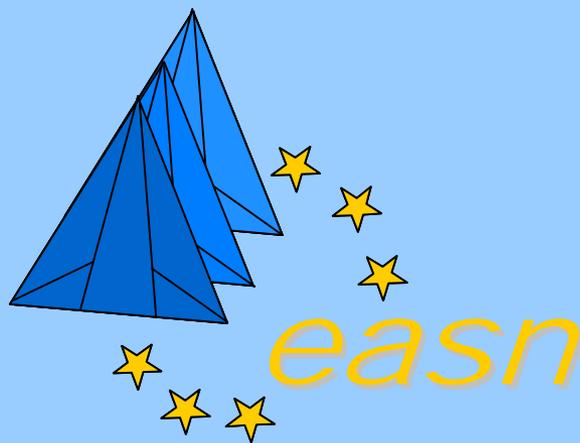


Theodoros Kermanidis; University of Patras, LTSM



European aeronautics science network

## Aerostructures

### EASN Interest Groups

Area of Interest: Aerostructures:

- Ageing Aircraft (P. Horst)
- Crashworthiness and structural Impact for Commercial a/c (R.Mines)
- Increased Exploitation of Metallic Airframe Materials(E.Hombergmeier)
- Surface Engg. (C. Rodopoulos)
- Damage Tolerance of Welded Aerostructures (A. Kermanidis)
- **Increased exploitation of composites (G.Labeas)**
- Recycling (of composites?) and Life-Cycle Management ( N.N.)

EASN Interest Group:

## **‘Increased Exploitation of Composites’**

IG Leader: George Lampeas  
University of Patras  
Greece

## Contents

- Establishment of the Interest Group (IG)
- General objectives of the IG
- Technological topics for innovative and upstream research
- Participants of the IG
- Activities so far (EoIs and submitted proposal)
- Planned future activities

## Establishment of the Interest Group

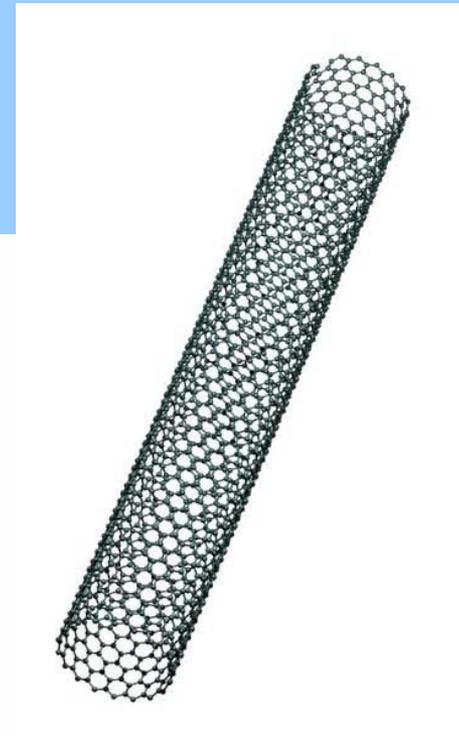
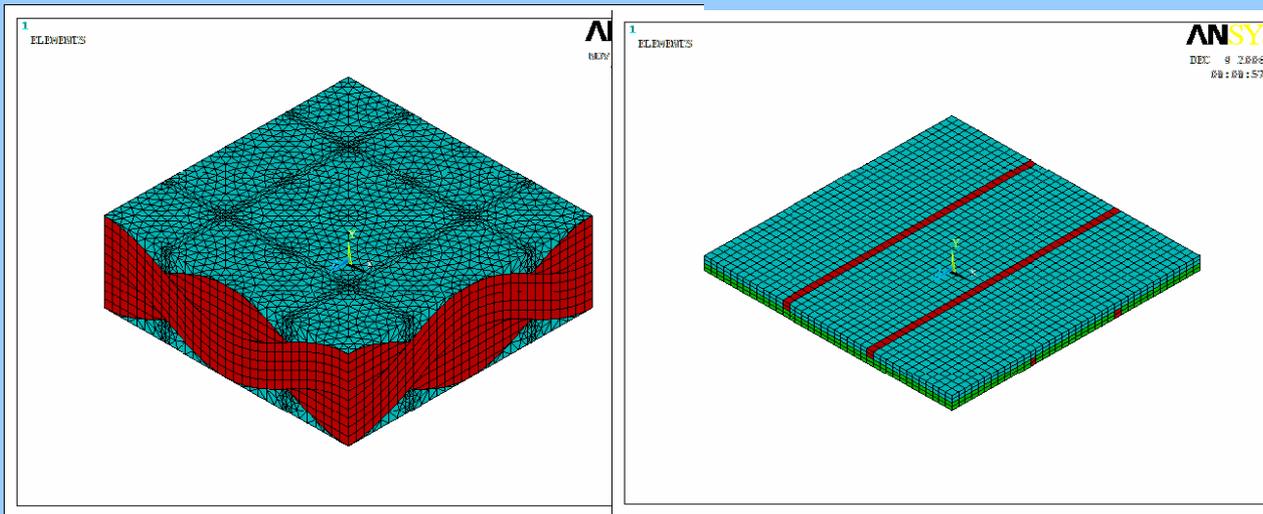
- The traditional 'metal like' design of composite structures prevents the full exploitation of the material capabilities, leading to very high cost of the final product
- Having this in mind, the Interest Group 'Increased Exploitation of Composites' has been established under the EASN structure on June 2003
- This IG is classified, according to the ACARE- ASTERA Taxonomy, under the scientific area "Aerostructures".

