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GLOBAL OPTIMIZED SHAPES OF AEROSPACE VEHICLE MODELS

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Abstract: The classical variational problem of the aerodynamic optimization of the shape of a flying configuration (FC) consists in the determination of the shape of its surface with fixed planform, in order to have a minimum drag at cruise. This elitary FC has a fixed set of similarity parameters of its planform, The global optimized (GO) shape of a FC consists in the simultaneous determination of its optimal camber, twist thickness and also of the similarity parameters of its planform in order to have a minimum drag, at cruise.This enlarged variational problem with free boundaries was solved by the author by introducing a lower limit hypersurface of the drag coefficients of the elitary FCs belonging to a class defined by their common properties This optimum-optimorum strategy of the author was used for the determination of the GO shapes of three models, namely: the delta wing alone ADELA and of two fully-integrated FCs Fadet I and FADET II, which are of minimum drag at cruising Mach numbers 2, 2.2 and respectively 3. The GO shapes of FADET I and FADET II are here usedl for the design of two GO space vehicle models for a suborbital touristic flight in space. A smaller and more rapid GO model can up and go on the surface of a much greater and slower one and can be considered like a Saenger GO variant.