Personal Lines Model Year and Symbol Rating

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Discussion Topics

- Concerns with the Current System
- Predictive Modeling Applications
- Crash Simulation
- Telematics

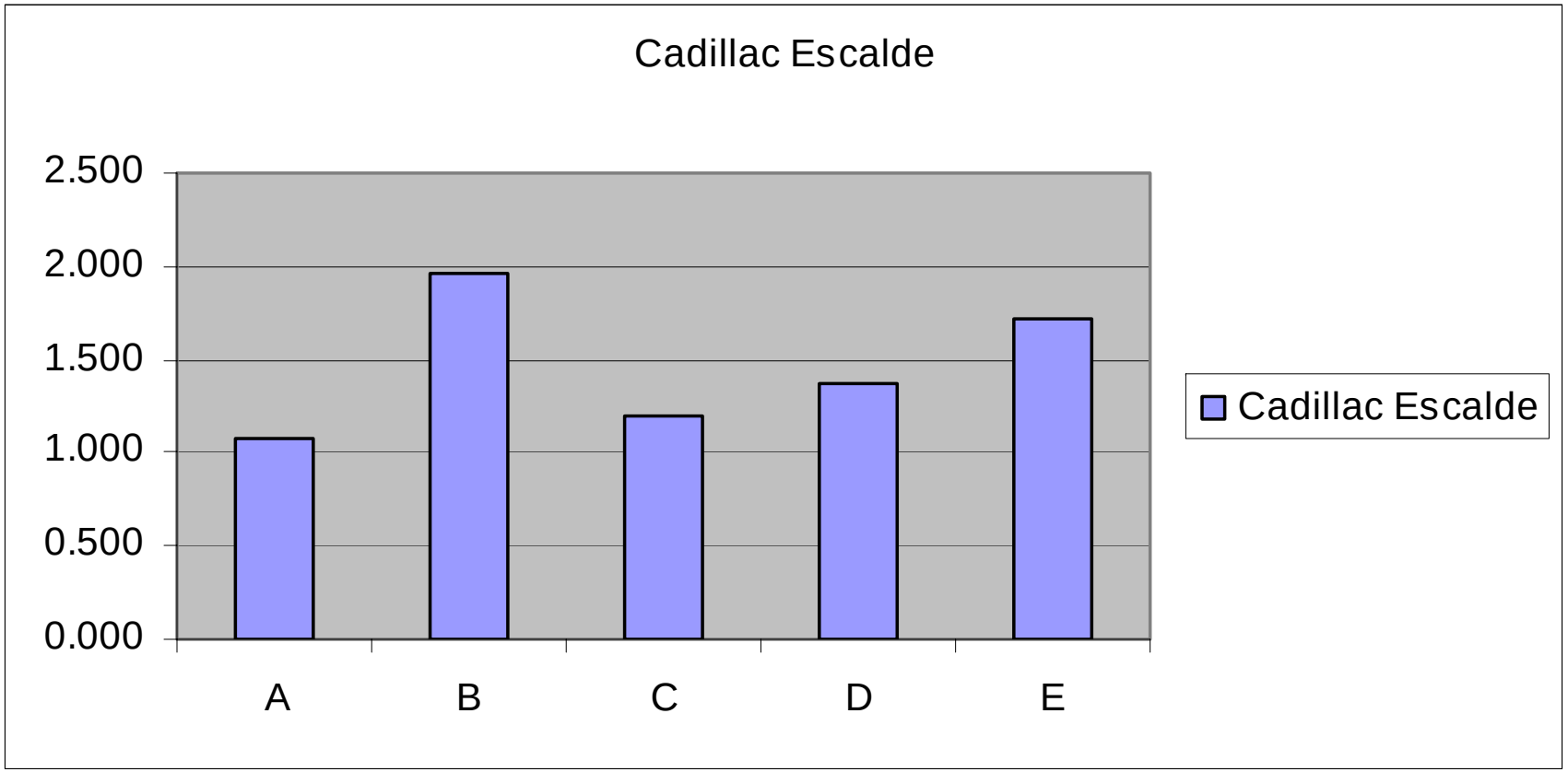
Concerns With the Current System

- The ability to use Model Year effectively together with specific models has not been realized.
  - E.G. If the 1995 Saturn SL or 2003 Cadillac Escalade has the highest theft rate as recently published – shouldn't it have a higher rate than the later models?

