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PPP Information Day Brussels

Expertise related to GV

C Styles
October 2015
c.styles@soton.ac.uk

UoS in European Framework Projects

- Ranked as one of the top 15 research-intensive universities in the UK and in the top 75 of the world.
- Partner/Coordinator on ~250 FP7 projects.
- The Engineering Faculty was a Partner/Coordinator in 84 FP7 projects.
- Over 50% of our research is performed in collaboration with industry.
- Ranked 17th of all HEIs for participation in EU projects.
- Dedicated H2020 Office.
- Can act as bid manager and/or act as project coordinator.

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Human Factors Research Group

Human Factors Research Unit, ISVR, University of Southampton: capabilities

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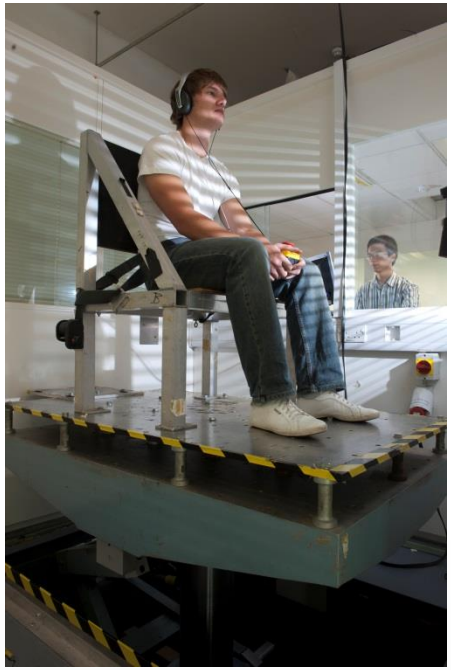


