X-DIA DEMONSTRATOR AEROELASTIC TEST – DESIGN, ANALYSIS AND MODEL WIND TUNNEL SUPPORT TUNING

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Submitted paper deals with preparation of the X-DIA aeroelastic demonstrator component wind tunnel tests. The paper is focused on design, analysis and manufacturing of new composite foreplanes, FE analyses of the X-DIA Component Model (static aeroelasticity, flutter, dynamic responses) and optimization study of the demonstrator wind tunnel support device. Analyses were performed by means of the MSC.NASTRAN program system.

Key words: *3AS project, flutter, dynamic response, aeroelastic tests, active control, all-movable foreplane*

1. Introduction

Aeronautical Research and Test Institute (Czech acronym – VZLU) is the major centre of aeronautical research, development and testing in the Czech Republic. VZLU Aeroelasticity Group was involved in the 5th FP EC project 'Active Aeroelastic Aircraft Structures (3AS)' during the 2002–2005. The main aim of the 3AS project was to employ aeroelastic characteristics of the aircraft structure to increase the operational efficiency of the structure (increasing performance, decreasing the aerodynamic drag, structural weight, control surface size etc.). Several concepts and approaches were researched and evaluated. The project was successfully finished in July 2005 and the follow-up project titled 'Advanced Active Aeroelastic Aircraft Structures (4AS)' was submitted to the 6th FP of the EC.

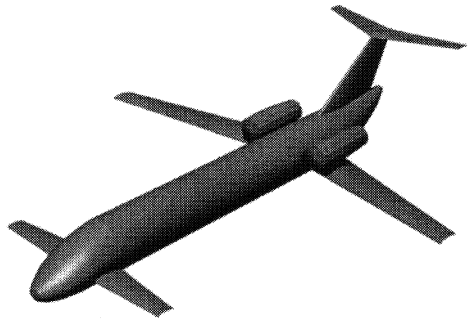

Fig.1: Demonstrator X-DIA (initial state)

The 'Active All – Movable Foreplane (AAMFP)' concept was validated by means of the 3-surface aircraft aeroelastic demonstrator named X-DIA (Fig. 1). The main aim of the task

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