Concerns With the Current System

- New Vehicles are usually rated by "comparison to similar" existing vehicle – becoming less accurate as new, different vehicle type are being introduced.
  - "Of the 324 models out there for 2005—by our estimation—64 qualify as all new." – ***Car and Driver Magazine***

Significant Differences By Company



Concerns With the Current System

- Comprehensive and Collision frequently have the same symbol assignments, although different perils apply.
- Many companies still are not applying to Liability and Medical coverages.
- Since typically not GLM based, doesn't reflect interactions properly – E.G. 2 vs. 4 door vehicles.

Predictive Modeling Applications

- Hypothesis – The use of GLM applied to vehicle classifications (to form a “Modified Vehicle Classification Approach”) would better determine vehicle groups.

Predictive Modeling Applications

- Advantages of Using Predictive Modeling for Symbol Rating
  - Easier to rate newer vehicle types.
  - More accurate reflections of safety equipment and other vehicle characteristics.
  - Reflection by specific model year of a vehicle's actual loss potential

Predictive Modeling Applications

- Advantages of Using Predictive Modeling for Symbol Rating (cont'd)
  - For physical damage coverages, and now Liability and PIP symbol can account for significant differences in rates between different insureds.
  - Get leg up on competition that don't use GLM.
  - Obviates some credibility issues.

Predictive Modeling Applications

- Data Bases
  - R.L. Polk vehicle characteristics
  - Highway Loss Data Institute vehicle data
  - Crash test information

Predictive Modeling Applications

- The Process
  - Append vehicle information to internal database.
  - Determine effect of each variable on expected losses
  - Group vehicles based on loss potential
  - Append vehicle class to rating database
  - Determine final relativities

Crash Simulation

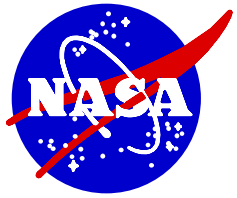
- Crashport
  - A Tec-Masters, Inc. venture
  - Most advanced, biomechanical, auto accident injury analysis platform
  - Built on automotive-industry virtual prototyping platform
  - Database of over 10,000 vehicles with key physical properties
  - ISO 9001 certified

Crash Simulation

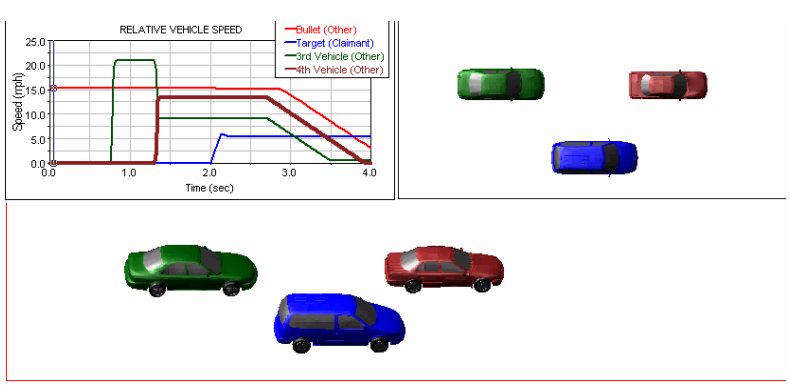
- Tec-Masters, Inc.
  - Tec-Masters (parent company) employs 300 engineers and scientists.
  - Automotive division specializes in mathematical modeling of vehicle crash and vehicle crash sensing systems.
  - Substantial expertise in dealing with complex data analysis, including expert systems, neural networks, simulation and validation of complex weapons systems, nation defense systems.

