# IGI Contributing to Ford's Industry Leading Quality

Given the perception that automotive build quality is somehow the sole domain of Japanese and European car manufacturers, it may come as a surprise that results from the 2007 J.D. Power and Associates Initial Quality Study showed that Ford earned more quality awards in top model segments than any other car company. Upon release of the study last July, Neal Oddes, Director of Product Research and Analysis for J.D. Power and Associates said, "Fourteen Ford Motor Company models placed in the top three of their respective segments—an achievement unmatched by any other corporation this year—which is a testament to the improvement in quality for Ford Motor Company vehicle models and plants."
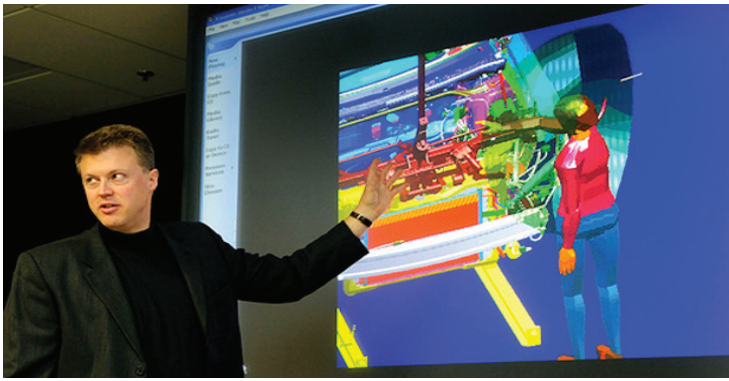
The process responsible for achieving such high levels of product quality, however, is set in motion well before Ford's new vehicles begin to roll down the assembly line. And while Ford is still among the largest auto makers in the world, a small, but key vendor of theirs, Immersion Graphics of Commerce, Michigan, is providing the company with the unique tools they need to achieve their industry-leading quality levels.

These are tools distinctly different from those used on the assembly line floor. Instead, Immersion Graphics provides large-scale visualization systems that are used by Ford's Virtual Build Teams to visualize, dissect, and plan every aspect of the vehicle assembly process in minute detail in a 3D, virtual world.

To the uninitiated, what teams of Ford engineers, human factors specialists and assembly planners view on these huge, room-sized screens may appear to be some sort of complicated video game. In fact, Ford utilizes sophisticated 3D computer graphics technology to simulate the entire vehicle assembly process months before parts begin arriving on the assembly line floor.

According to Dr. Richard Zavodsky, Virtual Build Leader who holds a Ph.D. in human organizational systems, literally hundreds, if not thousands of Ford engineers contribute 3D computer generated parts and subsystems to create a fully accurate, 3D computer model of an entire new vehicle. Every part of the vehicle as it will eventually be built ispresent on the master model. The resulting computer file is so large that it can take several days for even a high-powered computer just to open the file and prepare it for a meeting.

Eventually, the massive and intricate file is finally visible on the wall-sized display designed by Immersion Graphics in highly specialized meeting rooms at Ford. appropriately called Virtual Build Arenas. Zavodsky, who earlier in his career spent seventeen years working as a supervisor in Ford assembly plants and is intimately familiar with the assembly process says, "In the Arenas, we plan the production of the vehicle down to the smallest detail. We determine if all the parts will fit together the way they're designed, check for interferences and even evaluate ergonomic factors to make sure a human operator can adequately access all

parts of the vehicle during its assembly. There are literally thousands and thousands of checks made on the virtual car model long before we get to the assembly line floor."

Viewing the 3D models in full scale is not only helpful in gaining a realistic sense of scale, but also because there can be dozens of people from multiple departments in the same meeting at the same time and all with a need to see the same thing. A nineteen-inch desktop monitor just won't cut it.

This kind of interactive group collaboration tool, custom-engineered and installed by Immersion Graphics, greatly accelerates the decision making process. While a meeting that eventually yields Virtual Build approval can take three of four days of intensive scrutiny of the model by a large inter-departmental group, this represents a dramatic time savings over previous methods.

