

TRAJECTORY PREDICTION OF STORE SEPARATING FROM AIRCRAFT

VERTICAL:
AEROSPACE & DEFENCE

SERVICE:
ENGINEERING SERVICES

TECHNOLOGY:
CFD

Our customer is an establishment that evaluates aircrafts and systems for induction into services. An important aspect of integrating a jettisonable store is its ability to separate safely when released from parent aircraft. Ensuring a safe separation requires precise estimation of trajectory of the store under actual flight conditions. Wind tunnel experiments cannot generate these trajectories due to dynamic nature and carrying out flight tests without estimating separation behavior is dangerous.

Zeus Numerix carried out CFD simulations to compute time accurate trajectories of stores using proprietary solver comprising of automated pre-processor, implicit compressible CFD solver and 6-DoF dynamics solver. The methodology was validated against trajectory data of a store from actual flight test. The analysis was carried out for 2 new low drag stores under investigation with the help of a simulation matrix. The simulation matrix was designed in a way to understand the effect of altitude, Mach number, angle of attack and side slip angle on the separation behavior of new stores.

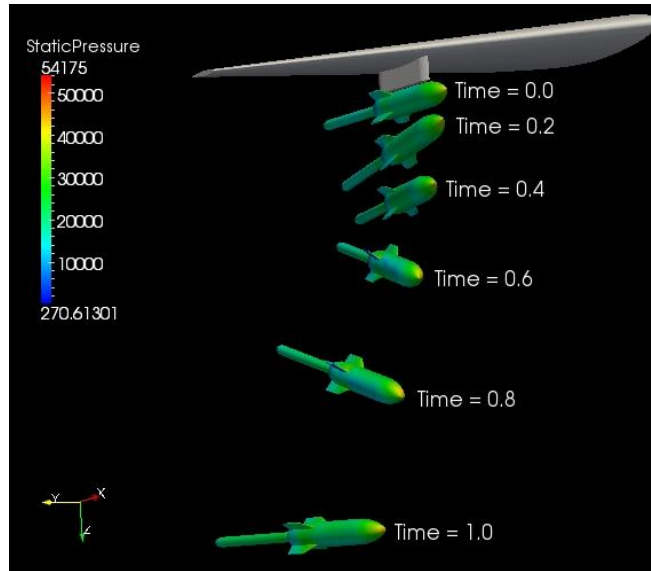


Figure 2: Dynamics of Store Separating from Platform

The customer was provided with detailed analysis of the vital dynamics parameters that ensured the safe separation of the stores. Extremely critical trends were obtained that established the relation between safe separation & flight conditions. Customer obtained certification for integration of the stores.