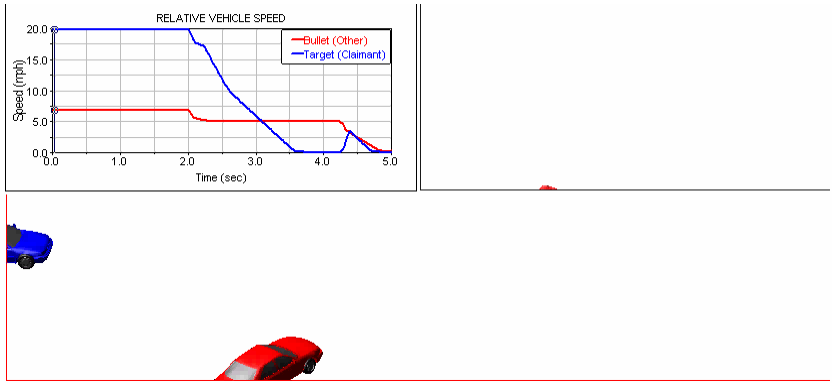
ENGINEERING CLIENTS (TEC-MASTERS)

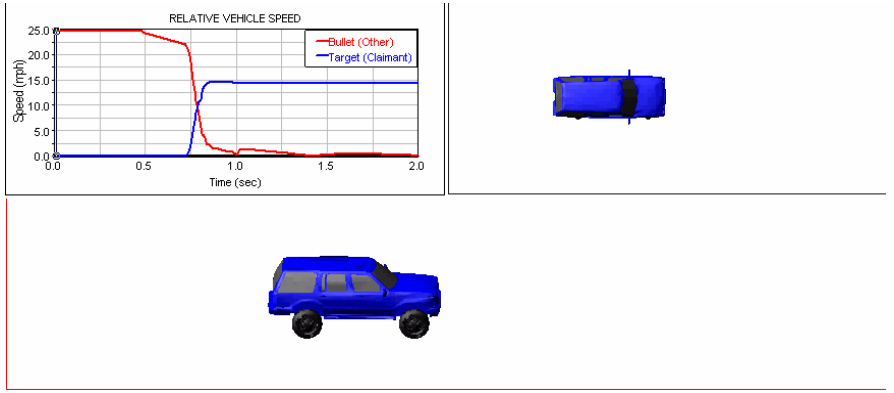
DOT



SIMULATION SAMPLES

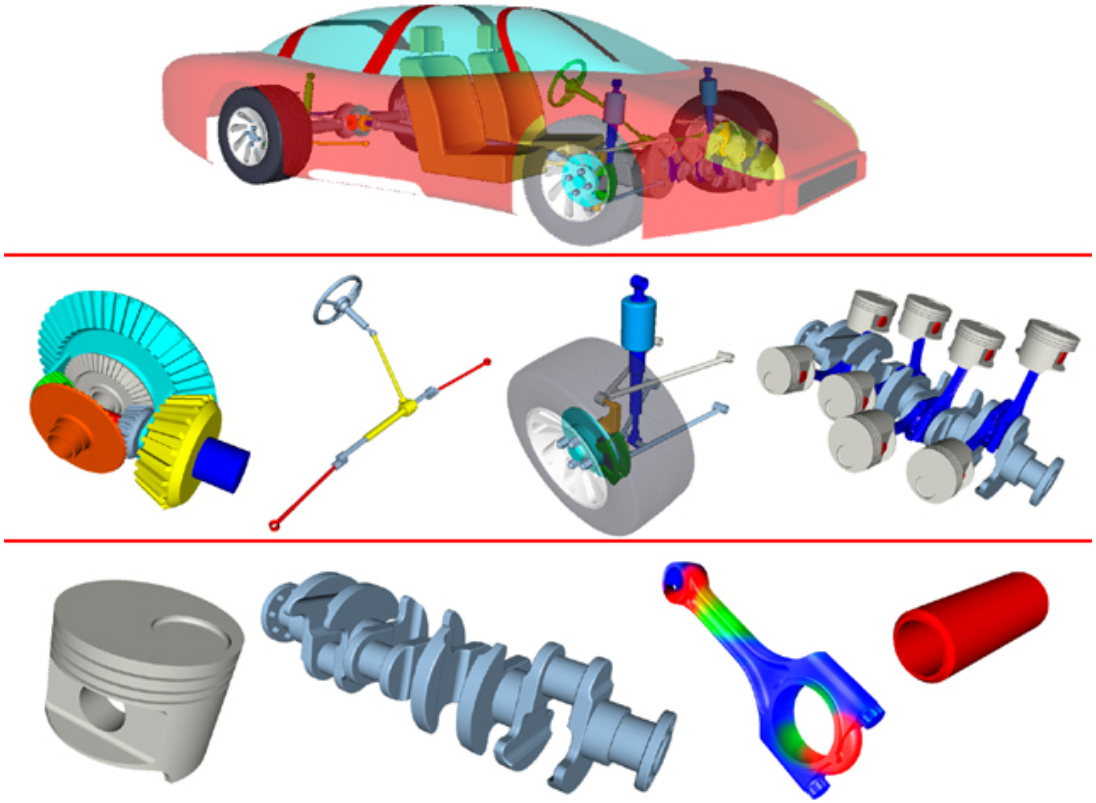






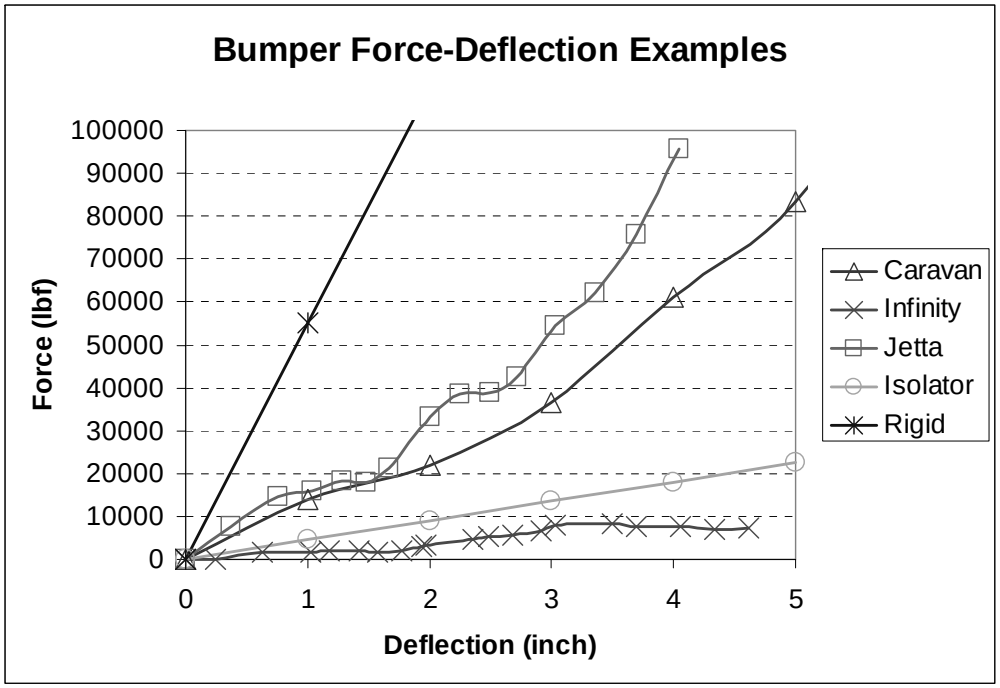
THE POWER OF SIMULATION

Enables vehicles and vehicle components to be virtually tested under real world stresses, strains, crash avoidance situations, driver reactions, high-speed and low-speed crashes, etc.

