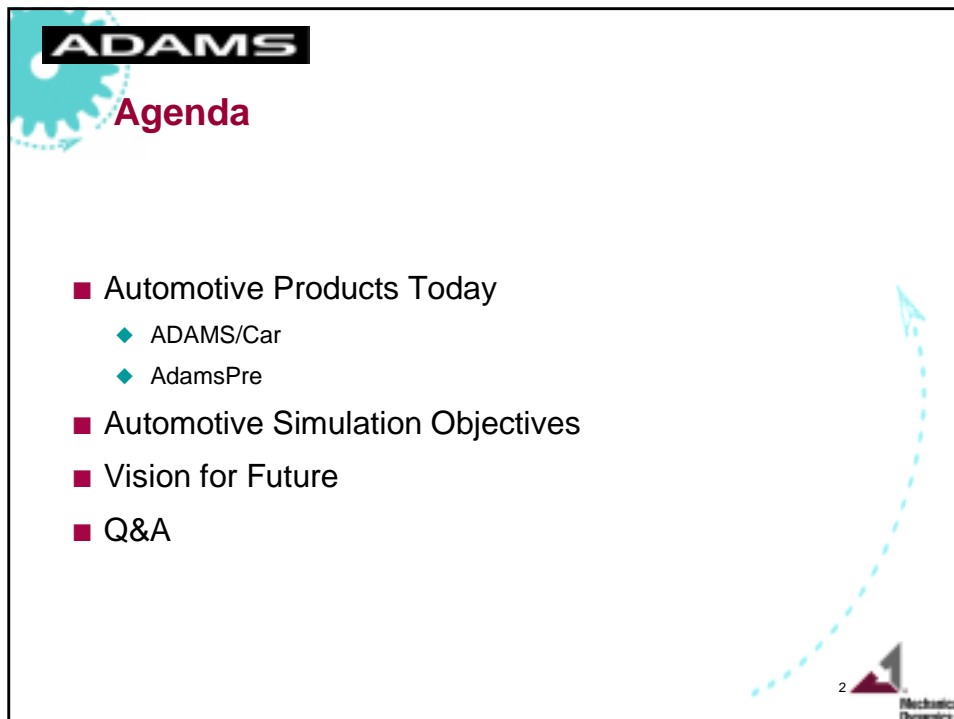
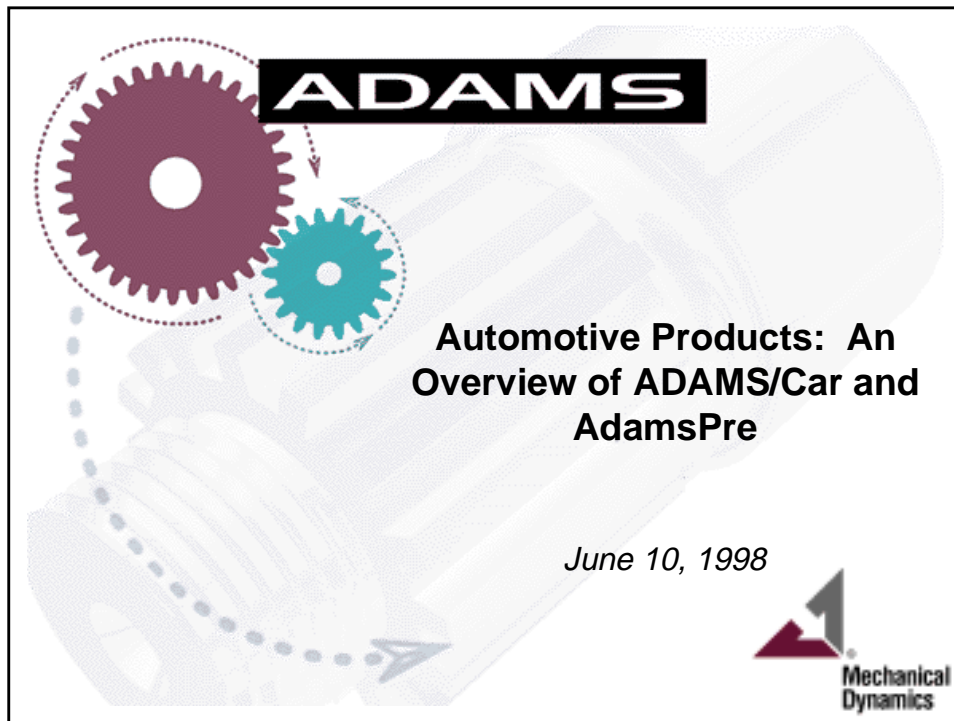


# Automotive Products: An Overview of ADAMS/Car and AdamsPre




## Automotive Products: An Overview of ADAMS/Car and AdamsPre

**ADAMS**

### History of ADAMS/Car

- Formed the ADAMS/Car consortium (1993)



The image displays the logos of four automotive manufacturers: Audi (four interlocking rings), Renault (diamond logo), BMW (roundel logo), and Volvo (blue and silver rectangular logo). Each logo is accompanied by a small photograph of a car from that brand.

