SECTOR:
ROCKETS AND MISSILES

OFFERINGS:
ENGINEERING SIMULATION SERVICES

TECHNOLOGY:
FLUID DYNAMICS

AERODYNAMIC ANALYSIS OF A GUIDED AERIAL STORE

Our customer is a premier Defence establishment working for Indian Forces in developing state of the art armaments. They are engaged in precision strike capabilities by design and development of GPS/INS guidance and control kit for an air dropped store. For design of the guidance and control algorithm, aerodynamic coefficients of the store are required over the flight envelope possible during the guided flight. Even though, the semi-empirical DATCOM data-sheet was previously used for fixing store configuration, it fails to provide aerodynamic response of a maneuvering store with control surface (tail fins) deflection and orientation.

Zeus Numerix recommended high fidelity turbulent viscous CFD simulation of store as flow separation was expected at high angle of attack and large fin deflections. Zeus Numerix opted for its proprietary pre-processor (GridZ™, structured multi-block mesh), CFD solver (FlowZ™, compressible and parallel) and post-processor (ViewZ™) modules of CFDExpert™ for the simulations. The simulation matrix of 110 CFD runs was completed within weeks on in-house parallel computing server.

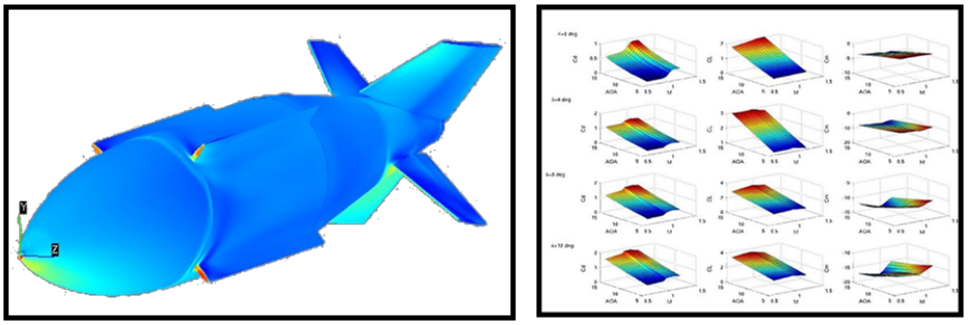

Figure 24: Aerodynamic derivatives of HSLD bomb

Customer was provided with tabulated static and dynamic aero-dynamics coefficients. The coefficients were used by them to develop guidance and control algorithm and predict the trajectory and precision hit accuracy. Through this study our customer was able to eliminate the need of conducting costly and time consuming wind tunnel experiment from their design and development process.

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