

Packaging in the Design Synthesis of Novel Aircraft Configuration

Authors : Paul Okonkwo, Howard Smith

Abstract : A study to estimate the size of the cabin and major aircraft components as well as detect and avoid interference between internally placed components and the external surface, during the conceptual design synthesis and optimisation to explore the design space of a BWB, was conducted. Sizing of components follows the Bradley cabin sizing and rubber engine scaling procedures to size the cabin and engine respectively. The interference detection and avoidance algorithm relies on the ability of the Class Shape Transform parameterisation technique to generate polynomial functions of the surfaces of a BWB aircraft configuration from the sizes of the cabin and internal objects using few variables. Interference detection is essential in packaging of non-conventional configuration like the BWB because of the non-uniform airfoil-shaped sections and resultant varying internal space. The unique configuration increases the need for a methodology to prevent objects from being placed in locations that do not sufficiently enclose them within the geometry.

Keywords : packaging, optimisation, BWB, parameterisation, aircraft conceptual design

Conference Title : ICAA 2015 : International Conference on Aeronautics and Astronautics

Conference Location : Chicago, United States

Conference Dates : October 08-09, 2015