- Set goals and requirements for ADAMS/Car

3 Mechanical Dynamics


**ADAMS**

### History of AdamsPre

- Developed by StatDesign, Inc. and Ford Motor Company (1992)
- StatDesign and AdamsPre acquired by MDI October 1997
- AdamsPre supported by MDI


4 Mechanical Dynamics


# Automotive Products: An Overview of ADAMS/Car and AdamsPre



## ADAMS/Car Customers


<ul style="list-style-type: none"> <li>■ Arrows Grand Prix International</li> <li>■ Audi AG</li> <li>■ Bayerische Motorenwerke AG</li> <li>■ Benteler AG</li> <li>■ BTR Anti Vibration Systems</li> <li>■ Continental AG</li> <li>■ Fiat Auto - Alfa Romeo</li> <li>■ French Department of Defense</li> <li>■ Goodyear Tire and Rubber Co.</li> <li>■ Isuzu</li> <li>■ ITT Automotive Europe GmbH</li> <li>■ Joint Stock Company "UAZ"</li> </ul>	<ul style="list-style-type: none"> <li>■ Newman/Haas Racing</li> <li>■ Nissan Motor Co., Ltd.</li> <li>■ Renault</li> <li>■ Rover Group PLC</li> <li>■ Samsung</li> <li>■ SMH-Automobile</li> <li>■ Steyr-Daimler Puch AG</li> <li>■ Tarok Mernokiroba BT</li> <li>■ Toyota</li> <li>■ TWR Engineering</li> <li>■ Volkswagen AG</li> <li>■ Volvo</li> <li>■ Williams Grand Prix Ltd.</li> </ul>
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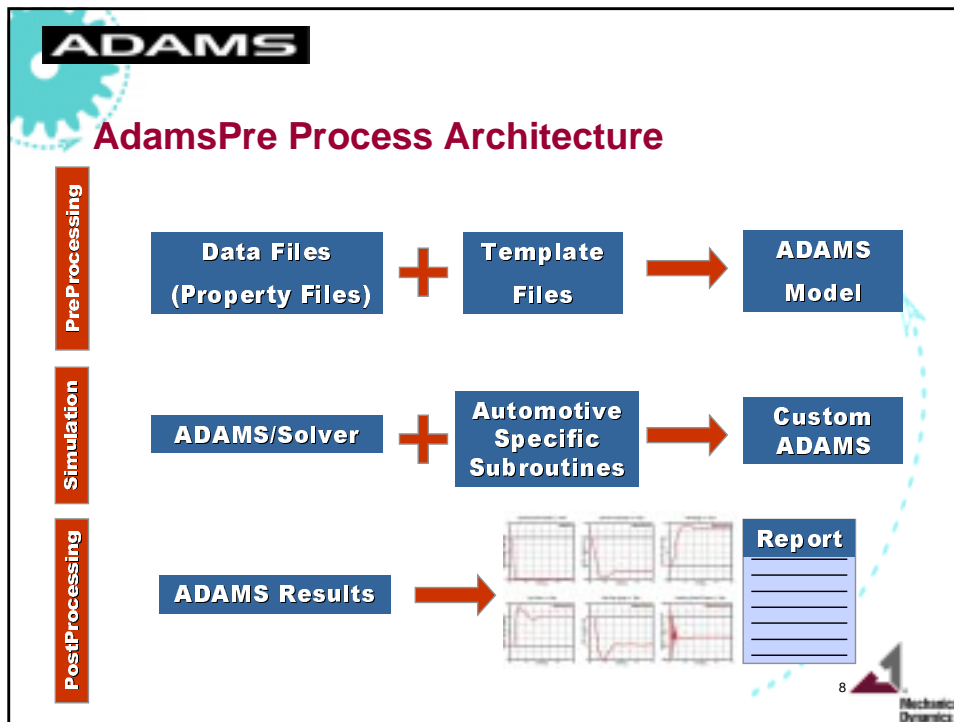
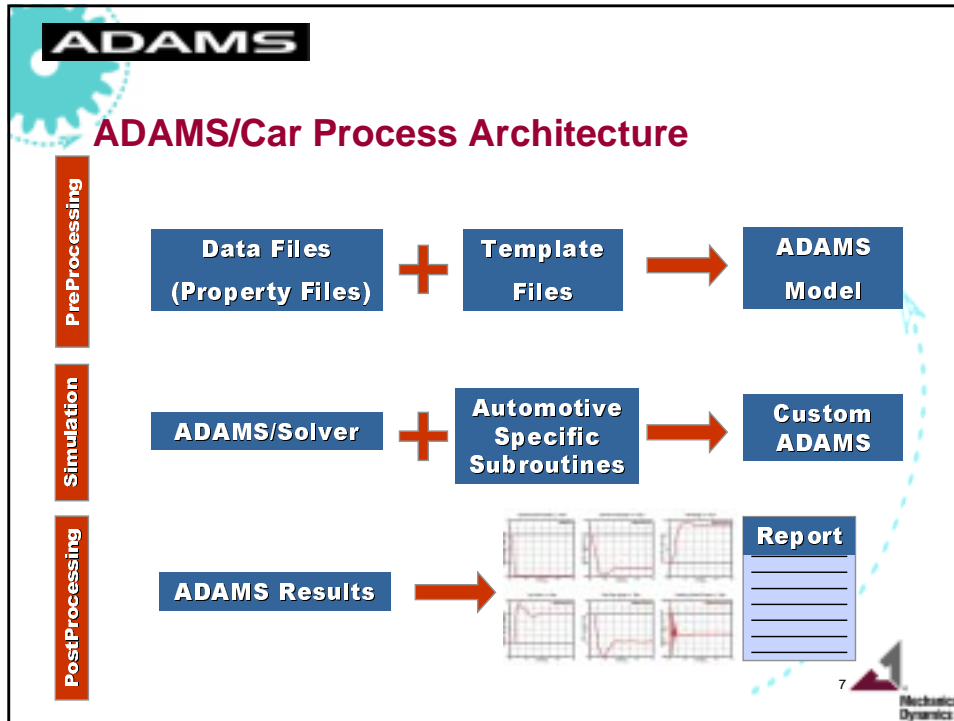


