

Motorcycle Racing Data

A Deeper Dive into Motorcycle Racing Data



Host:

Roger Caddell

AiM Sports - National Training Manager



Guest:

Chloé Lerin

MotoAmerica Data Engineer



Chloé Lerin



- Race Data Engineer at MotoAmerica
- Motorcycle Track Day Coach
- Amateur Motorcycle Club Racer #147
- 10 Years in Internal Combustion Engine Research
Working with Engine Dynos
- Master's in Mechanical Engineering from University of Wisconsin-Madison
- Engineering Diploma from UTT, France
- Enthusiast Educational Video Maker
- 3 Time Aim LearnFast Webinar Co-Host!



Chloé Lerin

Motorcycle Data Engineer



[aimsports.com](https://www.aimsports.com)

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Professional Racing Sensors

The “Must Have” Sensors

- Logger with Analog Channels: EVO4s/5, MXL2, MXM, MXS1.2
- Front Brake Pressure Sensor: 0-100 bar
- Suspension Potentiometers: Front (150 mm) – Rear (75 mm)
- Lambda Sensor: Integrated with ECU System (aRacer, Motec) or AIM LCU-One
- Wheel Speed Sensors: Included with all Recent Bikes



Professional Racing Sensors

The “We’re Not Joking Around” Sensors!

- Tire Pressure and Temperature (TPMS)
- Rear Brake Pressure Sensor: 0-100 bar
- Oil and Coolant Temp and Pressure Sensors for Accurate Monitoring
(Most Bikes use Switches Which Only Trigger a Light When Threshold Exceeded)
- Biometrics: Heart Rate Monitor
- Lambda Sensor in Each Header



Our MotoAmerica Twins Cup Setup

DISCLAIMER: Our Team Bike is a 'Work in Progress' and Only Has a Few of the "MUST Have" Sensors. Therefore, This Webinar will Focus on Suspension Potentiometers.

- 3rd Gen Suzuki SV650, Front End and Rear from a GSXR 600
- Front and Rear Ohlins Suspension
- AIM MXL2 Dash Logger, Front and Rear potentiometers
- Dynojet Autotune with Wideband Lambda



Suspension Data Basics



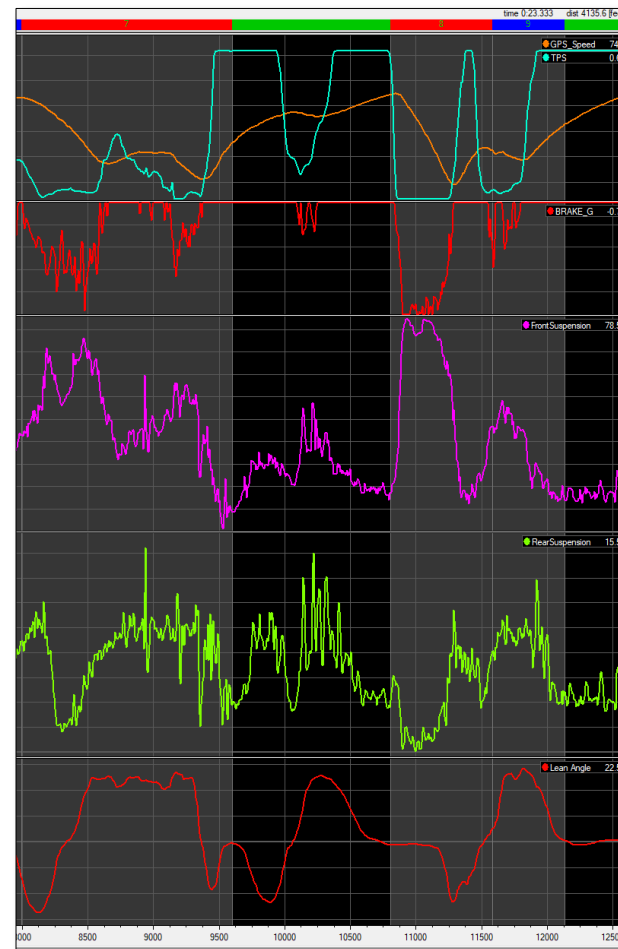
Suspension Travel (Front and Rear) Inform Us Whether the Bike Is:

