ZODIAC AEROSPACE GETS A FIRST-CLASS UPGRADE WITH THE NVIDIA QUADRO K6000

Zodiac Aerospace is a world leader in designing and manufacturing aerospace equipment and systems for commercial, regional and business aircraft. One of its largest divisions is Zodiac Seats, which has offices in California, Texas, France, Great Britain and other locations worldwide, and is one of the world's top manufacturers of aircraft seats. Its customers include the world's most respected airlines such as Cathay Pacific, Emirates, and Air France, as well as other global, regional, and private carriers throughout the world. Zodiac Seats designs both the seats and the cabin configurations (e.g. economy and business class), working to maximize the number of passengers that can comfortably fit into the cabin, while operating within each airline's specific parameters. Zodiac Seats recently worked with NVIDIA's newest and most powerful GPU, the Quadro K6000, to provide unmatched rendering speed and capacity for its designers.

CHALLENGE

Zodiac Seats is continuously bringing more of the product design, development, design and manufacturing processes in-house in order to achieve a more integrated product concept-to-delivery lifecycle for its clients, while improving innovation. Everything in an airplane is so interconnected—and limited by space—that Zodiac Seats' designers must be able to render efficiently and at a photo-real level in order to make the most informed design decisions. Realism is critical, since physical prototypes are expensive and time consuming, but clients still must be able to see the big picture—the design of the entire cabin with all seats and other components.

A typical project starts with designers using Dassault Systèmes' 3D CAD design software CATIA to design all external surfaces with which a passenger interacts. The designs—both of the seat by itself or of several rows of seats populated in a cross-section of the cabin—are then

Image courtesy of Zodiac Aerospace

Business class cabin of Zodiac's Cirrus sleeper suites rendered with NVIDIA Quadro GPUs in Bunkspeed

refined through multiple iterations in Bunkspeed 3D rendering software in order to test variations in color and lighting across the cabin and to ultimately achieve physically accurate, photorealistic imagery. From there, designers work closely with engineers to determine the optimal internal structure of seats and associated surfaces. Seat designs must consider integration with things like in-flight entertainment systems and beverage carts, and concerns regarding ergonomics and passenger comfort.

A workflow bottleneck for designers was that their previous workstations couldn't handle the amount of data required to work interactively with typical seat and cabin cross-section models—leading designers to reduce their designs down to a wireframe for review before sending them to render. This process made it difficult for designers to get the full picture—either an individual seat would be stripped of essential detail, or a cross-section would only show one small (and simplified) part of the cabin. Additionally, slow render times impacted productivity, and the additional time spent minimizing designs to wireframe could have been used more effectively.

Zodiac's Cirrus sleeper suite in a center double configuration rendered with NVIDIA Quadro GPUs in Bunkspeed

SOLUTION

Zodiac Seats recently evaluated the latest Dell Precision workstation, equipped with a top-of-the-line NVIDIA Quadro K6000 GPU, packing 12 GB of memory and NVIDIA's most powerful Kepler GPU architecture. The new hardware immediately improved designers' workflows, providing the power and capacity to perform data-heavy renders right on the workstation, and the speed to easily make changes when needed.

Felix Lorsignol, an Industrial Designer at Zodiac Seats, observed: "With the Quadro K6000, we can render larger files without having to simplify our designs; everything is more detailed and furthermore everything is rendered more quickly. Ultimately the real advantage for us is being able to look at the entire cabin with no compromises, seeing how everything fits together and testing different lighting and color scenarios in real time. Before, we'd have to work with models in a wireframe and wait at least twenty minutes before we could get a glimpse of the final design—and we could never even look at more than five or six rows of seats at a time. There was also a lot of trial and error before getting it right, due to the low level of detail our systems were limited to supporting, which reduced productivity. Now we can do much more complicated assemblies, and with more realism and accuracy than ever, in less time."

"Another example," Lorsignol continued, "is I remember one assignment for a corporate brochure where we had to create a rendering of a cross section of the entire aircraft, including seating, the cockpit, lavatories, cargo storage, etc. This scene contained well over forty million polygons. With our older workstation setup, it was literally impossible to render. We simply couldn't handle that project until we got the Quadro K6000."

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IMPACT

NVIDIA's Quadro K6000 is letting Zodiac Seats' designers work with more flexibility and efficiency. With the ability to work with more complex models and render anything directly on their workstations, designers now have fully fleshed-out designs in front of them and can simply take a screen shot and email it off for approval, further speeding up the design process.

"The next step for us is to connect Zodiac teams across the country and the world to work in a truly collaborative way," said Lorsignol. "Right now the designers have to create presentations and then hand something off for approval or edits, but we want to try having all the players around a desk or in a video conference, rendering and tweaking and making decisions all together in real time. The Quadro K6000 makes this possible."

To learn more about NVIDIA Quadro, go to **www.nvidia.com/quadro**