

**Beginner's Roadmap to Working with Driving Behavior Data**

THE SCIENCE OF RISK<sup>SM</sup>

1

---

---

---

---

---

---


---

---

### CAS Antitrust Notice

- The Casualty Actuarial Society is committed to adhering strictly to the letter and spirit of the antitrust laws. Seminars conducted under the auspices of the CAS are designed solely to provide a forum for the expression of various points of view on topics described in the programs or agendas for such meetings.
- Under no circumstances shall CAS seminars be used as a means for competing companies or firms to reach any understanding – expressed or implied – that restricts competition or in any way impairs the ability of members to exercise independent business judgment regarding matters affecting competition.
- It is the responsibility of all seminar participants to be aware of antitrust regulations, to prevent any written or verbal discussions that appear to violate these laws, and to adhere in every respect to the CAS antitrust compliance policy.

THE SCIENCE OF RISK<sup>SM</sup>



2

---

---

---

---

---

---

---

---

### Portrait of a Risky Driver



Image Credit: NASA Earth Observatory

THE SCIENCE OF RISK<sup>SM</sup>



3

---

---

---

---

---


---

---

---

**The Basics**

- Usage-Based Insurance
- Vehicle Telematics
- Driving Behavior Data

THE SCIENCE OF RISK™ 4 

---

---

---

---


---

---


---

---

**Part One**



Origins, Destinations, and Roadblocks

THE SCIENCE OF RISK™ 5 

---

---

---

---

---

---

---

---

**Objectives**

- Segmentation
- Selection
- Mitigation
- Behavior Modification
- Research and Policy

THE SCIENCE OF RISK™ 6 

---

---

---

---

---


---

---

---

### Paradigms

- Critical Conditions
- *Télématique*
- “Causal” Rating Variables
- Pay-at-the-Pump

THE SCIENCE OF RISK™ 7 

---

---

---

---

---


---

---

---

### Computerization of Cars

- Micro-processors
- Sensors
- GPS
- OBD-II
- GPRS

THE SCIENCE OF RISK™ 8 

---

---

---

---

---


---

---

---

### Early Practitioners

- Texas-only Pilot
- Utility-Bill Functionality
- Reactions
- Discontinuation

THE SCIENCE OF RISK™ 9 

---

---

---

---

---

---

---

---

## Intellectual Property

- Patents
- State Street Bank
- Bilski
- Litigation

THE SCIENCE OF RISK™ Verisk Analytics

---

---

---

---

---

---

---

---

## Privacy

- Use Cases
- Misuses of DBD
- IBM Framework
- EDR Laws
- Regulatory Levels

THE SCIENCE OF RISK™ Verisk Analytics

---

---

---

---

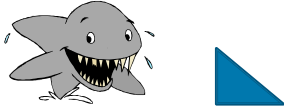
---

---

---

---

## Part Two



## Infrastructure

THE SCIENCE OF RISK™ Verisk Analytics

---

---

---

---

---

---

---

---

**Design**

- Business Model
- Physical Resources
- Knowledge Base
- Pilot Tests

THE SCIENCE OF RISK™ 13 Verisk Analytics

---

---

---

---

---

---

---

---

**Hardware**

- Feature Set
- Costing v. Granularity
- Deployment
- Installation

THE SCIENCE OF RISK™ 14 Verisk Analytics

---

---

---

---

---

---

---

---

**Communications**

- Methods
- Frequency
- Trigger
- Smartphones

THE SCIENCE OF RISK™ 15 Verisk Analytics

---

---

---

---

---

---

---

---

### Requirements

- Flexibility
- Capacity
- Statistical Software
- Value-Added Services

THE SCIENCE OF RISK™ Verisk Analytics

---

---

---

---

---

---

---

---

### Security

- Perils of Warehousing
- Access Controls
- Encryption
- Retention

THE SCIENCE OF RISK™ Verisk Analytics

---

---

---

---


---

---

---

---

### Part Three



Navigating the Data

THE SCIENCE OF RISK™ Verisk Analytics

---

---

---

---

---

---

---

---

### Raw Data

Obs	UTC	Degrees Latitude	Degrees Longitude	MPH	Miles	Seconds	Gallons
1	20:15:00	49.50	154.50	-	0.0	0	0.00
2	20:20:00	49.45	154.49	40	3.6	300	0.14
3	20:25:00	49.41	154.43	82	8.8	600	0.35
4	20:30:00	49.36	154.30	77	15.0	900	0.57
5	20:35:00	49.33	154.19	38	20.7	1200	0.72
6	20:40:00	49.35	154.14	42	24.7	1500	0.82
7	20:45:00	49.35	154.13	43	25.2	1800	0.83
8	20:50:00	49.36	154.08	38	28.5	1800	0.91
9	20:55:00	49.34	154.01	32	33.5	2400	1.04
10	21:00:00	49.33	153.97	28	36.0	2760	1.10