- Bottoming Out Under Braking
Full Front Travel is Used ~ 120 mm
- Wheeling: Front Fully Extended = 0 mm
- Losing Contact on the Rear: Rear Fully Extended = 0 mm
(If There is No Rear Wheel Speed, Electronics Will Not Work
Keeping the Tire on the Track is Crucial)
- Squatting Too Much: Rear Bottoming Out

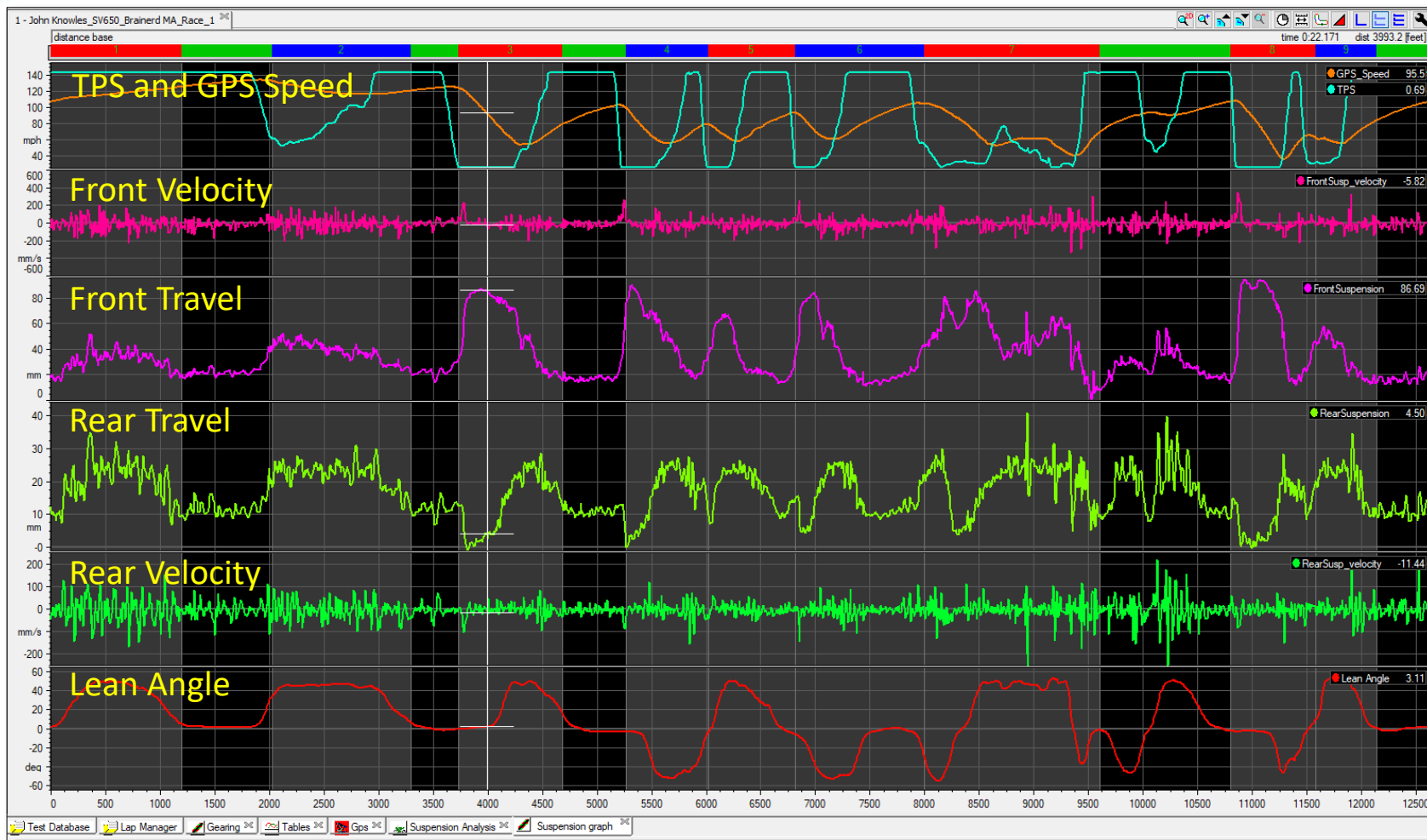
Suspension Travel Can Also Show:

- Chatter (Pogoing)
- Bumps on the Track
- Weight Distribution
- Overall Behavior of the Bike Under Acceleration and Braking

Reading Suspension Data is an Art!