## General objectives of the Interest Group

- To provide missing fundamental knowledge and **tools** for achieving the strategic technological goal of full exploitation of composites in critical primary integral aircraft structures
- To establish scientific and research collaboration in the specific area of composite materials
- As a result European & International recognition of the Group as a research collaboration platform is to be expected

## Technological topics for innovative and upstream research

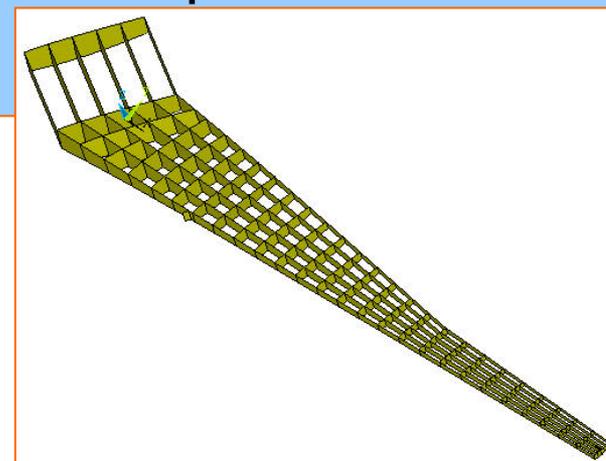
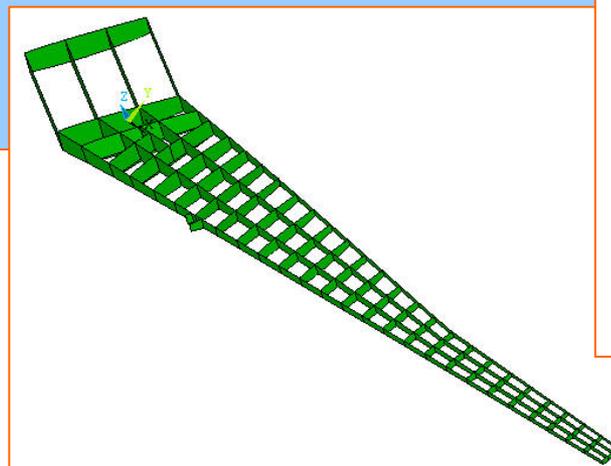
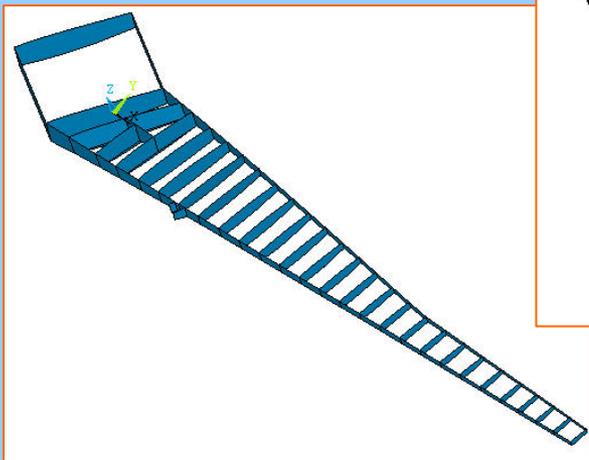
- To develop and exploit innovative superior lightweight composite systems for aerospace applications.



