Optimal Design of Airborne Test System Based on Model Analysis

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Abstract Model-based systems engineering design ideas play an increasing significant role in the development and testing of new aircraft, the finite element method as an important means of model analysis can provide a theoretical basis for the design of airborne test systems. First, propose an optimized design scheme for model-based airborne test system, design a multi-source data fusion real-time processing system for UAV, make the real-time processing and analysis speed of the original data, link data and multi-band test data reach a subtle level; Then, according to the complex coupling heat transfer mechanism of the UAV, based on the structure characteristics, a method of calculating the thermal environment of the UAV in different regions was proposed, realize the rational design of temperature test structure layout. Finally, based on the theory of modal analysis and simulation experiment, the optimal selection of vibration auxiliary equipment is realized to solve the vibration data overrun problem caused by resonance. The test results show that the airborne test system has a reasonable layout and measurement design, which can effectively reduce about 32.5% of test flight resources, and can be applied to other flight tests.

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