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## 新型高超声速飞行器气动构型设计 (PDF)

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Title: The Design of Aerodynamic Configuration for a Novel Hypersonic Vehicle

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摘要: 为设计一种新型高超声速滑翔飞行器,采用数值模拟方法对HIFiRE Flight 1所选用的试验飞行器进行改型设计,使其具有良好的气动性能。结果表明:飞行器上表面形状和翼型对其气动性能影响显著,升阻比随上表面迎风面积的减小而升高;当机体不带机翼时,升阻比随马赫数的增加而升高;具有乘波特性的机翼能够给机体提供较高的升阻比;在研究范围内( $Ma = 4 \sim 10$ ),随着马赫数的增加,Model 3的升阻比先增大后减小,当马赫数为8时,升阻比最大。

Abstract: In order to design a novel hypersonic cruise vehicle, the test vehicle of HIFiRE Flight 1 was modified to achieve better aerodynamic performance numerically. The obtained results show that the upper surface and airfoil greatly affect aerodynamic performance of the vehicle. The lift to drag ratio increases continuously with the decrease of the area of the upper surface. Furthermore, without the airfoil, the lift to drag ratio increases with the increase of the Mach number. The wing with the waverider characteristics provides a larger lift to drag ratio. With the increase of the Mach number, the lift to drag ratio of Model 3 first increases, and then decreases. When the Mach number is 8, the lift to drag ratio is the largest.

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