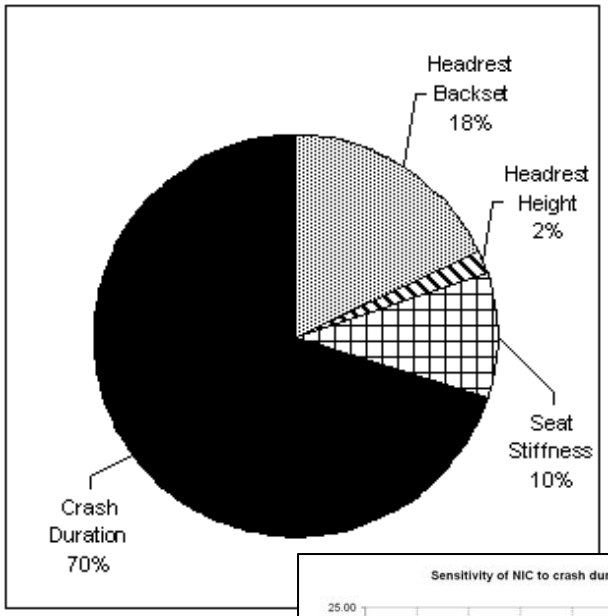


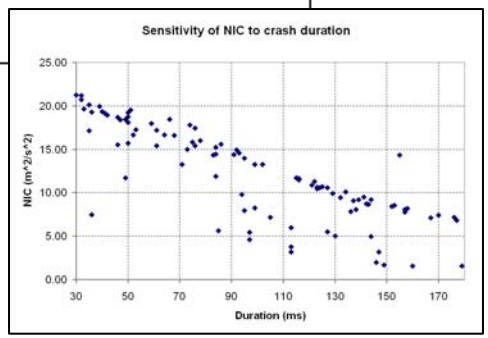
EXAMPLE: INJURY EFFECT OF BUMPER DESIGN-Crashport

Key Bumper Characteristics



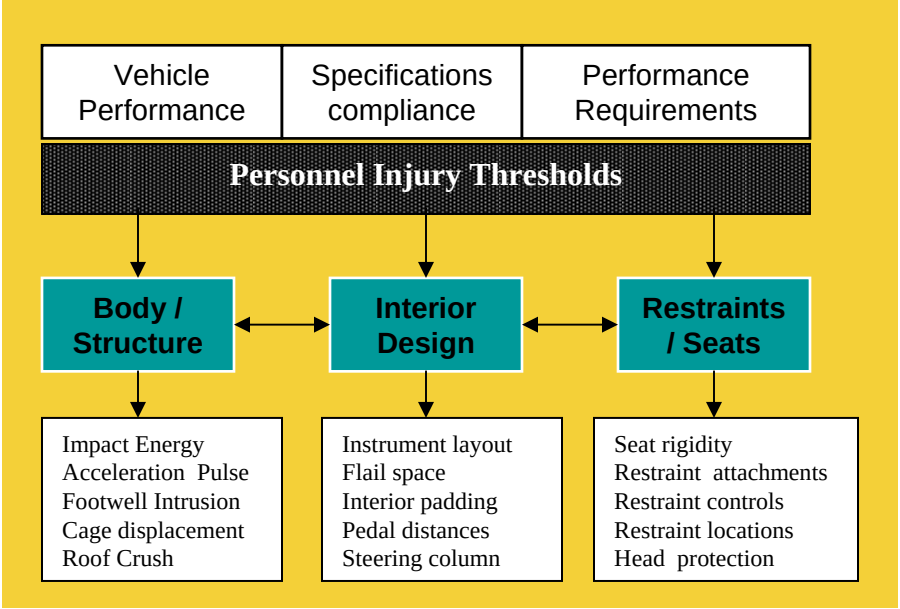
Affect on Whiplash Injury





CRASH ANALYSIS PLATFORM

Simulation Environment	• **Fast and accurate multi-body dynamics solver** • **3D CAD kernel to facilitate data exchange** • **Generates vehicle models "on the fly" from vehicle specifications database**
Analysis Types	• **Design of Experiments (DOE)** • **Monte Carlo** • **Goal-Seeking**



Crashport can:

- **Rapidly and statistically analyze large quantities of vehicle crash scenarios**
- **Evaluate the impact of a vehicle design change on crash results**
- **Correlate vehicle design characteristics to crash results**
- **Both for the striking vehicle and for all vehicles struck**

VALUABLE CAPABILITY FOR VEHICLE RATING?

Current Challenges

- Assignment of symbols to new vehicles is crude, often very wrong
- Vehicle characteristics used for rating plans are crude and do not correlate well to occupant protection, aggressivity, vehicle handling and damageability

