

# INTRODUCTION



## IISI Overview



## ULSAS Consortium Overview



## Group Lotus Overview

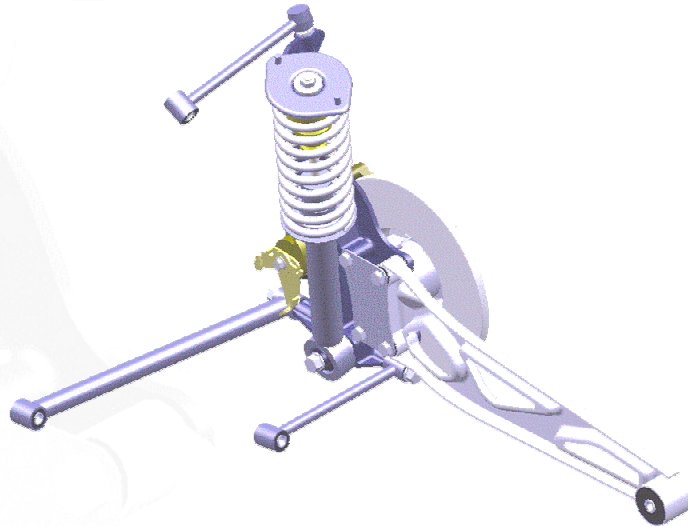
In 1997 building upon the success of other UltraLight programs, the IISI commissioned the UltraLight Steel Auto Suspension (ULSAS) project. Collectively, these activities form part of a cohesive, global steel industry strategy of meeting environmental demand for fuel efficiency, through the development of mass-optimised and recyclable products and assisting the competitiveness of its customers, the auto makers, through the provision of lightweight, cost effective engineering solutions.

The ULSAS Consortium, comprising thirty four major steel producers from fourteen countries, has commissioned Lotus Engineering, the engineering consultancy division of Group Lotus Ltd, UK, to conduct the UltraLight Steel Auto Suspension programme. Lotus was selected due to its widely recognised expertise in the arena of vehicle dynamics.

In common with all of the UltraLight series programmes, the principal objective of ULSAS is to realise and demonstrate the potential for cost effective weight reduction by exploring the full range of state of the art, yet implementation ready, steel-based material and process technologies.

In recognition of the technical diversity and impact upon vehicle layout and character, the ULSAS programme has focused exclusively upon rear suspension systems. The programme is structured in phases. This Compact Disc details primarily with work completed during the Concept Design Phase (Phase 2) of the project. A separate Compact Disc details the work completed during the Benchmarking and Initial Design Concepts' Phase (Phase 1) although Phase 1 results are overviewed on this Compact Disc.

## ULSAS - PROJECT BACKGROUND



### **UltraLight Steel Auto Suspension**

In 1997, under the umbrella of the IISI, a world wide Consortium of major steel producers was formed to commission the UltraLight Steel Auto Suspension (ULSAS) programme. This initiative was the third lightweight steel project of this kind.

Building upon the success of the other Consortium funded programmes the UltraLight Steel Auto Suspension activities form part of a cohesive, global steel industry strategy of meeting environmental demand for fuel efficiency, through the development of mass-optimised and recyclable products and assisting the competitiveness of its customers, the auto makers, through the provision of lightweight, cost effective engineering solutions

## PROJECT DRIVERS

### AUTOMOTIVE INDUSTRY TRENDS:

#### LOWER MASS

- Due to fuel efficiency requirements and environmental awareness

#### COST REDUCTION

- Influenced by increased competition

#### IMPROVED SAFETY

- Increasing emphasis on passive safety

#### HIGHER EFFICIENCY

- Increasing customer demands for space practicality and economy



The demand for lower mass is being driven by the increased environmental awareness of the vehicle consumer. Improvement in fuel efficiency is a primary objective coupled with the responsible usage of natural resources and their resultant 'through life' impact on the environment.

The demand for cost reduction by the Automotive Industry is a function of the competitive nature of the global market. It is the responsibility of the Steel Industry to respond to this challenge, such that vehicle producers and their supplier base can realize their objectives in a cost effective and competitive manner.

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The demands for higher levels of safety are being driven by both the customer expectations and the legislative requirements. The vehicle producers are now being forced to look at passive safety features to avoid accidents as well as the more traditional areas of body crash behaviour. These passive safety features include such things as ABS, stability control systems and also increasing demands for suspension systems with high levels of performance, stability, and refinement. The reduction of driver fatigue is seen by many as a fundamental requirement in improving safety, so further pressure is placed on the manufacturer to make quieter, easier to drive vehicles.

