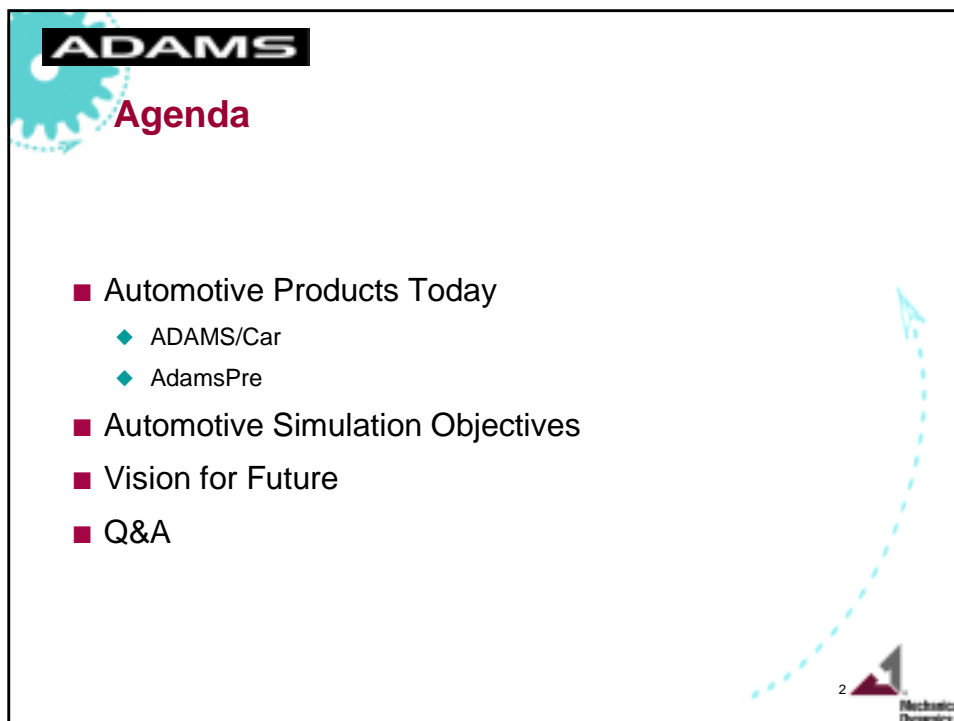
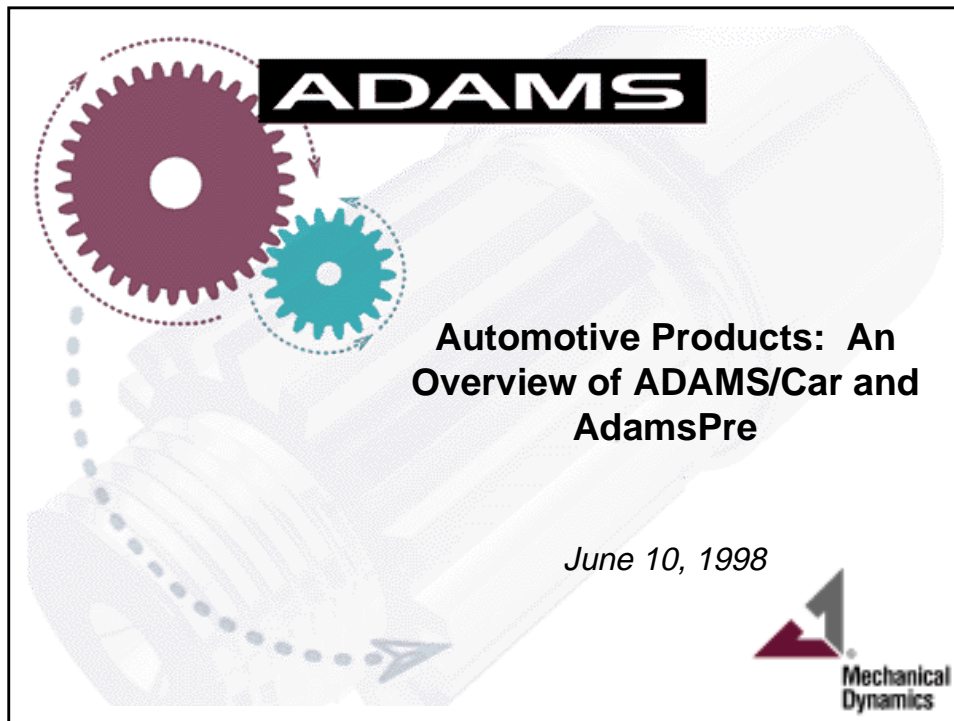


Automotive Products: An Overview of ADAMS/Car and AdamsPre




Automotive Products: An Overview of ADAMS/Car and AdamsPre

ADAMS


History of ADAMS/Car

- Formed the ADAMS/Car consortium (1993)



The image displays logos for Audi, Renault, BMW, and Volvo. Audi is represented by four interlocking rings and the word 'Audi'. Renault is shown with its diamond logo and the word 'RENAULT'. BMW is the circular logo with blue and white quadrants and the letters 'BMW'. Volvo is the word 'VOLVO' in white on a blue rectangular background.