... from conventional UD's to woven, Non-Crimp Fabrics, 3D reinforced systems, or even to carbon nanotubes and composite nano / or cellular materials ....

## Technological topics for innovative and upstream research

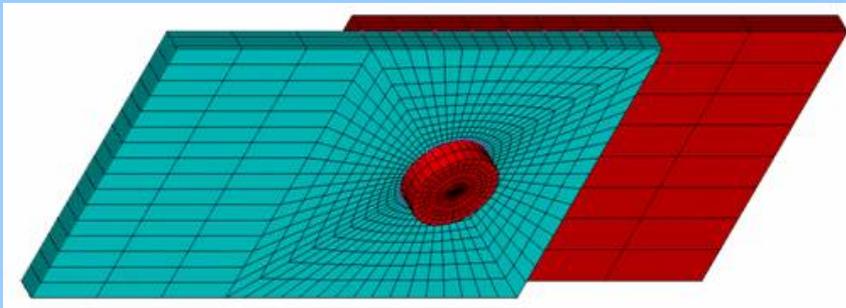
- To develop low-cost composite aircraft structures through innovative 'tailored' design concepts



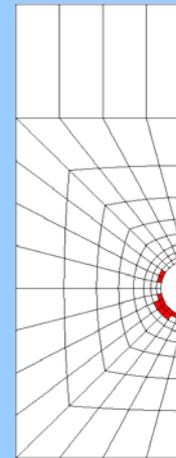
... from a two-spar towards a multi-spar composite wing...

## Technological topics for innovative and upstream research

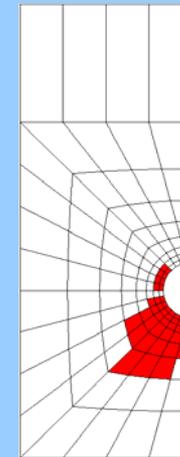
- To develop accurate prediction methodologies for damage evolution by exploiting the Progressive Damage Modelling principles in fatigue design



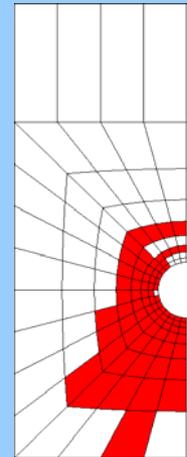
... from the low-level stressed structures towards an accurate prediction of the fatigue behaviour ...



12MPa



48MPa



81MPa

## IG-Participants

### University Partners

- LTSM, University of Patras (Greece)
- University of Pisa (Italy)
- IFL-TU Braunschweig (Germany)
- University of Limerick (Ireland)
- CTU Prague, Brno University of Technology (Czech Republic)
- LMT- Cachan, Ecole de Mines Saint- Etienne (France)
- **More ?... if you are interested you are welcome...  
EASN is a University network**

## IG-Participants

### Collaborating Research Establishments

- DLR (Germany)
- NLR (The Netherlands)
- IDMEC (Portugal)
- EADS- CCR (France)
- **More ?... EASN is an open network...**

## IG-Participants

### Collaborating Aircraft manufacturers & SMEs

- Airbus (France)
- Physical Acoustics LTD, (UK)
- INASCO (Greece)
- **More ?... EASN promotes collaboration to the industry and SMSs...**

## Activities so far - general

- Establishment of communication routes between the partners of the Interest Group for the exchange of information and ideas relative to the scientific interests and objectives of the Interest Group
- Submission of two upstream research proposals:  
2nd FP6 call **'Increased Exploitation of Advanced Composites'**  
2nd FP7 call **'Buckling Behaviour of Impacted CFRP'**
- Contribution to the preparation of FP7, by providing research priority topics in the area of composite materials
- Preparation for proposals, ideas, through the 'Eol' procedure for the 3rd FP7 call

## Planned Future Activities

- Proceed to the preparation and submission of at least one proposal for the 3<sup>rd</sup> FP7 call (out of the proposed Eols)
- Exploitation of the existing EASN electronic platform for improving exchanging information routes and for discussing scientific, technological and educational issues of common interest
- Exploit possibilities of existing CEC instruments for strengthening cooperation within the IG, for example by:
  - Exchange of students and Scientists
  - Perform Training Activités (e.g. Marie Curie programmes) etc.

*Thank you for your attention!*

**Questions .. Proposals...?**