ANSYS SUCCESS STORY

BENTLEY REINVENTS THE DESIGN OF FUTURE VEHICLES WITH VIRTUAL REALITY

Since founded by WO Bentley in January 1919, Bentley Motors Ltd's uncompromising vision has allowed them to achieve the highest levels of handcrafted luxury, with a clear, instantly recognizable bloodline running through all their cars. The design team at Bentley includes over 100 experts from around the world, closely working with engineers, production experts, and craftspeople. Every aspect of their car is intentionally scrutinized & evaluated multiple times, with nothing left to chance.

BENTLEY REINVENTS THE DESIGN OF FUTURE VEHICLES WITH VIRTUAL REALITY

The launch of the new Bentayga was unique at Bentley as the goal was to redefine the SUV, a fast car, a good car to the best in its class. A unique opportunity to deploy new tools for new horizons.

In 2013, Bentley decided to start a STRIVE program. STRIVE, stands for Simulation Tools for Rapid Innovation in Vehicle Engineering and combines next generation technologies around virtual reality. With their SPEOS, THEIA RT and HIM suite of software, ANSYS was a key partner in this endeavor. ANSYS software allowed Bentley Motors' Engineering and Product Launch teams to work collectively & cooperatively in the development and engineering design of new models.

ANSYS offers an integrated solution of high fidelity simulation and immersive virtual prototypes. This solution enables companies to create a process for evaluation and, ultimately, application for the advancement of the automotive industry. Virtual Reality was the keyword as Bentley was anticipating its power and its benefit.

"ANSYS solutions were able to combine everything together and were at the heart of our decision center addressing engineers, designers and for the first time, craftspeople altogether around virtual reality."

Mark Harding, Manufacturing Project Leader | Bentley

REPLACING THE REAL WORLD WITH THE VIRTUAL WORLD

One important challenge to replace a real car with a digital mock-up is to "validate" the virtual world in context to be sure you perceive both the virtual and real world the same way. This is the only way to ensure making the right decision. Part of the project was to compare those two worlds: visualization, perspective, 3D view and size of the car are all contributing to the realism of a virtual mock-up. Thanks to ANSYS physics simulation approach, the accuracy of the virtual world met Bentley's expectations as it matched the real world, which opened the door to the virtual world.

THE ISSUE OF PERCEIVED QUALITY WAS IDEAL TO INVOLVE ALL COMPETENCIES INCLUDING DESIGNERS, ENGINEERS & CRAFTSPEOPLE

Customers are uncompromising regarding quality, which is of the highest importance at Bentley. Years before the new car exists, through virtual reality, ANSYS solutions have allowed Bentley to validate the alignment of doors, wings, lamps, chrome and door locks. Every part of the car is perfectly aligned with the next, which is a challenge as Bentley's cars are often longer than others. Thanks to the high-fidelity visualization powered by ANSYS SPEOS and to virtual reality immersion capacities, all participants were able to share their own perception of the outside and inside of the future vehicle and make decisions regarding shapes, tolerances, materials, and colors. Even mood lighting has been adjusted to perfection!

ADDING NEW TECHNOLOGIES ONBOARD IS A GOOD THING. BUT WHAT IS MORE IMPORTANT IS THE WAY YOU DELIVER IT!

Based on optical simulation and real-life measured material, THEIA RT real-time visualization from ANSYS allows you to visualize how selected material will be perceived under any lighting condition. What is important for the appearance of the car is also important for the ergonomics of the cockpit: cluster, navigation, infotainment system and surrounding material have all been studied to improve driver and passenger's experience. Adding new technologies on board is a good thing. But what is more important is the manner you deliver it.

Each piece of technology has been seamlessly integrated into the vehicle to offer intelligent functionality, maximizing safety by improving reachability and enhancing the legibility of displayed information. With ANSYS human vision simulation, you can perceive what the future driver will see and avoid light reflection on any part of the car.

MAKING DREAMS HAPPEN

For every new car, Bentley must create the associated production line. At Bentley, more than any other car manufacturer humans are the most important resource. All skills must be combined to produce the best car. Before building the production line, Bentley deployed the HIM solution from ANSYS to model the assembly line in virtual reality and study any gesture in view to maximizing safety and comfort of operators when building the car. The best way to make dreams happen.

During the STRIVE program, Bentley was able to explore all virtual reality technologies deployed at Virtual Engineering Centre in Daresbury and to develop a robust process. Thanks to the adoption of innovative technologies like virtual reality into its design process, Bentley has been able to open new doors for the design of sporty and elegant vehicles and to perfect cars, by virtually experiencing many variants of shape and material, of onboard technologies, multiplying tests and improving both safety and quality for the benefit of their customers.

In all these applications, visual realism provided by ANSYS' solutions was key in the acceptance of virtual reality as it is important to really feel the future product and to perfectly immerse designers into the virtual world. Bentley has recently deployed a brand new virtual reality center in their headquarters in CREWE where all employees can test and validate proposed new options.

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