
Substantiation of the choice of materials for the wing of tourist class suborbital reusable space vehicle

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The article presents the results of numerical simulation of the thermal conditions of the wing of a hybrid polymer composite material for tourist class reusable space vehicle to fly on a suborbital trajectory. Calculations performed by finite element analysis, using the universal software system ANSYS Workbench 16.0, provide the temperature distribution on the surface of the wing corresponding to the stage of vehicle descent in the atmosphere. It became clear that thermal-protective coating must be used at the edges of the wing and the type of coating was defined. As a result of finite element simulation classes of polymeric matrix materials, suitable for the manufacture of hybrid composite wing skins, and carbon composite spar were identified, and the honeycomb filling material used in the wing skin was selected, using thermal condition numerical simulation methods.

Keywords: reusable space vehicle, thermal conditions, wing, hybrid composite material, simulation.

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