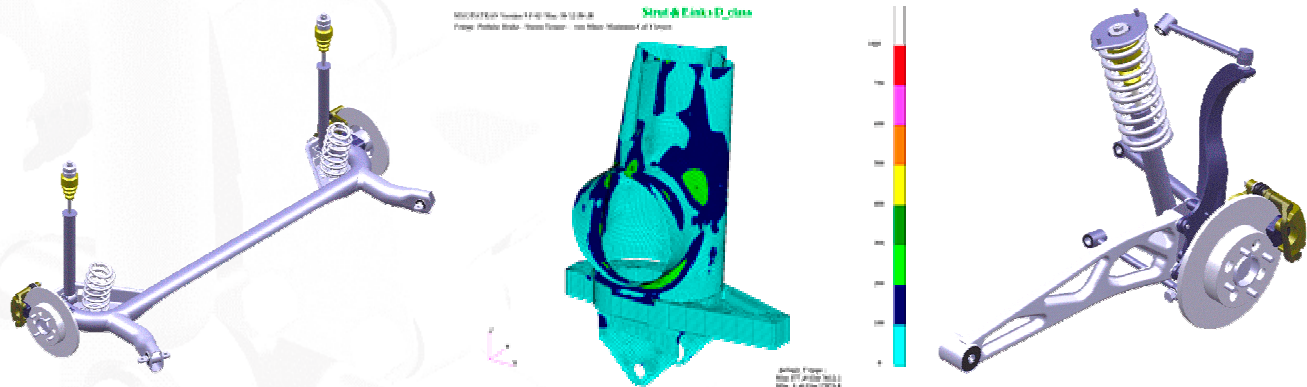
At the same time, the end customers are also expecting ever increasing levels comfort and space inside the vehicle and improved practicality for everyday use.



## ULSAS OBJECTIVE



- Identify the potential for optimised cost effective, and lightweight steel based solutions.
- To promote & explore the full range of steel product and process technologies.
- Develop suspension system concepts that meet or exceed modern standards of performance and efficiency
- To assist the competitiveness of its customers.



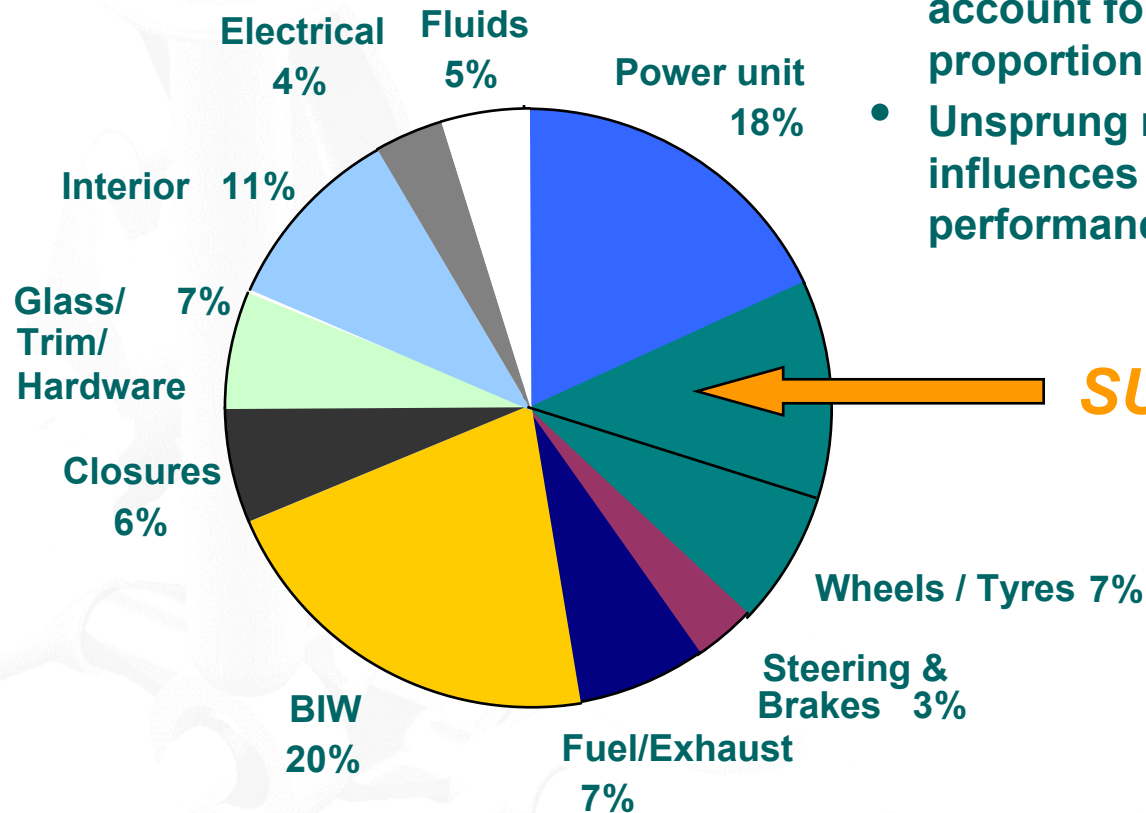
In common with all of the UltraLight series programmes, the principal objective of ULSAS is to realise and demonstrate the potential for cost effective weight reduction by exploring the full range of state of the art, yet implementation ready, steel-based material and process technologies.

The Consortium recognises that automakers face a continuing challenge to reduce mass while remaining competitive and satisfying a variety of legislative, technical, environmental and consumer demands. The highly competitive and global nature of the Automotive business increases the industry demands for enabling technologies.

## PROJECT DRIVERS



### MASS BREAKDOWN OF TYPICAL PASSENGER CAR:



- Suspension systems account for a significant proportion of vehicle mass.
- Unsprung mass directly influences vehicle dynamic performance.

A mass breakdown of a typical volume production passenger car is illustrated. The overall mass of the vehicle is dominated by the body structure (20%), followed by the power unit (18%) and then the suspension systems (12%).

Unsprung mass directly influences vehicle dynamic performance. Therefore, weight savings identifiable in this area are of particular significance to the automakers.