- Set goals and requirements for ADAMS/Car

3 


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 


Automotive Products: An Overview of ADAMS/Car and AdamsPre



ADAMS/Car Customers

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






AdamsPre Customers

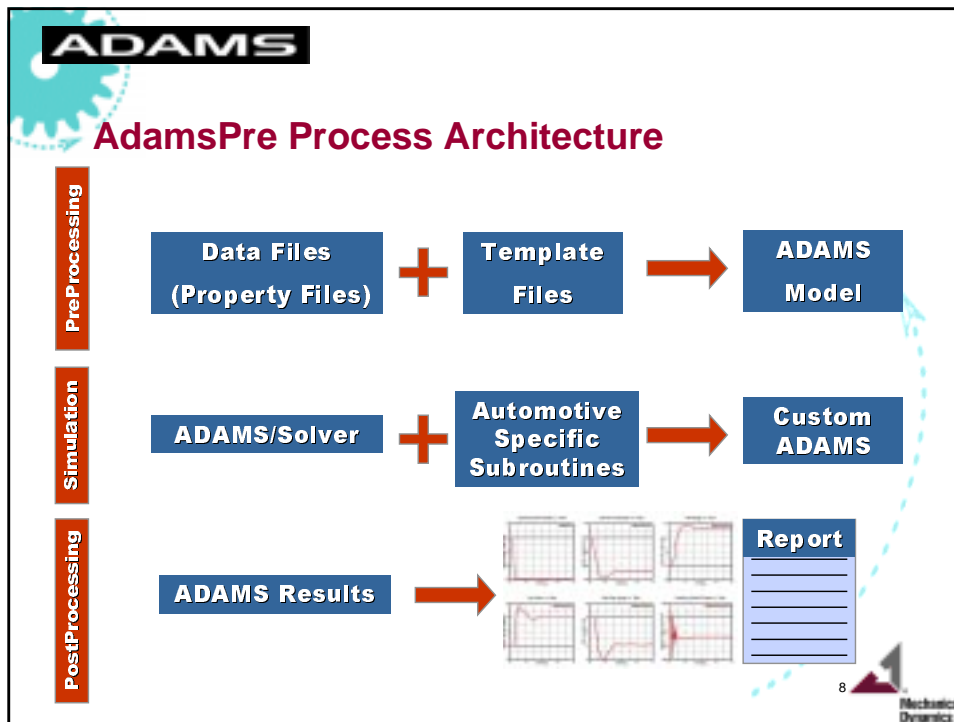
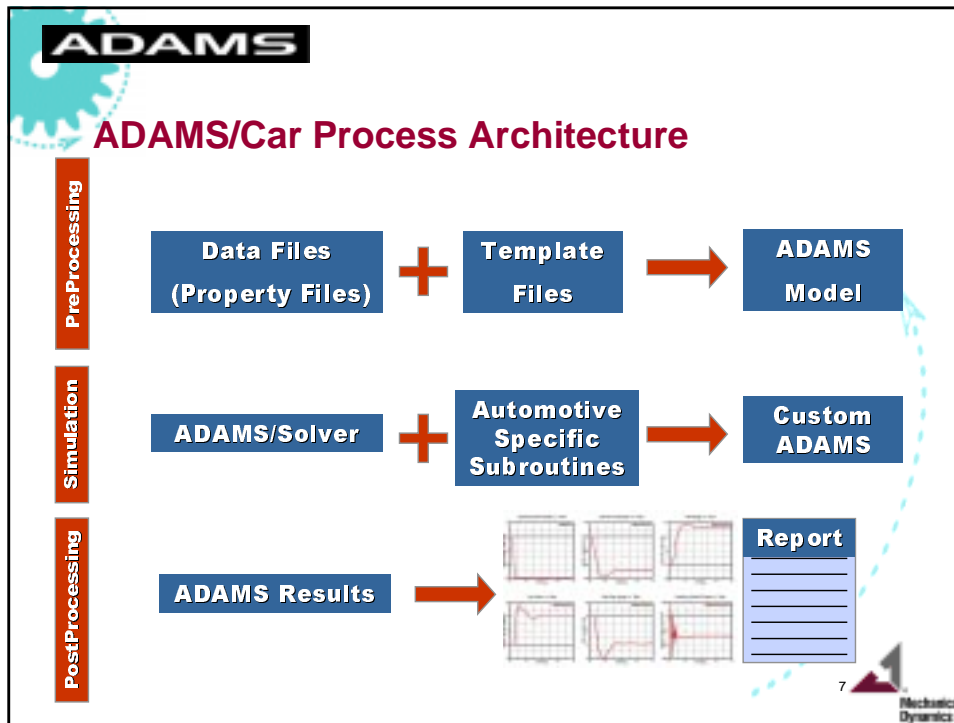
Ford Installed Sites