My Suspension User Profile



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My Suspension RS2A User Profile

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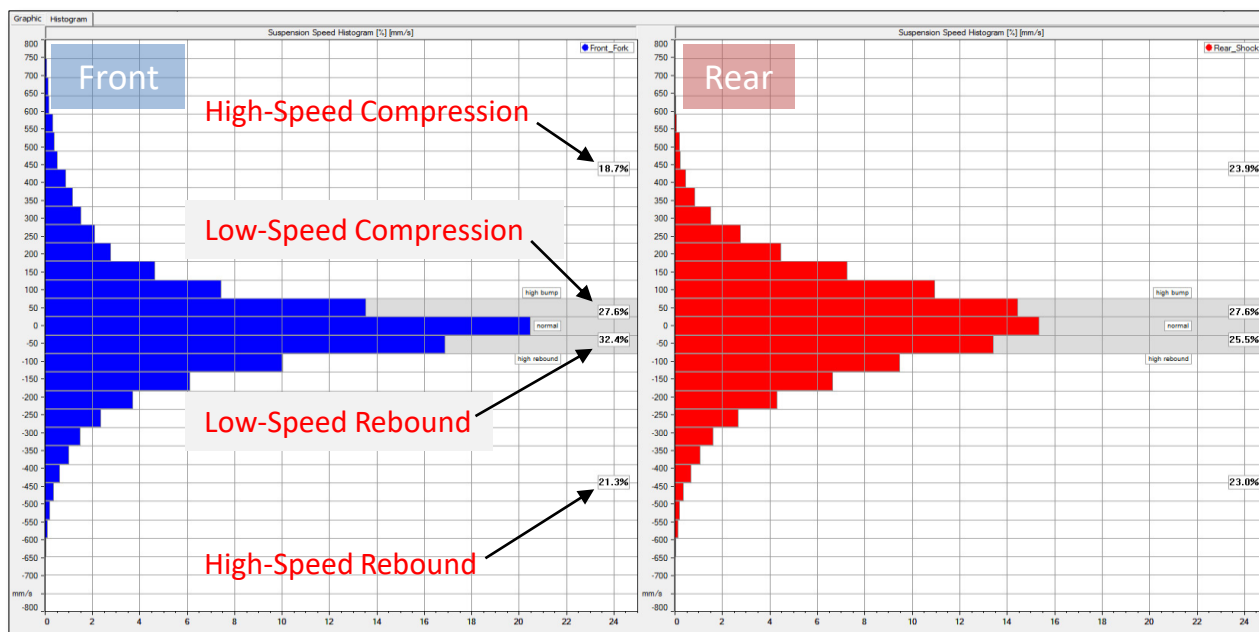
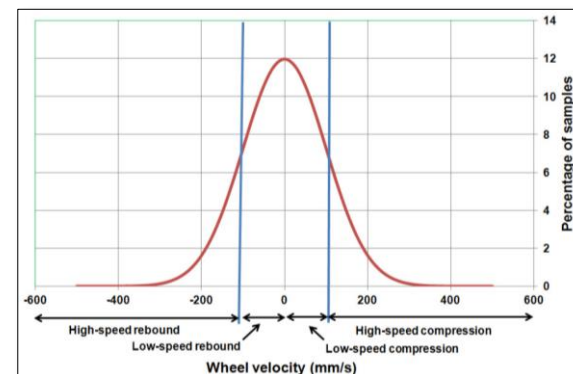
Suspension Data Basics



Histograms Put Values to How Much Time the Suspension is Active in Each Damping Range Using the Probability Density Function Method.

