With a 12-hour time difference between the two sites, this meant that AIM Altitude would derive maximum use from a set of 11 licenses.

“The other vendor could not accommodate this option and we are not heavy enough users of FEA that we could justify more licenses,” continues Thornton. “The facilitation of a global operation became a significant deciding factor. In addition, the contract with Siemens Digital Industries Software gives us tangible cost savings over a three-year period.”

“We had effective training from Siemens Digital Industries Software partner OnePLM, and although we do not take FEA to the full extent of its capability, it is still vital to our company,” notes Pollard. “As a CAD-independent solution, we knew that Femap would be compatible with the various design packages we have in the business. We also knew that engineers have great trust in Nastran, the solver integrated within Femap.”

#### A powerful tool for productivity

Once AIM Altitude is awarded a contract, feasibility work begins so design concepts can be validated and images can be presented to customers. Most of the FEA focus at AIM Altitude is on composite laminates. The core and layer of these need to be checked for stress and breakage, with the worst-case scenario being an impact of 9 gravitational force (Gs).

“We go beyond this standard, usually mixing physical testing with FEA,” explains Pollard.

For analysts at AIM Altitude, computer-aided design (CAD) data is typically a set of panels of varying thicknesses. FEA users must collapse these 3D models down to a



midplane in order to create a 2D mesh of inspection points and apply material properties, constraints and loading conditions.

Mike Hoey, senior structural engineer, explains the process: "We have to copy an outside surface and move it to the middle. Once we have midsurfaces we join them and cut them down so that they fit together. This used to be a fiddly manual process, which required the user to break up a surface, create a new periphery and then regenerate surfaces. The best thing about Femap is the built-in parasolid engine, which makes this process both easy and accurate. It is also quicker to bring in any design changes."

Stress engineer Noman Nasir also regards Femap as a powerful tool for creating mid-surfaces: "It is a speedy and simple process to extend panels, join them and remove features such as cable holes to get a nice tidy surface and a good quality mesh. This can be done in seconds rather than minutes and for easier meshing there are different user options; for example, I can ensure alignment when putting two panels next to each other. I really like the graphics solver in Femap because I can use the transparency feature and overlay one geometry on top of another. This was not so easy in our old software."

#### Clarity and accuracy

Hoey appreciates the tight integration between the preprocessor in Femap



and the solver, Nastran® software:

"Communication between the two was not so good in our previous software," he notes. "Running a model creates a database of numbers and I used to find that it was quite easy to look at the wrong set of results, for example, those from an earlier iteration or from a different model altogether. In contrast, Femap presents results very clearly." For stress analysis, engineers are only working with structural parts, but lighting, electrical installations and decorations might account for 30 percent of the CAD model.

"We usually need to add weight and distribute it around our model so that the center of gravity is the same as for the original design," says Nasir. "I can highlight any part of model on the screen, ask Femap to find the center of gravity and obtain the overall mass of area. In this way, it is very easy to balance the whole model so that it ties up with what the designer has."



***“Femap enables quicker creation of an FE model. I have just completed a model in two days; it would have taken me at least a week before.”***

Mike Hoey  
Senior Structural Engineer  
AIM Cabin Interiors

## Solutions/Services

Simcenter Femap  
siemens.com/simcenter-femap

## Customer's primary business

AIM Altitude is one of the leading global suppliers of cabin interiors to the world's leading airlines and OEMs, including Boeing, Airbus, the UK Ministry of Defense and manufacturers of regional aircraft.  
www.aimaltitude.com

## Customer location

Bournemouth  
United Kingdom

## Solution Partner Provider

OnePLM  
www.oneplm.com



## Ease of use and efficiency

"I like the way that Femap looks," says Ahmed Siddig, stress engineer. "The color and visual attractiveness draw me in and I find that meshing is much more intuitive. In addition, Femap has many useful options for doing one action. This was at first a bit daunting, but the software is so user-friendly that after a couple of days the menus became quite clear. With our previous software, we had minimal choice." Nasir supports Siddig's comments: "Femap is well laid out and easy to learn. Stress hot spots or design weaknesses show up well and we can quickly introduce a modification or come up with a proposal and liaise with the designer. With Femap we can also write our own customized codes; for example, to create connections between panels. We can make a script that runs automatically, saves lots of manual clicking and is much speedier."

## Stability and speed

The FEA engineers agree that Femap provides a significant increase in stability. Hoey notes, "Our old software used to crash quite often." Siddig agrees: "I used to get random crashing but Femap is very reliable."

Speed is another benefit. According to Siddig, solving a typical model takes no more than five to 10 minutes, depending on the model or meshing. "I usually do two or three runs per day and if I need to make an amendment, iterations are instant within Femap. Our former solution was very long winded. Femap is a lot quicker and smoother."

Hoey adds, "Femap enables quicker creation of an FE model. I have just completed a model in two days; it would have taken me at least a week before."

This individual user efficiency is translating to overall business productivity. "It is taking us 50 percent less time to create FEA models and it is less than a year since we implemented Femap in the UK," reports Pollard.

"We have a stable platform, all the functionality we need and floating licenses enable us to share work across sites. That is a solid basis for business cohesion and growth," concludes Thornton.

## Siemens Digital Industries Software

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