Vibration comfort studies

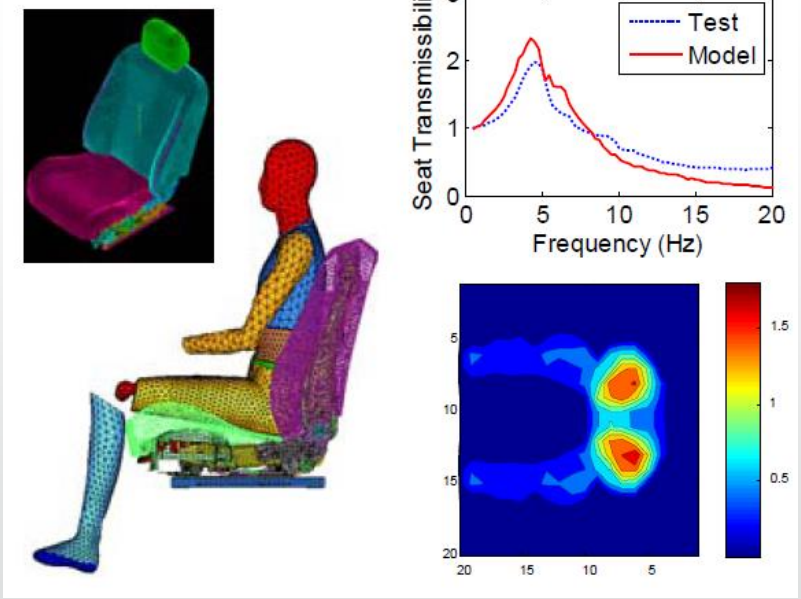
Field measurements

Seat testing

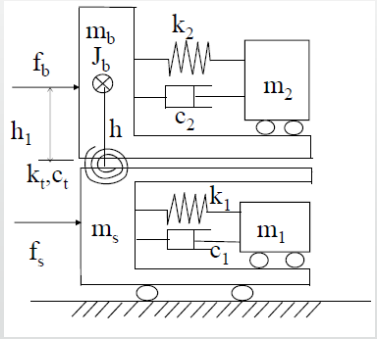
Postural stability studies

Motion sickness studies

Task performance studies

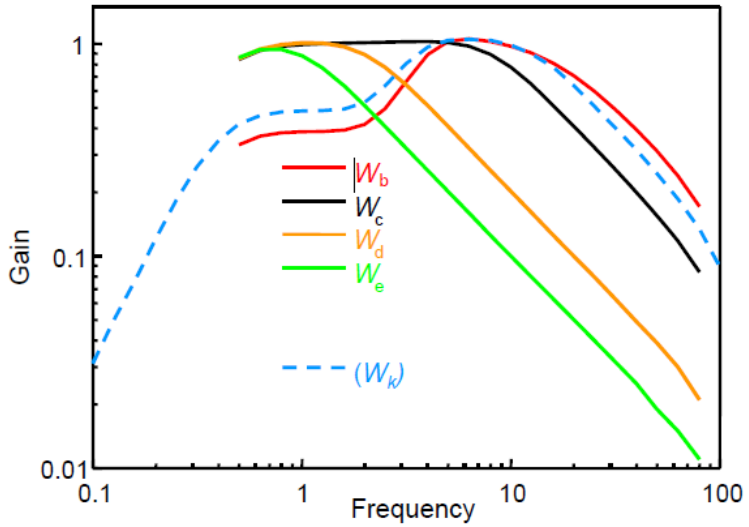


Finite element seat modelling



Human body modelling

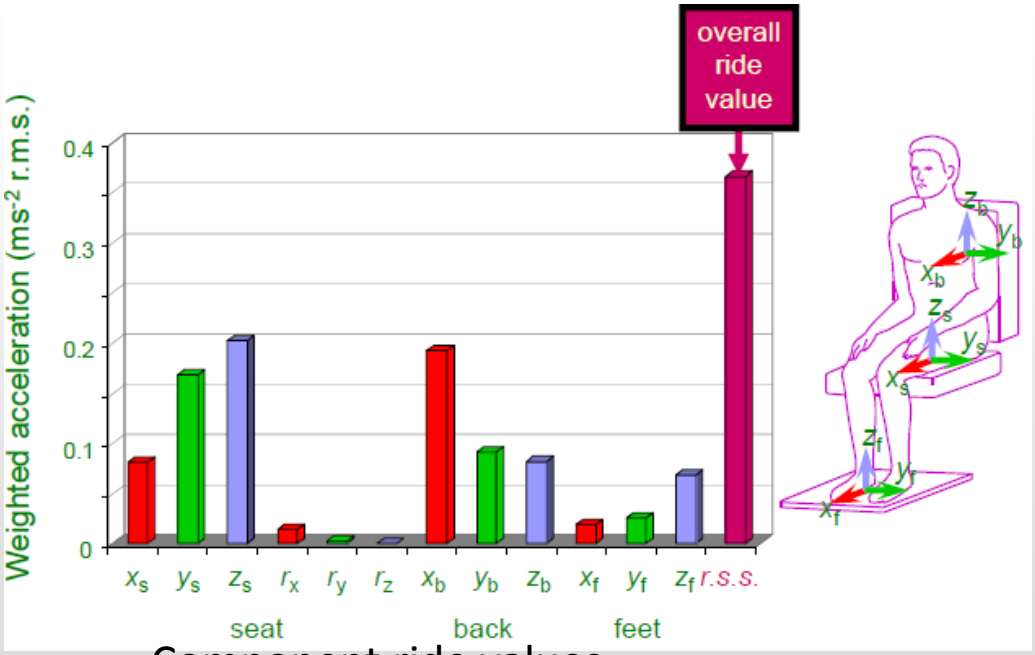
Human Factors Research Unit, ISVR, University of Southampton: research



Frequency weightings for comfort evaluation

Development of British and International standardised methods used in all EU countries:

- Predicting vibration discomfort
  e.g. ISO 2631-1 (1997), BS 6841 (1987)
- Evaluating the vibration performance of seats, e.g. ISO 10326-1 (1992)



Component ride values

Research and consultancy projects for vehicle companies and seat manufacturers to optimise vehicle motion with respect to:

- comfort
- health

Influence of:

- seating
- posture
- noise
- light-weighting

Human Factors Research Unit, ISVR, University of Southampton: Horizon2020 relevant topics

- GV-04-2017: Next generation electric drivetrains for fully electric vehicles, focusing on high efficiency and low cost
  - effects of vibration
- GV-05-2017: Electric vehicle user-centric design for optimised energy efficiency:
  - safety, comfort and well-being of vehicle occupants
  - effects of vibration, posture, noise
- GV-08-2017: Electrified urban commercial vehicles integration with fast charging infrastructure
  - comfort and safety of the vehicle occupants

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Electromechanical Research Group:

GV Topics related to electric vehicles

Active Battery Management System with built-in Fault Tolerance

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- **This will address the following two areas**:
  - Novel BMS designs with improved thermal management, cell balancing, power density and life time, safety and reliability.
  - Improved modelling and simulation tools for BMS improvement.
- **Project description**:
  - The novel BMS will include power electronics that will actively control the charging and discharging of cells, and if necessary reconfigure the battery to continue to function despite faults. Improved modelling and simulation tools will be used to inform and evaluate alternative designs and aid the development of a demonstration.

Electric Vehicle Grid Integration: Vehicle-to-Grid Functionality

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- **Project description**:
- This project will study and demonstrate the control and communications algorithms and systems necessary to implement a geographically disparate, aggregated grid scale electrical energy store, using electric vehicles (V2G system).

- Currently have large EPSRC grants including: Project on Vehicle-to-Grid (V2G, www.southampton.ac.uk/v2g) and the Centre for Doctoral Training in Energy Storage and its Applications.

- Recently won large scale project on rapid charging (up to 500kW) of electric vehicles with consideration of V2G functionality.