4 Zones Identified:

- High-Speed Compression
- Low-Speed Compression
- High-Speed Rebound
- Low-Speed Rebound



Theoretical Ideal → Equal Distribution in Each Zone

i.e., A Stiffer Spring Will Increase Time in the Low-Speed Zones (Both Compression and Rebound Damping)

<https://www.datamc.org/data-acquisition/suspension-data-analysis/histograms-and-suspension-velocity-analysis/>



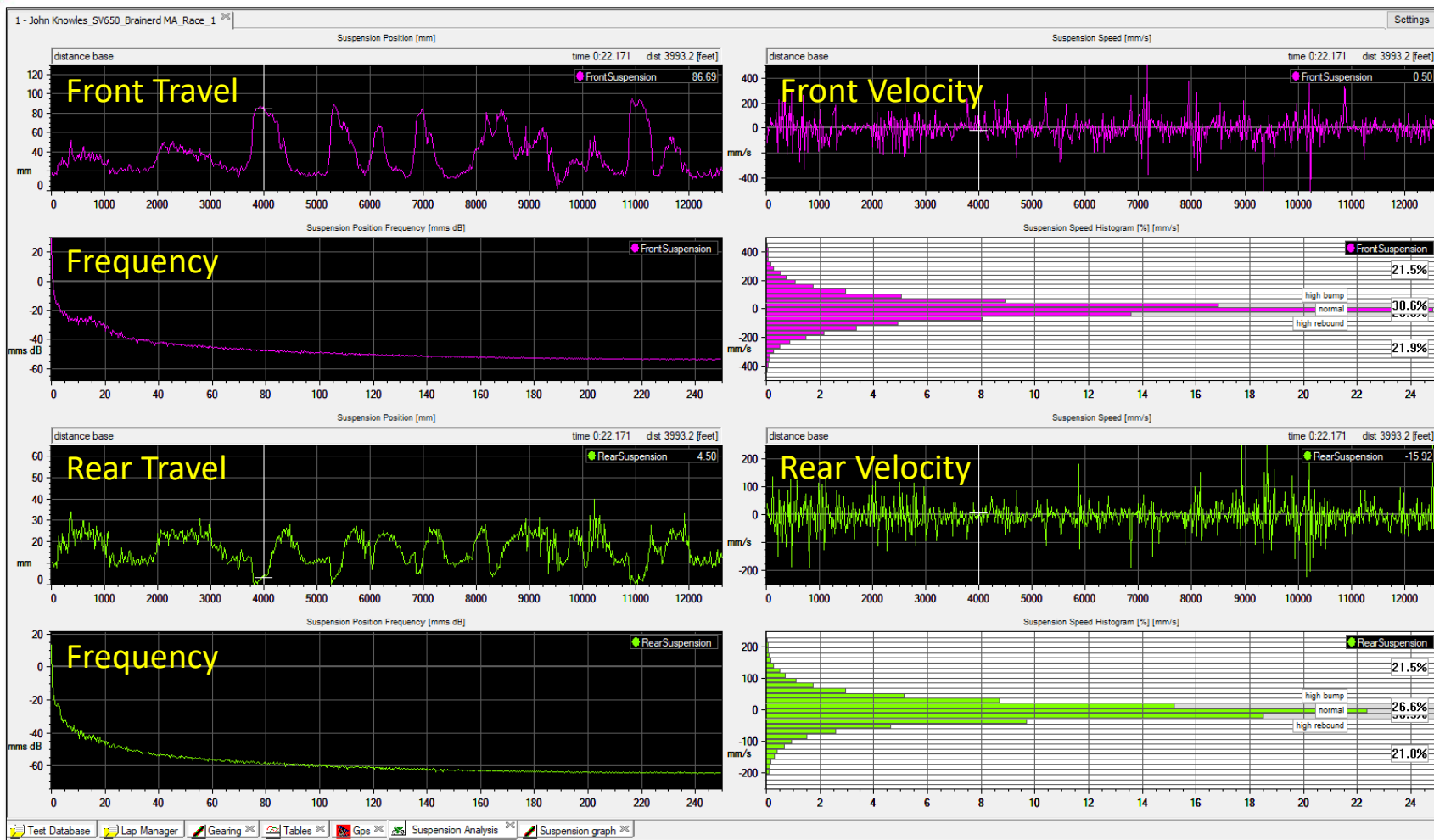
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Suspension Data Basics

