

FCA Industry 4.0 Virtual Assembly Project Achieves ROI in Eight Months with ESI IC.IDO



Challenge

Before implementing ESI IC.IDO, digital assembly reviews were done with computer-aided design (CAD) geometry, viewed on flat screens. The result was that assembly reviews often failed to identify assembly difficulties that only became evident during the construction and testing of production tooling. Late identification of difficulties triggered high project costs and delays in the program's ramp-up to serial production. To address this, virtual validation of physical prototypes were identified as a crucial need for upcoming projects.

Benefits

FCA LATAM was able to analyze several assemblies at different workstations on the production line and simulate the real conditions of the product and process, without building physical tooling or a vehicle. Ergonomics, visibility of hard-to-see locations, access of hard-to-reach places and validation of assembly devices, transfer systems and installation processes were all addressed.

Story

Fiat Chrysler Automobiles (FCA) has production units in 40 countries and commercial presence in 150 countries. The group is home to brands like Alfa Romeo, Chrysler, Dodge, Fiat, Jeep, Lancia, Ram, SRT, Maserati, and Mopar (parts and services).

As part of FCA's ambitious MFG2020 initiative, an Industry 4.0 project, FCA LATAM considered how to further improve the engineering and validation of assembly operations for the new Fiat Argo car model, seeking to further reduce costs and delays. For this action, they turned to ESI Group and ESI's virtual reality solution, ESI IC.IDO.

The 'Fiat Argo' was the current program for FCA LATAM and had a strong focus on interior assembly and trim. It was the first time that FCA LATAM applied IC.IDO throughout an entire project, including in the validation of vehicle assembly. The virtual reality solution was

used to identify risks in the product design before construction of a physical prototype. All of their engineering groups - manufacturing, production, and ergonomic health & safety (EHS) - were involved in the action, which enabled them to reach an optimized solution for all areas reviewed. IC.IDO enabled FCA LATAM to evaluate different process scenarios and design variants for the program, including the validation of the manipulator arms of passenger compartment assembly. During this review, it was identified that a manipulator arm interfered with the vehicle conveyor hook, causing a collision. By evaluating and validating this process in advance, FCA LATAM was able to implement a corrective action plan to develop a new device and optimize the assembly process.

The validations occurred following the Global Vehicle Development (GVD) process, from step 2 for Product Engineering to step 5 for Process Verification, which is the validation using a physical prototype. In practice, once the product geometry is released, the design enters the technical development phase, which is when the project should be complete for packaging, tooling kick-off, and definition of the manufacturing processes. It is crucial, prior to the next phases of the program, to assure the products are safe and feasible to assemble.

18 months was considered to be an acceptable ROI for this Industry 4.0 technology investment. But in fact, the project reached full ROI after only 8 months and FCA was able to successfully assemble the new vehicle as planned. ESI IC.IDO brought agility, reduced time and enhanced workplaces. IC.IDO enabled FCA LATAM to experience the real process conditions of assembly and assure the conformity of the product by considering all the interferences in the virtual phase of development. Today, FCA LATAM has IC.IDO rooms at the Automotive Industrial Center of FIAT Betim - state of MG and at Jeep Goiana - state of PE, which allows them to use the tool across the entire range of FIAT's brands, including Toro, Mobi, Argo, Cronos, and Jeep (Renegade and Compass).



The team reviewing the Fiat Argo.

"Due to ESI Group's disruptive virtual reality solution, IC.IDO, it was an easy decision for us to implement their software. It met the growing need for increasingly assertive virtual simulations generated by industry 4.0."

Eric Beremis Baier Laia
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