Zavodsky says that once the new Virtual Build process began to take hold, other areas of the company suddenly had to accelerate their performance in the manufacturing timeline just to keep up. But with the increase in speed-to-market performance also came higher quality levels. Confirming the J.D. Powers & Associates Initial Quality Survey results, Zavodsky says, "What we're doing keeps potential problems from getting to the (assembly line) floor in the first place. As a result, we've really seen a dramatic decrease in the number of new car warranty claims at our dealerships. I'm not at liberty to share the specific numbers, but I can assure you the gains have been significant. And in my opinion, we're really just scratching the surface of the true potential of this process."

Janice Goral, Ford's Manager of Body Construction Engineering, was one of the executives instrumental in helping to bring large-scale 3D model visualization to its Manufacturing Development Center in Dearborn, Michigan. Goral had seen the technology successfully applied to other areas of the business, such as styling and design, and surmised that similar process efficiencies could be realized by deploying the technology within her own department. Her decision

at the time was once a bold plunge into a still evolving technology, but she states, "We're now to the point where this is just an integral part of the way we work. We absolutely rely on our Virtual Build Arenas. We use pictures now instead of words."
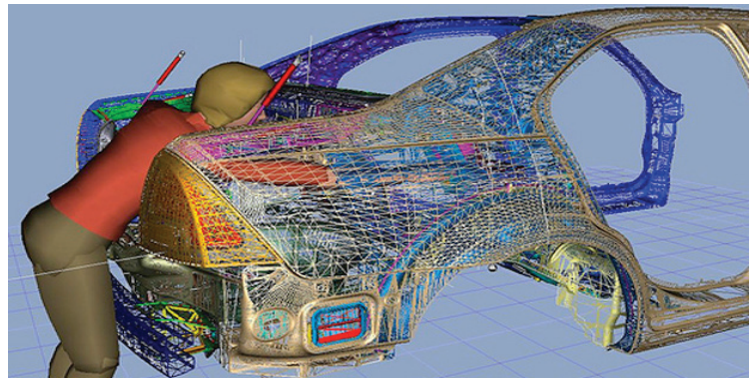
Goral says that while the level of technology designed by Immersion Graphics into the Arenas' display walls is sophisticated, she says, "The technology is largely transparent to us during the meetings and does not interfere with what we're trying to accomplish. I think this is essential to the success of our process. Due to the importance of our meetings, we absolutely require 100% readiness of the facility. We've been highly satisfied in this regard with the level of dependability and service provided by Immersion Graphics."

Anyone who has ever tried to schedule an important business meeting at a big corporation with numerous colleagues scattered throughout multiple departments can appreciate Goral's implied message. It is so difficult just to find a common date and time at which everyone is available to meet that once everyone is seated in the Arena, any failure of the technology would create a serious and unacceptable setback to the production schedule.

Pat Hernandez, President and owner of Immersion Graphics, who has overseen the installation of Ford's Virtual Build Arenas, says, "We feel fortunate to work with companies like Ford, who both consider and treat us as a valuable partner. They know that we will drop everything we're doing should a problem occur with one of our systems and be on the scene usually in the same day to solve the problem. We've always prided ourselves on that level of service and we've proven that we will respond in that fashion."

According to Hernandez, large-scale visualization of 3D models and complex information is rapidly gaining acceptance in other industries as well. And astonishing new projector technology - with four times the pixel resolution of HD - is also now being deployed by Immersion Graphics, even in mission critical applications such as command and control centers for major utility companies.

Hernandez says, "Just as Janice Goral applied what she saw in other areas of Ford's business to accelerate her own department's processes and improve the build quality of their vehicles, companies are also looking around at other industries to see what has been done with large-scale visualization and are beginning to apply the benefits to their own business."

The result for Hernandez is that just as Ford attained industry-leading quality levels utilizing its systems, Immersion Graphics had its best year yet in 2007, this despite being located in the challenging economy that is the greater Detroit area. The company has recently opened up a new office in Indianapolis to begin exploring business opportunities outside its home market and is looking to hire additional engineering talent to keep up with new opportunities.

"Business is good," says Hernandez, "never been better, actually. Now that we've really perfected our core competency in our home market with great customers like Ford, I finally feel like we're ready to begin expanding our reach into other geographic markets." Thus, in an industry where helping companies see the big picture is literally the key to success, Immersion Graphics looks to help companies visualize their own route to success through their unique and effective, large-scale visualization displays.