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Suspension Analysis Window



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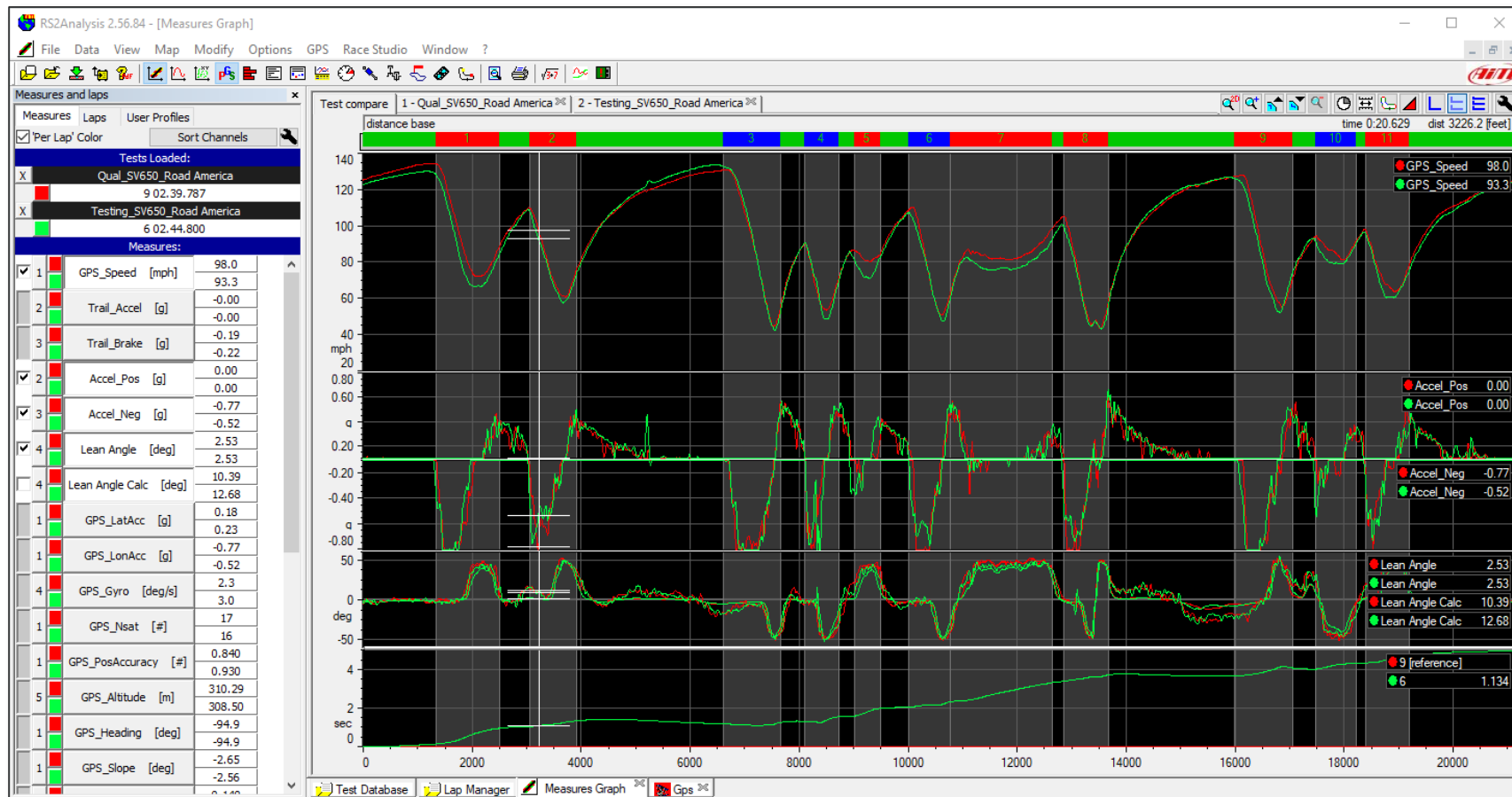
Suspension Analysis Function

