

DESIGN OF AIRCRAFT STRUCTURES - STRUCTURAL DESIGN OF CARBON FIBER COMPOSITE WING FOR THE SARAS CIVIL TRANSPORT AIRCRAFT

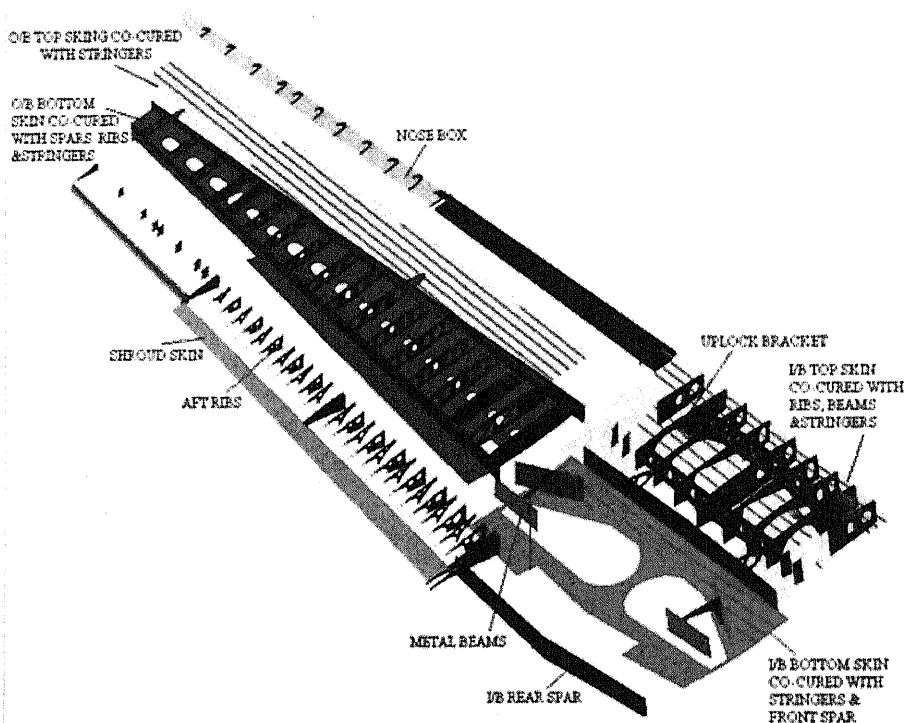
S. Sridhara Murthy

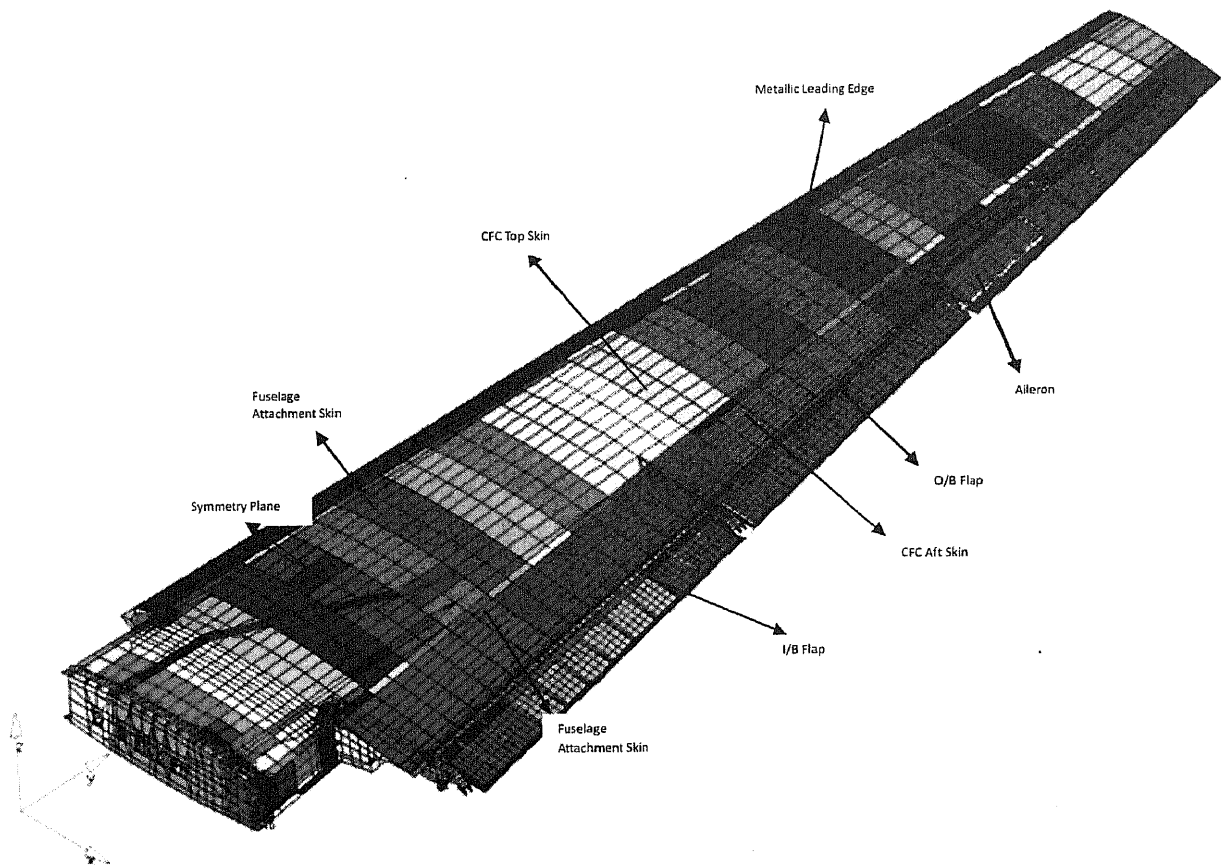
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EXTENDED ABSTRACT

National Aerospace Laboratories has undertaken the design and development of a Carbon Fiber Composite (CFC) wing for SARAS Production Standard Aircraft (PSA) replacing the existing metal wing in SARAS Prototype Aircraft (please see the figures below). The optimisation of the CFC layup was carried out for minimum weight design of the wing subject to structural design constraints on strength and stiffness. While the strength constraints were based on Yamada-Sun failure theory, those on stiffness were based on Panel Buckling Factors (PBF) on compressive skins and shear webs. The design optimisation was carried out using SOL 200 of MSC/NASTRAN where the PBF were enforced through deployment of DRESP2 secondary response feature of the optimiser. The details of the design optimisation process, the results and their discussions are presented.

O/B TOP SKIN CO-CURED WITH STRINGERS





S. Sridhara Murthy

Education:

- o B.E., Civil Engineering, Bangalore University, 1973
