November 10, 2014 –
November 12, 2014
Seattle, Washington

2014 EU-US Frontiers of Engineering Symposium

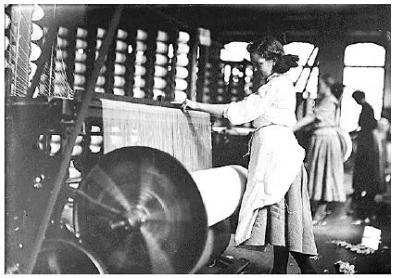
Atoms to Airplanes:

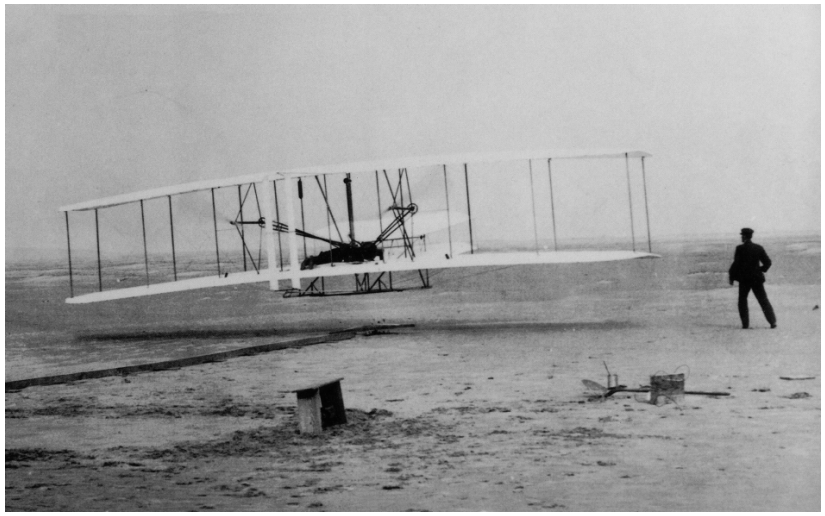
Designer/Engineered Aerospace Materials

Session co-chairs:

Dr. Weidong Song, The Boeing Company

Prof. Brian G. Falzon, Queen's University, Belfast





weaving

fabrication

Making airplanes: then (1903) and now (2008)

weaving

fabrication

Air travel 2050

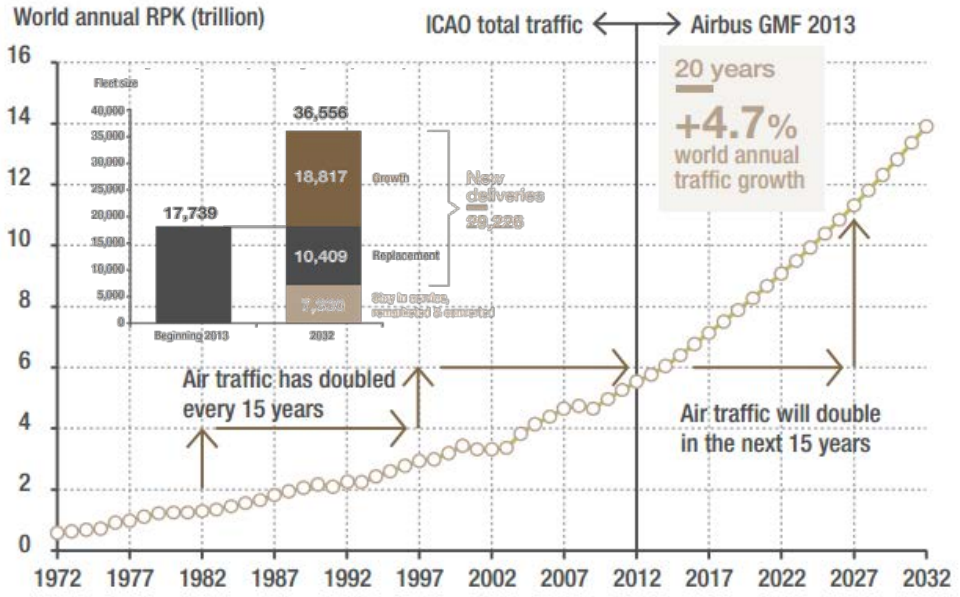
- EU Flightpath 2050 targets (wrt 2000 baseline):
  - 75% reduction in CO_2 emissions
  - 90% reduction in NO_X emissions