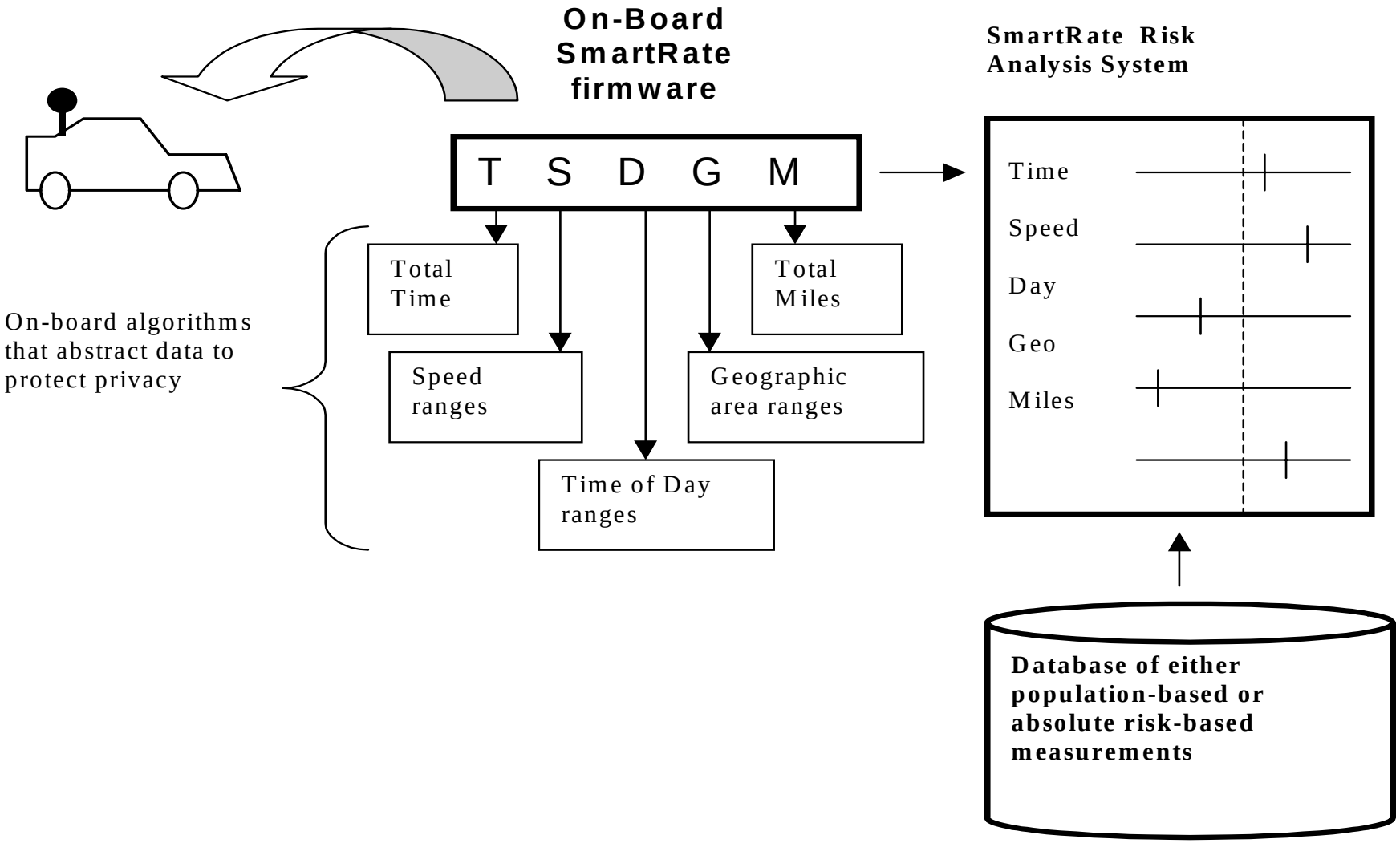
VALUABLE CAPABILITY FOR VEHICLE RATING?

Benefits of Crashport Intelligence

- **Accurate symbols for new vehicle designs**
  - Symbol assignment based on key design characteristics that affect crash performance
  - Symbols for key coverages, including BI, 1st party medical and damageability (and possibly repairability)

- **More precise vehicle rating plan**
  - Year, Make and Model rated based on the vehicle design characteristics that affect crash performance
  - Separation of insured characteristics from vehicle characteristics for more precise assessment of risk

Telematics


On-Board SmartRate firmware
SmartRate Risk Analysis System
T S D G M
Total Time
Total Miles
Speed ranges
Geographic area ranges
Time of Day ranges
On-board algorithms that abstract data to protect privacy
Time
Speed
Day
Geo
Miles
Database of either population-based or absolute risk-based measurements

Personal Lines Model Year and Symbol Rating -- Tomorrow

- Greater use of true multi-variate analyses by actuaries will greatly improve predictability of symbol rating.
- Computer simulation of crashes will vastly improve accuracy of initial symbol assignment.
- Telematics – interaction between where and how car is driven