

SECTOR:
AEROSPACE SYSTEMS

OFFERINGS:
DESIGN APPROVAL STUDIES

TECHNOLOGY:
FLUID DYNAMICS

AERODYNAMIC ANALYSIS OF SENSOR INSTALLATION ON INTERFACE BEAM

Our customer is a Defence laboratory that spearheads research and development of airborne electronic installations. They wish to install an external sensor on an aircraft through an interface beam which is designed to be fitted between the pylons and missile adapters. Since the externally mounted sensors are exposed to airflow and with its close proximity to the missile and pylons, a CFD study was warranted to analyze any incremental changes to the aerodynamic characteristics and its effect on the flight envelope of the aircraft.

Unstructured hybrid mesh with grid size of 40 million cells was generated. Grid near the beam has been made denser to capture the flow characteristics. Implicit compressible flow CFD package CFDExpert is used for the simulations in parallel on 64 cores. The simulations were also carried out for clean aircraft configuration on the same flight envelope for comparison. Figure shows the streamlines near the interface beams. Similar post-processing was done to find the change in pressure distribution, vortex formation, if any, and effect of shocks for supersonic cases.

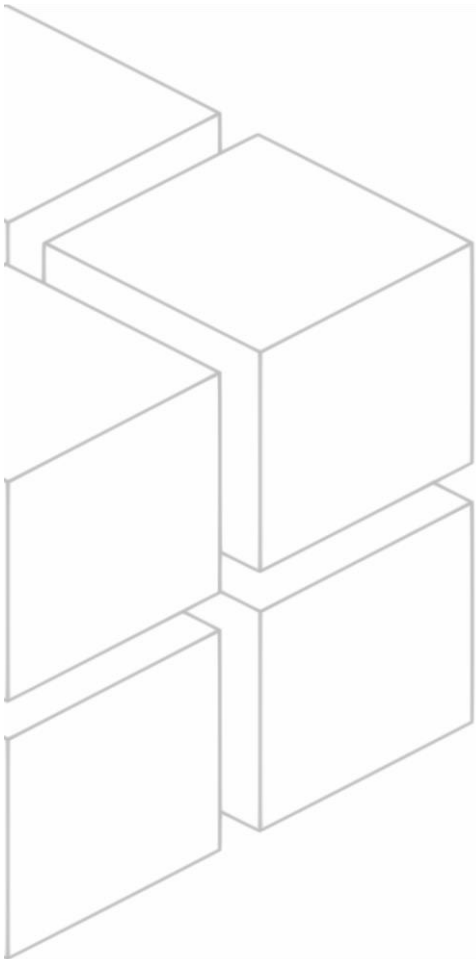


Figure 8: Generic image of interface beam

The customer was provided with the aerodynamic coefficients showing less than one percentage reduction in lift coefficients and less than two percentage increase in drag coefficients. Additionally, the variation in pitching coefficients was found to be within ± 5 percentage. Certification studies were submitted for further approval.