Weight reduction will continue to play a key role …

- 50% reduction in the cost of certification
- significant reduction in development costs

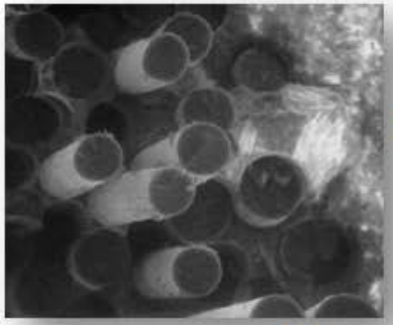
Requirement for simulation and modelling at all stages of the development cycle …

Source: Flightpath 2050: Europe's Vision for Aviation, EU, 2011

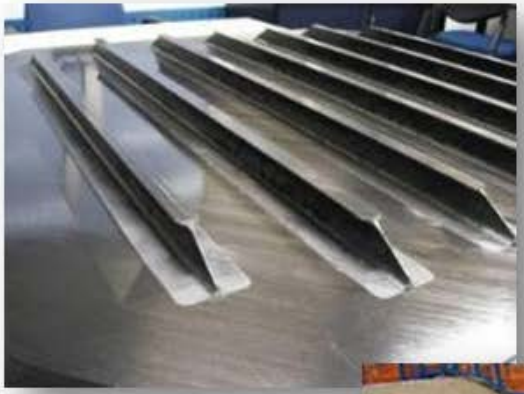


Source: Future Journeys– Global Market Forecast 2013-2032, AIRBUS, 2013

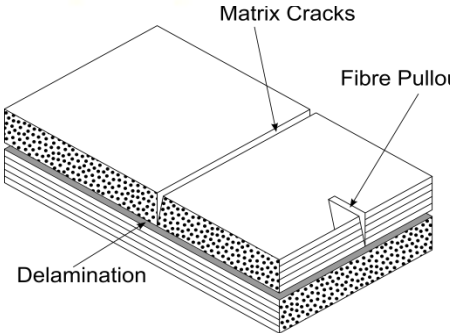
"The tyranny of scales" Oden et al. (2006)

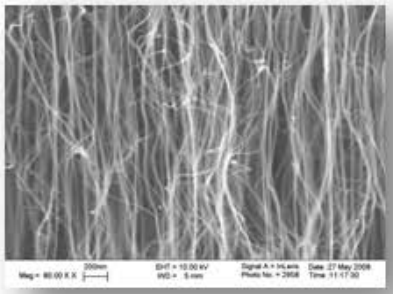


Microscale



Meso/macroscale





Nanoscale

Links between damage across scales is not well established!

Speakers

- **Prof. Ian Kinloch, University of Manchester**
  - Harnessing the unique and tremendous properties of nano-scale graphene structures to develop multifunctional composite structures.
- **Dr. Tobias Schaedler, HRL Labs**
  - Use of cellular architectures across scales leading to the development of a new class of lightweight materials with unprecedented structural properties.
- **Prof. Stephane Bordas, University of Luxembourg/Cardiff University**
  - Recent progress and challenges in the modeling of fracture of composite materials across scales.
- **William Grosse, The Boeing Company**
  - The emergence of an integrated multiscale modeling methodology for aircraft leading to highly novel and efficient design configurations.

Format

- **10:05 – 10:35 Prof. Ian Kinloch**

  10:35– 10:40 (Q & A – clarification questions only)
- **10:40 – 11:10 Dr. Tobias Schaedler**

  11:10 – 11:15 (Q & A – clarification questions only)
- **11:15 – 11:45 Prof. Stephane Bordas**

  11:45 – 11:50 (Q & A – clarification questions only)

  11:50 – 12.50 Lunch

- **12:50 – 13:20 William Grosse, The Boeing Company**

  13:20 – 13:25 (Q & A – clarification questions only)

- **13:25 – 14:00 PANEL DISCUSSION**