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Live Race Studio Data Analysis



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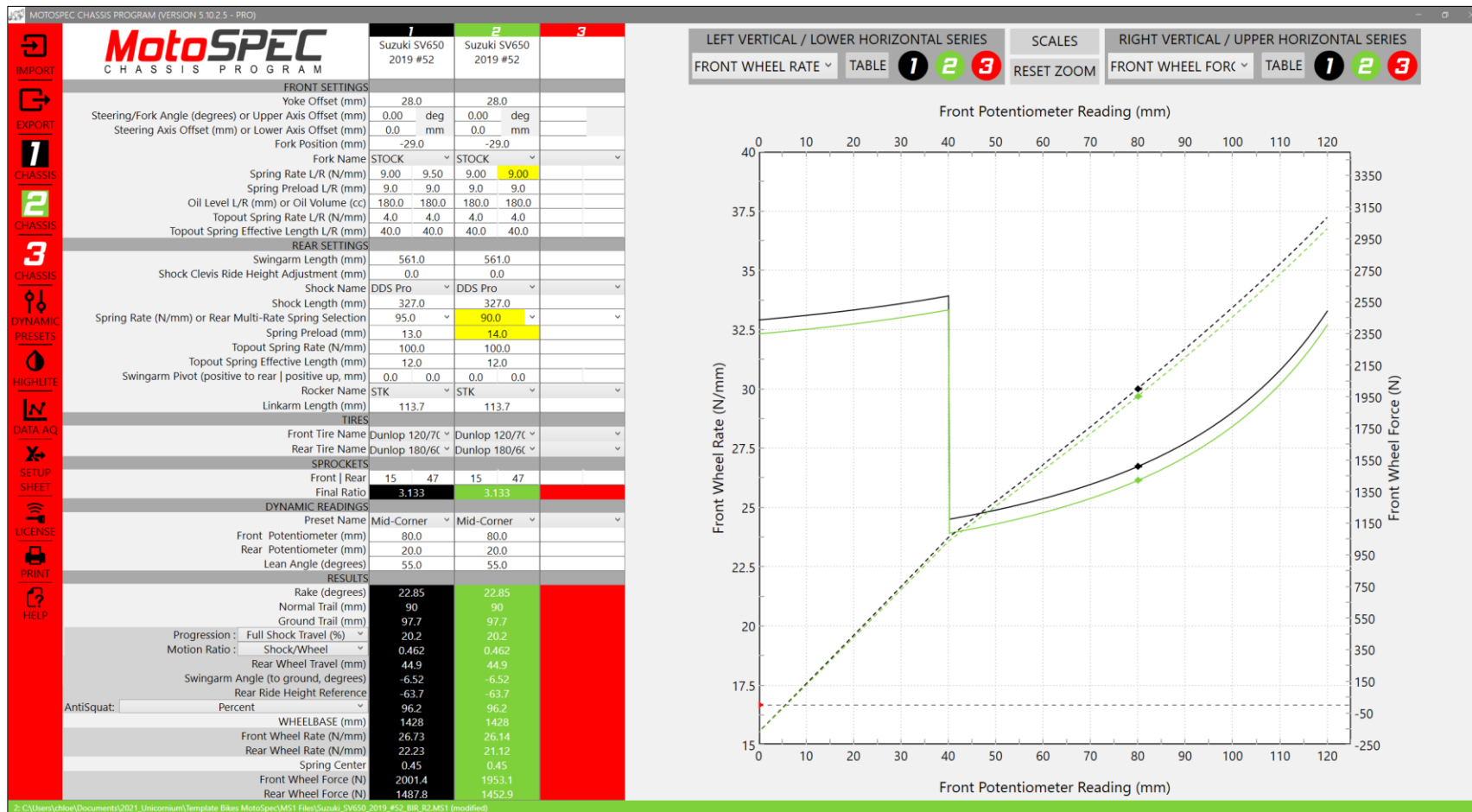
Live Race Studio Data Analysis

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Pairing Data Analysis with Chassis Software - MotoSPEC