THE SCIENCE OF RISK™ Verisk Analytics

---

---

---

---

---

---

---

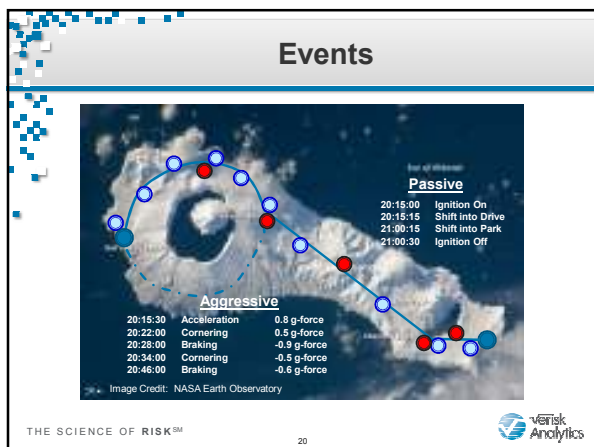
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

---

---

### Driving States

Obs.	UTC	Vehicle Status	Degrees Latitude	Degrees Longitude	Miles	Incr. Miles	Accel	Brake	Corner
Trans.	20:15:15	Idling	49.50	154.50	0.0	0.0	-	-	-
Event	20:15:15	Driving	49.50	154.50	0.0	0.2	0	0	0
Event	20:15:30	Driving	49.50	154.50	0.4	1.8	1	0	0
2	20:20:00	Driving	49.45	154.49	3.6	2.6	0	0	0
Event	20:22:00	Driving	49.43	154.46	5.6	2.6	0	0	1
3	20:25:00	Driving	49.41	154.43	8.8	3.4	0	0	0

Dummy Record:  
No Mileage  
Allocated to Idling

Rolling Average  

$$\left( \frac{(3.6 - 0.4) + (0.4 - 0.0)}{2} \right)$$

$$2 = 1.8$$

Bucketing:  
Facilitates  
Aggregation

THE SCIENCE OF RISK™ Verisk Analytics

---

---

---

---

---

---

---

---

---

---

---

---

## Enrichment

- Conversions and Metrics
- Snapping and Mapping
- Traffic and Weather
- QC Checks

THE SCIENCE OF RISK<sup>SM</sup> Verisk Analytics

---

---

---

---

---

---

---

---

## Driving Portfolio

<u>Vehicle</u> Jim's Car	<u>Term</u> Jan - Jun, 2012	<u>Status</u> Driving	<u>Date</u> Weekday	<u>Time</u> AM Peak
<u>LC Band</u> 5	<u>Road Type</u> Freeway	<u>From Garage</u> 11 - 15 Mil.	<u>Weather</u> Flurries	<u>Visibility</u> Average
<u>Speed (mph)</u> 85 - 90	<u>vs. Limit</u> 22.5 - 27.5	<u>vs. Flow</u> 17.5 - 22.5	<u>Fatigue</u> 11 - 15 mins.	<u>Fuel Econ.</u> 25 - 30 mpg
<u>Mileage</u> 3.1	<u>Time (mins.)</u> 2.5	<u>Fuel (gals.)</u> 0.11	<u>Harsh Accel.</u> 0	<u>Harsh Brake</u> 1

THE SCIENCE OF RISK<sup>SM</sup> Verisk Analytics

---

---

---

---


---

---

---

---

## Part Four



## Applications

THE SCIENCE OF RISK<sup>SM</sup> Verisk Analytics

---

---

---

---

---

---

---

---



**Pricing**

- Causative Rating Variables
- Interactions
- Operators and Driving Habits
- Classification

THE SCIENCE OF RISK™ 25 Verisk Analytics

---

---

---

---

---

---

---

---

**Underwriting**

- Scoring
- Tiering
- Verification
- Transferability

THE SCIENCE OF RISK™ 26 Verisk Analytics

---

---

---

---

---

---

---

---

**Claims**

- FNOL
- Coaching
- Fraud Tools
- Civil Engineering

THE SCIENCE OF RISK™ 27 Verisk Analytics

---

---

---

---

---

---

---

---

**Going Live**

- Data Ownership
- Regulatory Filings
- Marketing
- What is your roadmap to success?

THE SCIENCE OF RISK<sup>SM</sup> Verisk Analytics

28

---

---

---

---

---

---

---

---

Visit us online at  
**[www.verisk.com](http://www.verisk.com)**

THE SCIENCE OF RISK<sup>SM</sup> Verisk Analytics

29

---

---

---

---

---

---

---

---