## AdamsPre Customers



<h3 style="color: blue; margin-top: 10px;">Ford Installed Sites</h3> <ul style="list-style-type: none"> <li>■ <b>North America</b> <ul style="list-style-type: none"> <li>◆ Large Luxury Car</li> <li>◆ Truck</li> <li>◆ Tools and Methods</li> <li>◆ Road Load Methods Group</li> <li>◆ Road Load Acquisition Group</li> </ul> </li> <li>■ <b>Australia</b> <ul style="list-style-type: none"> <li>◆ Vehicle Dynamics</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ <b>England</b> <ul style="list-style-type: none"> <li>◆ Dunton: Vehicle Dynamics</li> <li>◆ Dunton: Durability</li> <li>◆ Dunton: Powertrain</li> </ul> </li> <li>■ <b>Germany</b> <ul style="list-style-type: none"> <li>◆ Merkenich: Small Car VC</li> <li>◆ Merkenich: Durability</li> <li>◆ Aachen: Research Center</li> </ul> </li> </ul>
<h3 style="color: blue; margin-top: 10px;">Jaguar</h3> <ul style="list-style-type: none"> <li>◆ Vehicle Dynamics</li> <li>◆ Durability</li> </ul> <h3 style="color: blue; margin-top: 10px;">Mazda</h3> <ul style="list-style-type: none"> <li>◆ Vehicle Dynamics</li> </ul> <h3 style="color: blue; margin-top: 10px;">Stewart Grand Prix</h3> <ul style="list-style-type: none"> <li>◆ Race Support</li> </ul>	<h3 style="color: blue; margin-top: 10px;">Hankook Tire</h3> <ul style="list-style-type: none"> <li>◆ Vehicle Dynamics</li> </ul> <h3 style="color: blue; margin-top: 10px;">Bridgestone/Firestone</h3> <ul style="list-style-type: none"> <li>◆ Vehicle Dynamics</li> </ul>



# Automotive Products: An Overview of ADAMS/Car and AdamsPre





## Automotive Products: An Overview of ADAMS/Car and AdamsPre





### ADAMS/Car Strengths

- Template creation
- Modular products (ADAMS/Tire, ADAMS/Driver, etc.)
- Object-oriented conceptual architecture





9 




### AdamsPre Strengths

- Rapid Simulation
- Redesign




10 

## Automotive Products: An Overview of ADAMS/Car and AdamsPre

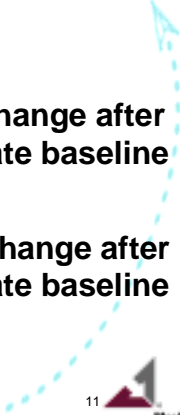



### Virtual Prototyping Capability


■ Levels of analysis capability:



