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Process for Refining and Validating a Finite Element Model of an Experimental High-Altitude, Long-Endurance (HALE) Aircraft

By Air Force Institute of Technology

Biblioscholar Sep 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x9 mm. This item is printed on demand - Print on Demand Neuware - The work presented here focuses on finite element (FE) modeling of X-HALE, a test aircraft designed and built by the University of Michigan, in conjunction with the Air Force Institute of Technology (AFIT) and Air Force Research Laboratory (AFRL). This scaled vehicle is representative of high-altitude, long-endurance (HALE) aircraft and was designed to provide controlled aeroelastic and flight data. FE models of portions of the X-HALE wing structure were created and analysis results were compared against two separate laboratory static bending tests conducted on X-HALE wing sections. The process documented here should improve future efforts to refine FE models of X-HALE. Improved modeling techniques will help design and test X-HALE to provide data for future designs of HALE aircraft and will also help to validate coupled nonlinear aeroelastic and flight dynamic codes. Results of the FE models created indicate the manufactured wing structure possesses material properties close to those expected of the composite materials used in its design. However, the results also suggest additional focus is required to accurately model the wing joint region of the X-HALE structure,...



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