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Computational Fluid Dynamics Analysis Success Stories of X-Plane Design to Flight Test

By Gary B. Cosentino

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 24 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. Examples of the design and flight test of three true X-planes are described, particularly X-plane design techniques that relied heavily on computational fluid dynamics (CFD) analysis. Three examples are presented: the X-36 Tailless Fighter Agility Research Aircraft, the X-45A Unmanned Combat Air Vehicle, and the X-48B Blended Wing Body Demonstrator Aircraft. An overview is presented of the uses of CFD analysis, comparison and contrast with wind tunnel testing, and information derived from CFD analysis that directly related to successful flight test. Lessons learned on the proper and improper application of CFD analysis are presented. Highlights of the flight-test results of the three example X-planes are presented. This report discusses developing an aircraft shape from early concept and three-dimensional modeling through CFD analysis, wind tunnel testing, further refined CFD analysis, and, finally, flight. An overview of the areas in which CFD analysis does and does not perform well during this process is presented. How wind tunnel testing complements, calibrates, and verifies CFD analysis is discussed. Lessons learned revealing circumstances under which CFD analysis results can be misleading are given. Strengths and weaknesses of...



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