

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Smart Materials and Adaptive Structures (5)

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SELF ADAPTIVE DEFORMABLE FLIGHT VEHICLE TECHNOLOGY RESEARCH

Abstract

The self adaptive structure composed of material, control, sensing, actuation, information processing and system integration has been around for many years, and the self adaptive deformable flight vehicle technology has been recently focused. The self adaptive deformable technology will revolutionize and enable flight vehicle to operate under a wide range of varying flight conditions, including optimizing aerodynamic performance, reducing the aerodynamic heating, increasing flying range, and so on. So this kind of vehicle possess a better environment adaptability and existence capability, and has intelligent or smart character. A great deal of progress has been made recently in the development of adaptive flight vehicle. In this article, the reentry vehicle local structure that can change shape based self adaptive has been discussed. The deformable flexible skin sample resistant to high temperature used smart materials has been designed and fabricated, and the deformable nose of wing also has been designed, simulated and investigated. The research above shows that, although facing some key technology challenges today, the concept of self adaptive deformable technology will be beneficial for the future intelligent flight vehicle design.

Keywords: self adaptive; reentry vehicle; deformable flexible skin; deformable nose of wing