TotalSim's role in helping NASCAR R&D Build CFD capability

The Situation:

NASCAR R&D needed the tools to evaluate how vehicle design changes would affect behavior of the cars on track. This analysis is used to inform rule changes allowing for more competition on track while also improving driver and fan safety. While NASCAR has a history of using wind tunnel and on-track testing, it can be costly, time consuming and not always able to fully analyze the unique multi-car interactions that are a hallmark to NASCAR racing; therefore, they were looking for alternative options.

Client Challenge:

NASCAR R&D felt that Computational Fluid Dynamic (CFD*) simulations would solve the needs but they didn't have the CFD or High Performance Computing (HPC) capability to run the number and types of simulations they wanted to conduct: single and multi car interaction simulations were desired. Additionally, with a limited team to conduct the simulations, a well defined method for setting up and reviewing the simulation results was necessary to keep the work on track.

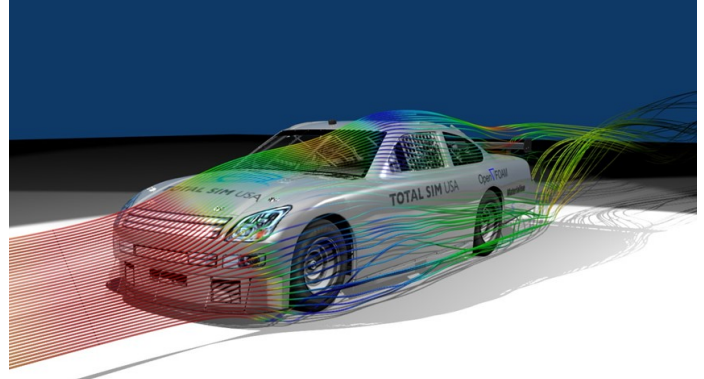## Type of TotalSim Engagement:

NASCAR R&D decided to engage TotalSim using a CFD Support contract. This provided them with support for license-free, open source tools instead of costly commercial codes which potentially would have limited their ability to run large numbers of simulations. The support contract includes TotalSim's entire suite of automated CFD tools and templates for simulation setup and data post processing. Additionally, since NAS-

What TotalSim Did:

As part of the CFD support contract, TotalSim provided the entire suite of tools and templates to NASCAR R&D, in-depth training (so they were able to get started quickly) and technical support whenever they had questions. Additionally, TotalSim handled all the set up and logistics at OSC so there was no additional IT pressure on NASCAR's team. Having these resources allowed NASCAR to start conducting CFD analysis much faster than if they had started from scratch. During the support contract NASCAR studied single car and multiple car interactions and TotalSim conducted custom scripting to expand on the standard tools to accommodate NASCAR's specific needs – for example, accommodating multi-car drafting cases. All along the way TotalSim's experienced engineers were available to answer questions which is invaluable as TotalSim's engineers use the same tools every day in their own work and are, therefore, intimately familiar with them.

Results:

For NASCAR R&D, the ability to leverage a support contract and cloud computing services allowed them to do the work they needed in a focused and painless way. The value TotalSim provided can be summed up by Dr. Eric Jacuzzi, Sr. Director of Aerodynamics at NASCAR R&D: "The money we spent on CFD saves us money in the long run because when we go onto the track or we go to the wind tunnel we're already 90% sure we are going down the right path." Additionally Jacuzzi said, "without the access to [TotalSim and OSC resources] what we do would be impossible."

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