Introducing Flow360 - a fast and accurate CFD solver integrated with ANSA

Maciej Skarysz*, CJ Doolittle, Zongfu Yu
Flexcompute

KEYWORDS -
Flow360, Flexcompute, CFD, Integration

ABSTRACT
The accurate prediction of aerodynamic performance is crucial for the development of efficient and high-performance vehicles. In quick development environments, the integration of computational fluid dynamics (CFD) with pre-processing tools is essential for the efficient analysis of complex geometries. In this work, we present the integration of Flow360 with ANSA for accurate aerodynamic analysis.

Traditionally, performing complex flow simulations on real-world products has been both time consuming and costly. However, with the emergence of the Flow360 solver, these barriers are being eliminated. This state-of-the-art solver is based on a full-stack software-hardware design that enables steady-state flow simulation of complex products within a matter of minutes - a process that used to take several hours and require thousands of cores to achieve. The Flow360 solver can perform transient simulations of complex flows in just a few hours, and it can prepare complete aero databases in days. Thanks to its cloud-native architecture, this cutting-edge tool can be accessed through both web applications and ANSA, offering users unparalleled flexibility and ease of use.

The integration of Flow360 with ANSA allows for a seamless workflow for the meshing and preparation of simulations. ANSA provides powerful meshing capabilities that enable the creation of high-quality meshes for CFD simulations, and Flow360 provides accurate and highly efficient CFD simulations of vehicle aerodynamics. The integration of these two tools streamlines the CFD workflow and reduces the time required for analysis.

The Windsor Body and DrivAer models are benchmark test cases widely used in the automotive industry for aerodynamic analysis. Our study focuses on evaluating the accuracy of Flow360 simulations and presenting the easy-to-use workflow integrated with ANSA. We conducted a series of simulations for the Windsor Body and DrivAer test cases, comparing the results with experimental data. Flow360 results show good agreement with experimental data and other CFD codes for both the Windsor Body and DrivAer test cases. The aerodynamic coefficients obtained from the simulations are in close agreement with the experimental data, demonstrating the accuracy of the Flow360 solver. The 260M cell DrivAer simulation was completed in just 17 minutes with Flow360.

Overall, the integration of Flow360 with ANSA provides a powerful and efficient workflow for the aerodynamic analysis of complex geometries in the automotive industry.