<ul style="list-style-type: none"> ■ North America <ul style="list-style-type: none"> ◆ Large Luxury Car ◆ Truck ◆ Tools and Methods ◆ Road Load Methods Group ◆ Road Load Acquisition Group ■ Australia <ul style="list-style-type: none"> ◆ Vehicle Dynamics 	<ul style="list-style-type: none"> ■ England <ul style="list-style-type: none"> ◆ Dunton: Vehicle Dynamics ◆ Dunton: Durability ◆ Dunton: Powertrain ■ Germany <ul style="list-style-type: none"> ◆ Merkenich: Small Car VC ◆ Merkenich: Durability ◆ Aachen: Research Center
--	---



<h3 style="color: blue;">Jaguar</h3> <ul style="list-style-type: none"> ◆ Vehicle Dynamics ◆ Durability <h3 style="color: blue;">Mazda</h3> <ul style="list-style-type: none"> ◆ Vehicle Dynamics <h3 style="color: blue;">Stewart Grand Prix</h3> <ul style="list-style-type: none"> ◆ Race Support 	<h3 style="color: blue;">Hankook Tire</h3> <ul style="list-style-type: none"> ◆ Vehicle Dynamics <h3 style="color: blue;">Bridgestone/Firestone</h3> <ul style="list-style-type: none"> ◆ Vehicle Dynamics
--	--



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

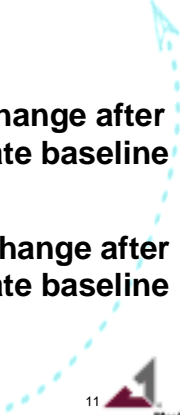



Virtual Prototyping Capability


■ 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



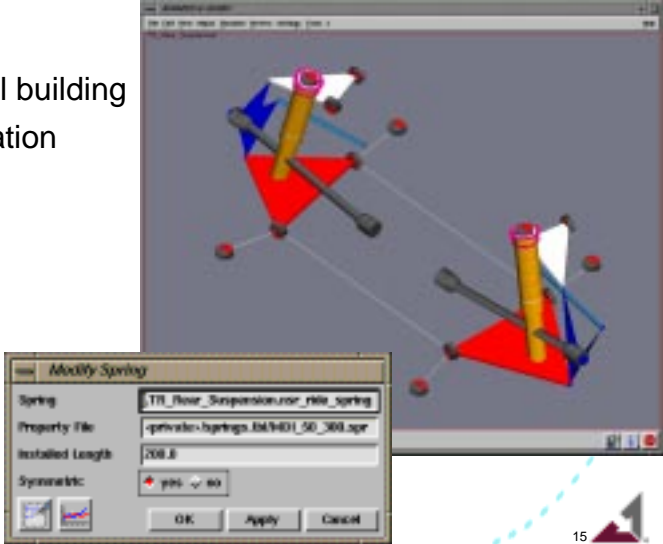
14 

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 box has 'OK', 'Apply', and 'Cancel' buttons. The number '15' is visible in the bottom right corner of the slide.

15 Mechanical Dynamics

ADAMS

Template Builder Customer Base

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



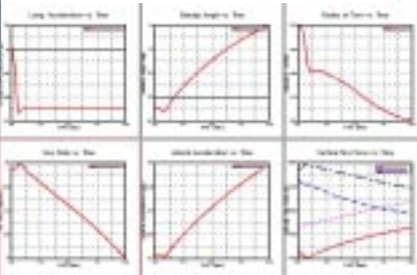
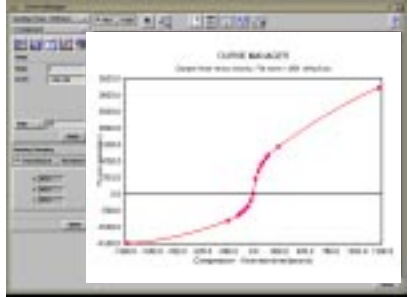

The screenshot shows the ADAMS software interface. The main window displays a 3D model of a suspension system with various components like springs, dampers, and control arms. A dialog box titled 'Modify Spring' is open in the foreground, showing fields for 'Spring' (TTI_Rear_Suspension.ror_rile_spring), 'Property File' (-private-hsprings.tti401_50_300.spr), 'Installed Length' (200.E), and 'Synthetic' (y/n). The dialog box has 'OK', 'Apply', and 'Cancel' buttons. The number '16' is visible in the bottom right corner of the slide.

16 Mechanical Dynamics


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