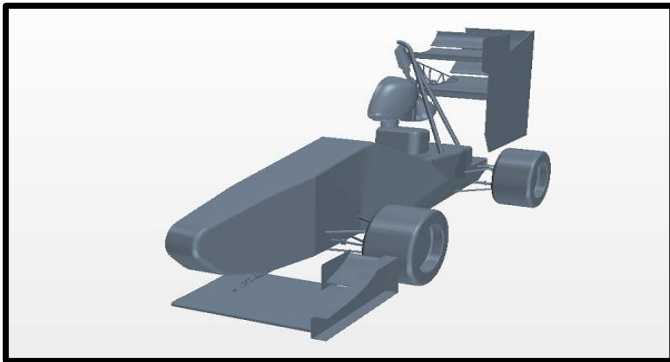


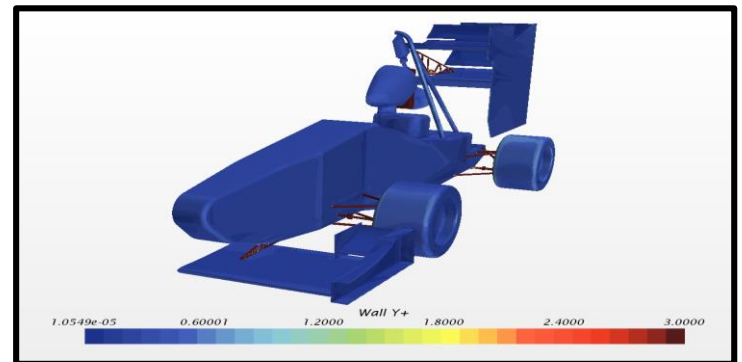
Formula Racing Innovation on HPCBOX

The Aerodynamics sub-team at Ryerson Formula Racing uses Computational Fluid Dynamics (CFD) for designing and optimizing the race car. Designing an aerodynamics package from the ground up is a very time consuming process for a small team and CFD studies need to incorporate a balance of accuracy and speed in order to both get useful results and finish the design on time. This is where High Performance Computing (HPC) can play an important role in accelerating innovation.

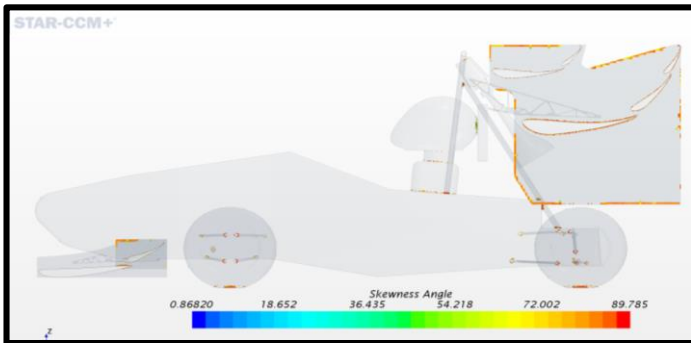
Ryerson Formula Racing is a student led racing team that designs and builds a Formula One style car from scratch every year. Based out of Ryerson University in Toronto, Canada, the team has been operating for twenty-six years and has competed globally in events at venues such as the Silverstone Circuit in England and Michigan International Speedway in the United States in addition to a few local competitions.



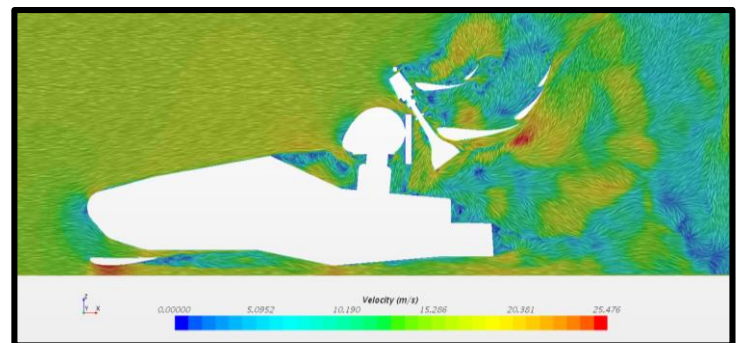
RF-20 CFD Geometry



Surface plot of wall y^+ values of the steady solution (mesh base size = 0.01m)



Surface plot of mesh cell skewness angle (mesh base size = 0.01m)



Side view of a vector field taken from the LES

At-a-glance:

Customer: Ryerson Formula Racing

Website: <https://www.ryersonformulasae.com>

Customer Size: 1 -10

Country: Canada

Industry: Formula Racing

Products and Services: HPCBOX on Microsoft Azure

Customer challenges

Ryerson Formula Racing uses Siemens Simcenter Star-CCM+ for CFD analysis. The team wanted to run a wide array of simulations to evaluate aerodynamic characteristics and study the design of their car more thoroughly than any previous year. Based on previous experience, they estimated that it would take them roughly seventeen days to perform one run using their existing local hardware. This was a serious limiting factor in their plans to include more geometries into RF-20's design.

Customer Benefits

HPCBOX allowed Ryerson Formula Racing to significantly increase the size and detail of the model they used for their aerodynamic package design. With a turn-key HPC solution and fully interactive desktop experience, they could access supercomputing power right from their PC without having to learn any new way of using Star-CCM+ and reduce run times from over 15 days to two hours.



Due to HPCBOX's capability to deliver a relatively low solving time, we were able to tweak the geometry frequently with finer mesh settings and still obtain results faster than our local hardware.



"At Ryerson Formula Racing there is no shortage of new ideas and design concepts. Drizti's HPCBOX allowed the team to turn many of those concepts into reality using advanced supercomputing power to run our CFD studies, saving time, while increasing our mesh cell count."



Ryerson Formula Racing's partnership with Drizti allowed the aerodynamics team to run a wide variety of simulations at a higher fidelity and faster speed than ever before and gave insight into the car's behavior allowing for testing of many different modeling techniques that can be used in the future.

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Learn More

<https://www.drizti.com>

<https://www.ryersonformulasae.com>