
Fully morphing aircraft structures: studies from the Department of Aerospace Engineering, METU, Ankara, Turkey

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Abstract: This study details the fully morphing aerospace structures by giving special references to the contributions made by the Department of Aerospace Engineering team of Middle East Technical University, Ankara, Turkey.

Keywords: fully morphing structures; unmanned aircraft; smart structures.

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Biographical notes: Yavuz Yaman is a Professor in the Department of Aerospace Engineering, METU, Ankara, Turkey. His research interests focus on the structural dynamics, aerospace structures, active vibration control, aeroelasticity, smart structures and morphing aerospace structures. He teaches statics, dynamics, mechanics of materials, mechanical vibrations and aircraft structures.

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1 Introduction

Unconventional control surfaces which can change their planforms to a great extent are usually heavier than the conventional ones, due to the complexity of various actuation capabilities of the former ones. Although this brings a weight penalty to the design; the aerodynamic advantages gained during the process makes this choice an advantageous one.

Researchers in aeronautical design studies have long been working on changing the shape of the aircrafts in order to gain the aerodynamic advantages. Actually, the first morphing aircraft is the one designed and flown by Wright Brothers which had roll