

DEPARTMENT OF MECHANICAL ENGINEERING WILLIAM MAXWELL REED SEMINAR SERIES

Inflatable Wings and the Tensairity Concept

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Abstract: Inflatable structures have very interesting properties such as the low weight, the compact transport volume and the fast and easy set up. Both manned and unmanned aircraft have been built using inflatable wings. A severe drawback of inflatable wings is the limited load-bearing capability. Introducing the structural concept of Tensairity®, which is mainly used in Civil Engineering at the moment, can overcome this deficiency. Tensairity combines an inflatable structure with struts and cables and thus increases the stiffness and maximal load of the inflatable structure tremendously. A further improvement of the stiffness and ultimate load of Tensairity can be achieved by the introduction of fabric webs into the airbeam. The concept of web-Tensairity was further developed to curved girders to be able to build wings with dihedral, sweep, and twist. To prove the concept of Tensairity wings, the goal was set to build a Tensairity kite which flies stable on a single line. The latest prototype has a span of almost 8 m and a projected area of 11 m². Also, steps were taken to decrease the production costs of inflatable wings in general, in cooperation with an airbag company. This resulted in a series of small wings with a symmetrical profile with a lot of potential for morphing wings.

Bio: Joep Breuer started working with inflatable wings and the Tensairity® concept during his internship at the Swiss Innovation Company ‘prospective concepts’ in 2005. He continued this work during his Master thesis with the specialization “Design and Production of Composite Structures” at the faculty of Aerospace Engineering in Delft, the Netherlands. The last couple of years he has worked at Empa, the Swiss Federal Laboratories for Material Testing and Research, to develop the concept even further. He has also worked on a small composite two-seater aircraft and a small satellite, launched by Delta-Utec Space and the ESA Education Office.

Date: Thursday, September 17, 2009

Time: 3:30 p.m. to 4:30 p.m. (refreshments 3:00 p.m.)

Place: Room 323 CRMS

Contact: Dr. Suzanne W. Smith 257-6336 ext. 80663

Meet the speaker and have refreshments
Attendance open to all interested persons