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MotoSPEC Chassis Program

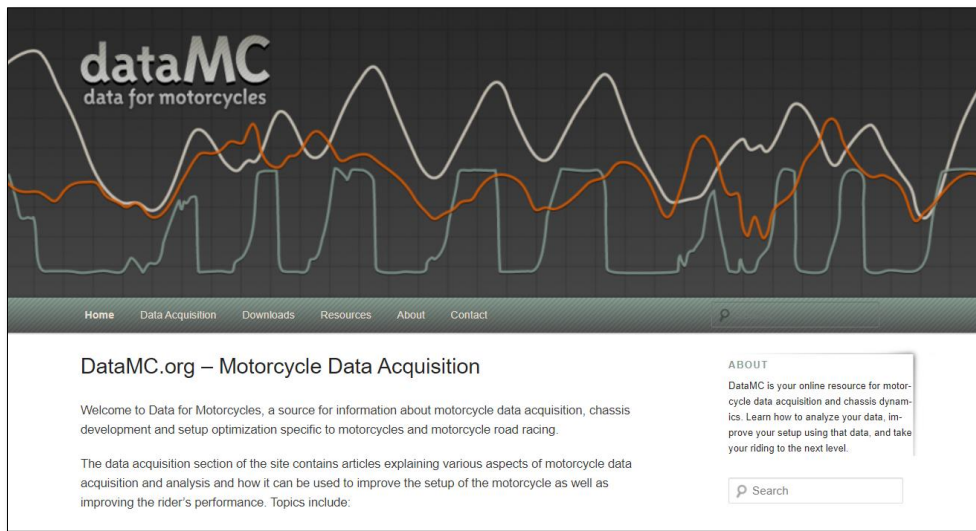
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We Have Answers!
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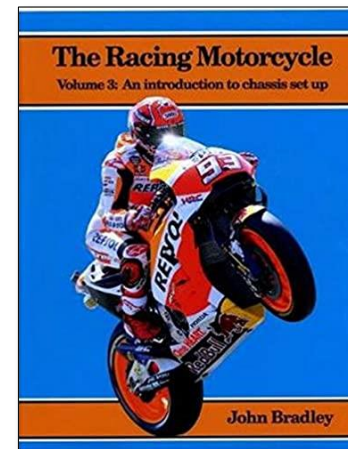
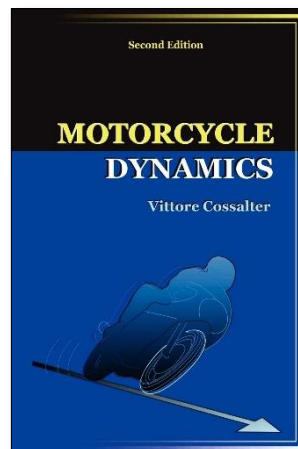
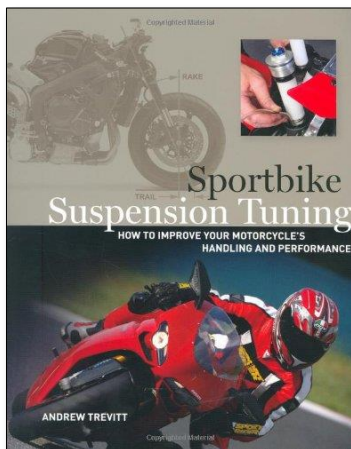


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Other Suspension Resources



<https://www.datamc.org/>



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Other Suspension Resources



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LearnFast™ E-Training Videos



Currently **174** Videos and Growing

YouTube www.youtube.com/aimdata

#2-35
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If You Have Questions

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Tuesday August 31st, 2021

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We Have Answers!
LearnFast™ #109

- All New 2020 - 21 Webinar Videos
- Software Updates with Race Studio 3
- Pre-Calculated Gear Position Function
- Configuring WiFi Communication
- Customizing AiM Device Logos
- Race Studio 3 Basic Configuration - Part 1
- Race Studio 3 Basic Configuration - Part 2
- **I Have Downloaded my Data, Now What - Part 1*
- **I Have Downloaded my Data, Now What - Part 2*
- GPS Lap Insert
 - Selection Criteria
- Data Views
 - Sensor Calibration
- Measure Units
 - Conditional Alarms
- Sort Channels
 - Gear Position
- Test Properties
 - Firmware Update
- Per Lap Color
 - Solo Configuration
- Export Tests
 - Transmit Tracks
- Channel Reports
 - Gps Manager Overview
- Setting Time
 - New GPS Track
- Track Mapping
 - Webinars
- * *Most Popular and Recommended*