- o M.E., Aeronautical Engineering, IISc, Bangalore, 1975
- o Ph.D., Engineering Mechanics, University of Arizona, USA, 1983 under the advice of Dean Gallagher.

Professional Experience:

- o Scientist at NAL, Bangalore, since 1976, Presently Scientist G
- o Faculty, Continuing Education Programme, I.I.Sc.: Given courses on FEA and Advanced FEA
- o Principal faculty for Workshop on FEA course for faculty of AIT, Chikkamagalur.
- o FEA lectures for many Industries, and consultant groups

Presently:

Head, Knowledge and Technology Management Division

Head, Computer Network Services

Deputy Project Director, SARAS Civil Transport Aircraft Development Project

Areas of Work:

- o Development of Finite elements for composite shells
- o Expert systems
- o Project Leader for stress analysis projects on AEW, HANSA, SARAS, and LCA air-intake models, RLV etc.
- o Computational Vibro-acoustics
- o Design installation, operation and maintenance of computer network of more than 2000 nodes at NAL
- o More than 50 publications

Awards & Fellowships:

- o Fellow, Aeronautical Society of India
- o Elected Member, Tau-Beta-Phi, The Engineering Honour Society of America
- o Awarded Govt. of India National Scholarship Award for Study Abroad, 1980-83
- o Won NAL outstanding performance award for project execution Five times