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Morphing Structures:

GV-09-2017 (Aerodynamic and flexible trucks)

Aeronautics and Flight Mechanics Research Group: Dr Rafic Ajaj

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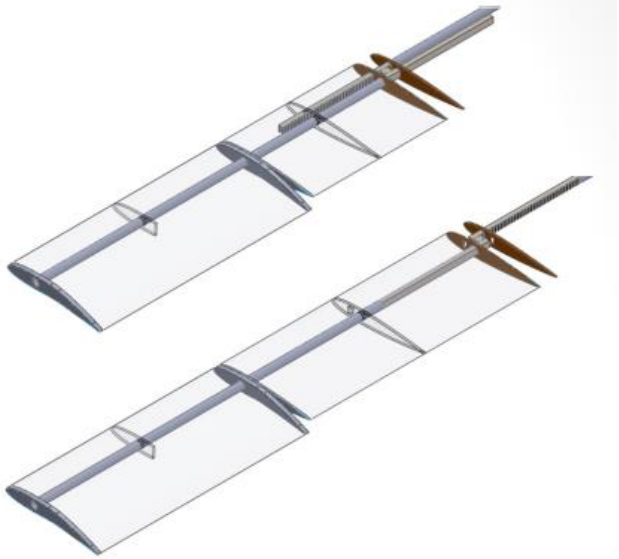
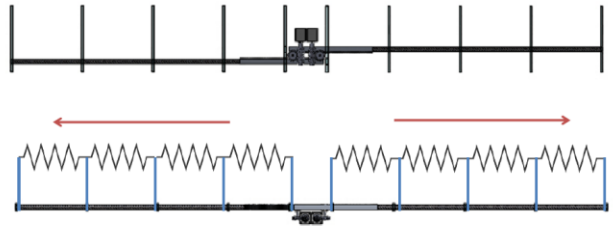
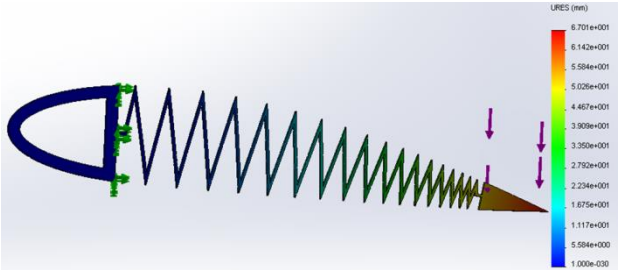
Variable Wing Span

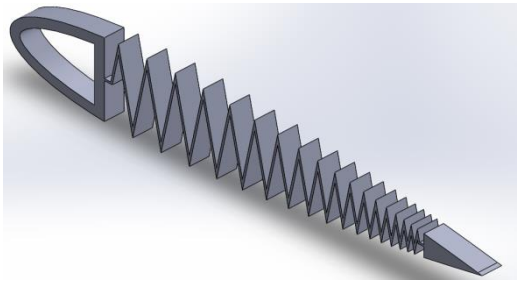


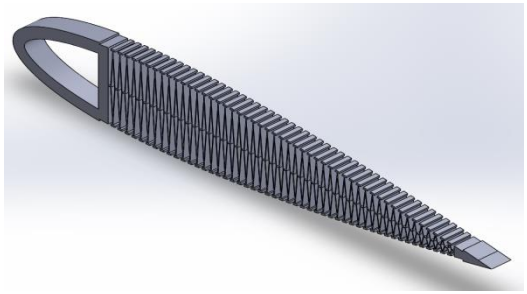


- Sliding inner ribs – Same outer spar section
- Elastic skin – Same deformation for each portion.

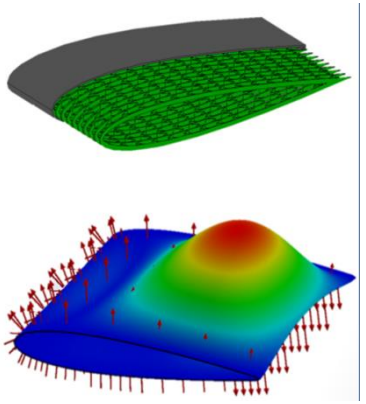
Chord/Camber morphing

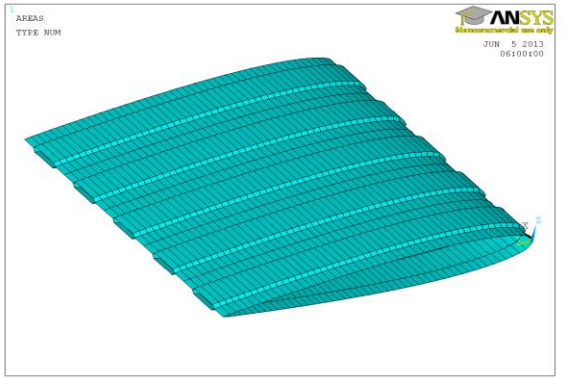






Morphing Skins





Exploitation route

- Building a UAV demonstrator that will incorporate the above technologies

Partners that you are seeking

- OEMs, End users