Faster Circles Using Data
David Smith
KartSpeed Solutions




Host:
Roger Caddell
AiM Sports - National Training Manager

Guest:
David Smith
KartSpeed Solutions

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Tuesday May 25th, 2021

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Webinar Series
Bringing Data Support and Training to You

Data Download Options
In Race Studio 3

March 31st, 2020

www.aimsports.com

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Additional Materials

LearnFast™ E-Training Videos

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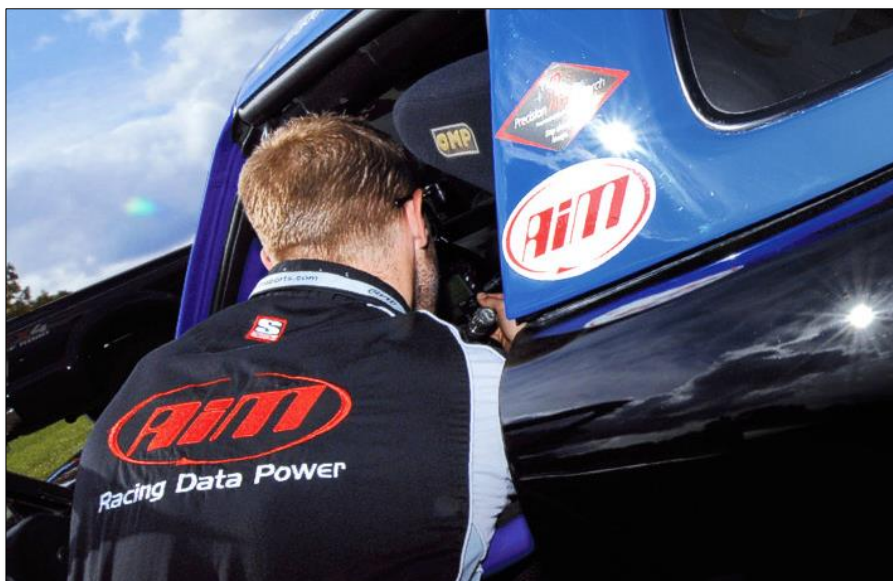
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Customer Support

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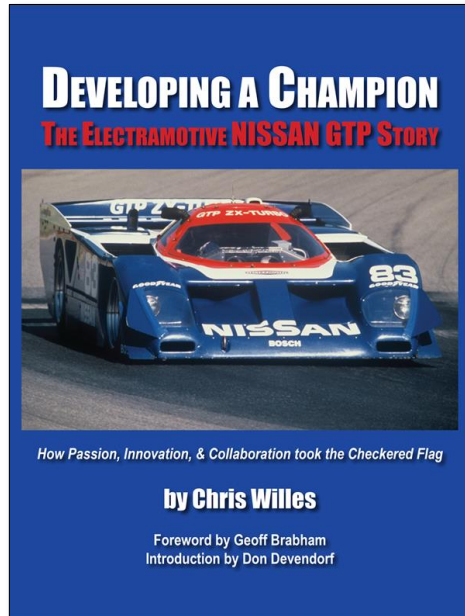


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Developing A Champion

The Electromotive Nissan GTP Story



Host:

Roger Caddell

AiM Sports - National Training Manager

Guest:

Chris Willes

Developing A Champion
The Electromotive Nissan GTP Story

Next Webinar: Tuesday Sept 7th, 2021 - 10:00am Pac/1:00pm East

Next Webinar Topic

Developing A Champion
The Electromotive Nissan Story

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Contact Information



Host:

Roger Caddell

AiM Sports
National Training Manager
roger@aimsports.com



Guest:

Chloé Lerin

MotoAmerica Data Engineer
chloelerin91@gmail.com
 @enginerdissima