- ◆ Predictive without hardware
- ◆ Magnitude prediction of design change after hardware has been used to validate baseline
- ◆ Directional prediction of design change after hardware has been used to validate baseline
- ◆ Incomplete analysis capability



11 




### Analysis Capability


■ To move up the scale:

- ◆ Provide complete analysis capability (tire models, bushing models, friction, flexible bodies, etc.)
- ◆ Prove that correct equations are being solved (Constant Radius event has all the right modeling elements)
- ◆ Prove that correct data is being used



■ Ongoing validation

- ◆ Consistent modeling methods
- ◆ Series of design analysis




12 


# Automotive Products: An Overview of ADAMS/Car and AdamsPre





## VISION: Overview

- Best of all worlds
  - ◆ ADAMS/Car
    - Custom model building
    - Template creation
    - Modular products
    - Object-oriented conceptual architecture
  - ◆ ADAMS/Pre
    - Rapid simulation
    - Redesign
- Extend functionality
  - ◆ Powertrain
  - ◆ NVH; ride quality; safety; durability
- Embed in CAD solutions





13 



## VISION: ADAMS/View Basic Toolset

- Transition to the following architectural modules:
  - ◆ Post processing
  - ◆ Parametrics engine
  - ◆ Solver
  - ◆ Graphical interface



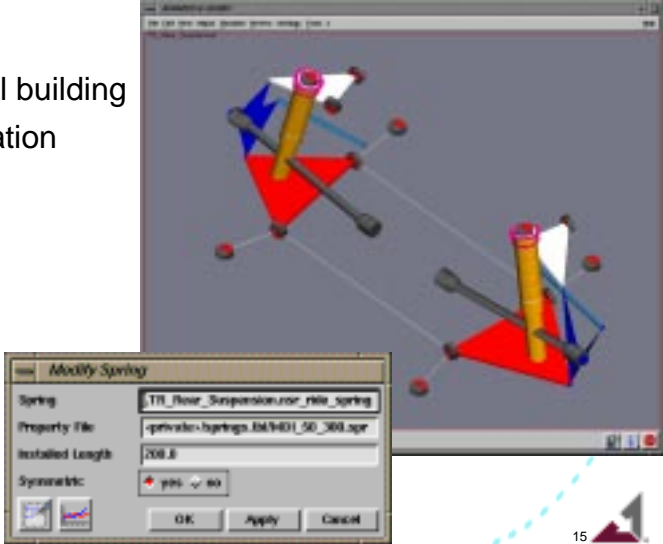
14 

## Automotive Products: An Overview of ADAMS/Car and AdamsPre

**ADAMS**

### VISION: Template Builder

- Custom model building
- Template creation
- User modes:
  - ◆ Graphical
  - ◆ Textual




The screenshot shows the ADAMS software interface. The main window displays a 3D model of a suspension system with various components like springs, dampers, and control arms. A dialog box titled 'Modify Spring' is open in the foreground, showing fields for 'Spring' (TTI\_Rear\_Suspension.ror\_rile\_spring), 'Property File' (-private-hsprings.tti401\_50\_300.spr), 'Installed Length' (200.E), and 'Synthetic' (y/n). The dialog has 'OK', 'Apply', and 'Cancel' buttons. The number '15' and the 'Mechanical Dynamics' logo are visible in the bottom right corner.

**ADAMS**

### Template Builder Customer Base

- Engineers involved with concept design
- Core methods groups
- Engineers wanting graphical feedback

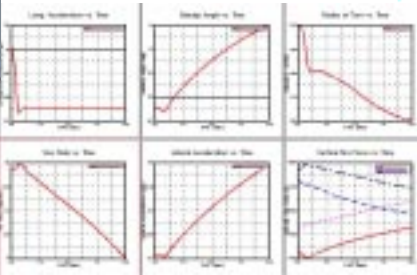
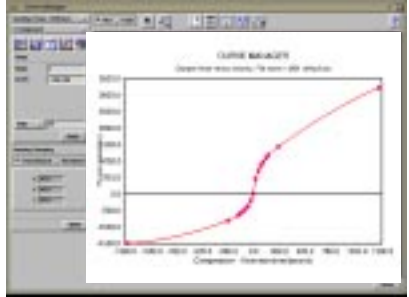



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## Automotive Products: An Overview of ADAMS/Car and AdamsPre

**ADAMS**

**VISION: Rapid Simulation**




- Virtual test set-up
- Data manipulation
- Results interpretation
- DOE

17 

**ADAMS**

**Rapid prototyping user base**

- Design & development engineers
- Analysis groups providing feedback to design team
- Design studies using corporate modeling methods

18 

**Automotive Products:  
An Overview of ADAMS/Car and AdamsPre**

**ADAMS**

**ADAMS/Car and AdamsPre**

Questions and Answers