Hypersonic aerothermoelastic response simulation using CFD/CSD approach

Zhi Chen[1], Jinan Lv[1], Bangcheng Ai[1], Jijun Yu[1]

[1] China Academy of Aerospace Aerodynamics (CAAA), Beijing, China, 100074
madas1@126.com

Abstract: In this paper, a coupling numerical simulation technology which combined computational fluid dynamics (CFD) method with computational structure dynamic (CSD) is developed. The aerodynamic heating is calculated using CFD method. The thermal modal under aerodynamic heating is simulated using CSD method and the influence of aerodynamic heating is discussed. The aerothermoelastic response problem of an elastic hypersonic vehicle wing under Ma 5 flight condition is analyzed using CFD/CSD approach. The computed results indicate that using CFD/CSD simulation approach to predict aerothermoelastic character of hypersonic vehicle is feasible and credible.

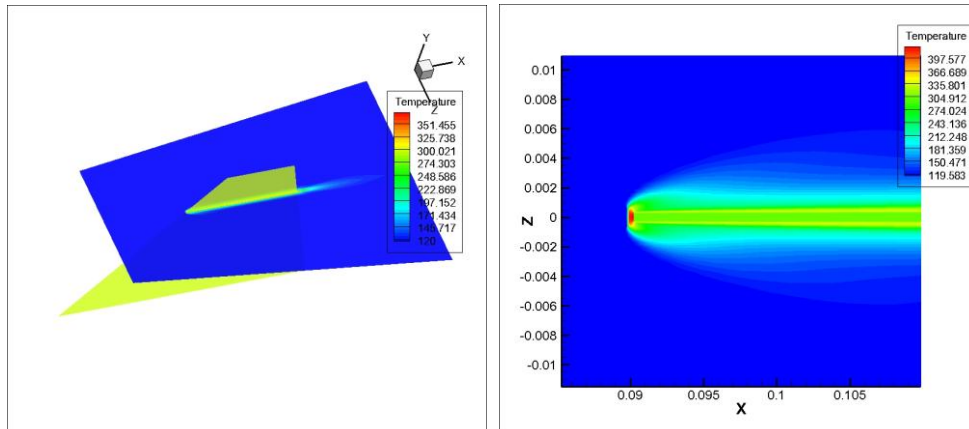**Key Words:** *CFD/CSD, aerothermoelastic response, hypersonic*

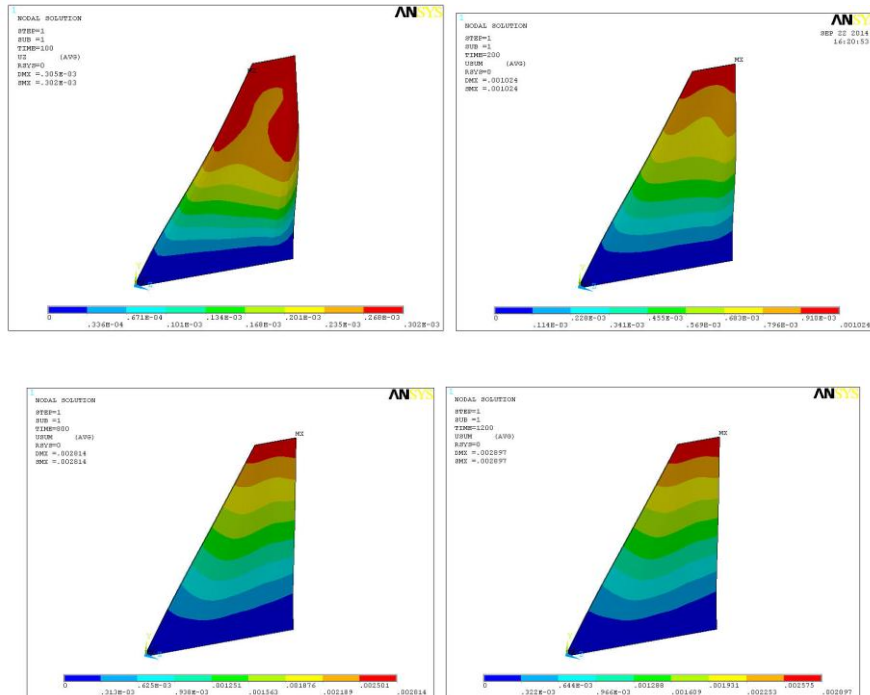**Figure 1 Film temperature contour**

Figure 2 Structure thermal deformations with aerodynamic heating progressing

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