

TotalSim US and Honda Performance Development work together to conquer Pikes Peak



The Situation:

Leading up to the 2018 Pikes Peak International Hill Climb, Acura Motorsports already held records on the mountain with RealTime Racing Driver Peter Cunningham but wanted to further improve performance of the Acura TLX-GT including aerodynamic performance to possibly set another record in the Pikes Peak Open Class. The Pikes Peak International Hill Climb is a grueling 12.42 mi, 156 turn race to the 14,115-foot summit.



Client Challenge:

Honda Performance Development (HPD) needed accurate aerodynamic simulation results of the race version of the Acura TLX-GT to tune the car for the Hill Climb race. Providing the results in a timely manner was critical to the development.

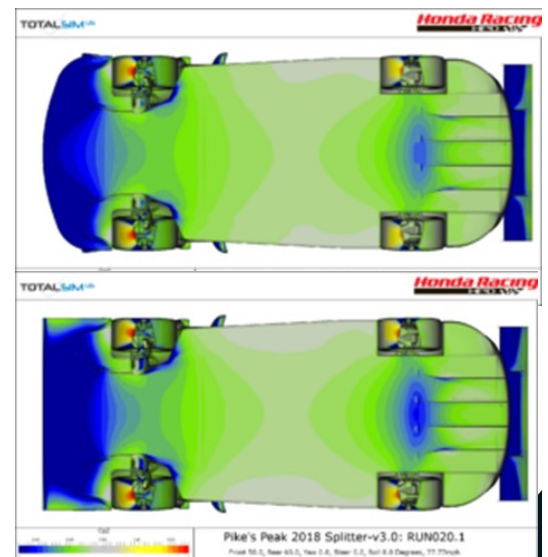
Type of TotalSim Engagement:

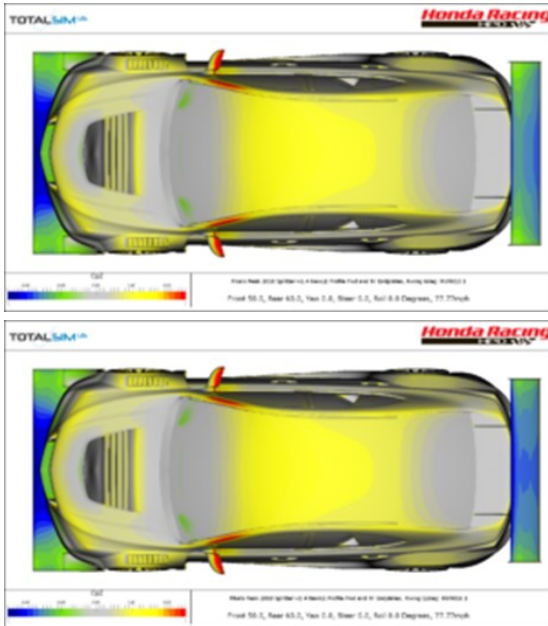
HPD, having worked with TotalSim before on the TLX-GT and other projects, knew they could count on TotalSim to provide the necessary support and get information to them in the timeline needed. TotalSim in 2018 and then again in 2019 provided Computational Fluid Dynamics (CFD)* and aerodynamic design services to improve the performance of the Acura TLX-GT for the Pikes Peak run.

What TotalSim Did:

Over the two projects TotalSim refined the splitter design, completed a rear wing optimization, and redesigned the diffuser and rear fender all with an eye to improved aerodynamic performance. Both projects had a limited time line and budget and TotalSim leveraged their automated tools for simulation setup and data post processing to complete the project under the time and budget restrictions.

The 2018 improvements included increasing the splitter design downforce by over 13% and the rear wing downforce by 3%. With the redesigned splitter and the rear wing at its optimal angle, the 2018 vehicle improved by nearly 22% in overall downforce and over 7% in Lift to Drag ratio. All this was completed in less than 20 CFD simulations.





Then in 2019 the focus was to continue refinement of the rear wing (shown in the images below) and to redesign the rear fender and diffuser. Additional improvements were realized for the rear wing but more substantial improvement was obtained in the redesign of the diffuser and the rear fender. While there was a small (0.3%) increase in drag, the benefit was an overall 14.3% increase in downforce and a corresponding L/D improvement of over 14%.

Results:

Peter Cunningham of RealTime Racing drove the 2018 Acura TLX-GT finishing first in class and third overall at Pikes Peak while shattering the course record for its class. The winning time of 9:27.352 bested the 2017 course record by 5 sec. Additionally, Cunningham competed in the Empire Hill climb (Empire, MI) finishing first overall in 18.539 sec, besting the next finisher by over 3 sec.



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