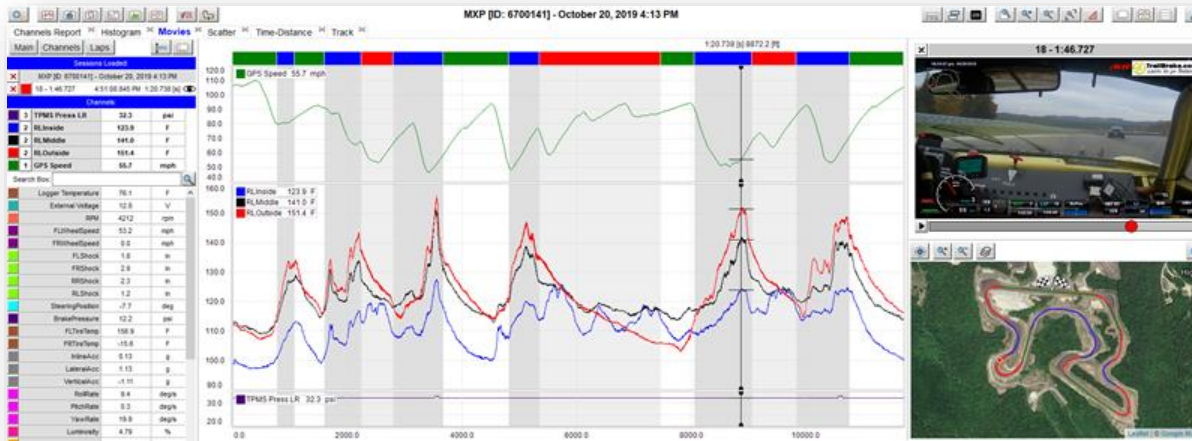




Co-Host:
Matt Romanowski
www.TrailBrake.com

Webinar Series

Bringing Data Support and Training to You

Tire Temps & Pressures
Where the Rubber Meets the Track!

2020 Webinar #71

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December 8th, 2020

1.800.718.9090

matt@TrailBrake.net

603-674-3250



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Where Are We Heading?

Measures and Laps

Measures Laps User Profiles

Per Lap Color Sort Channels

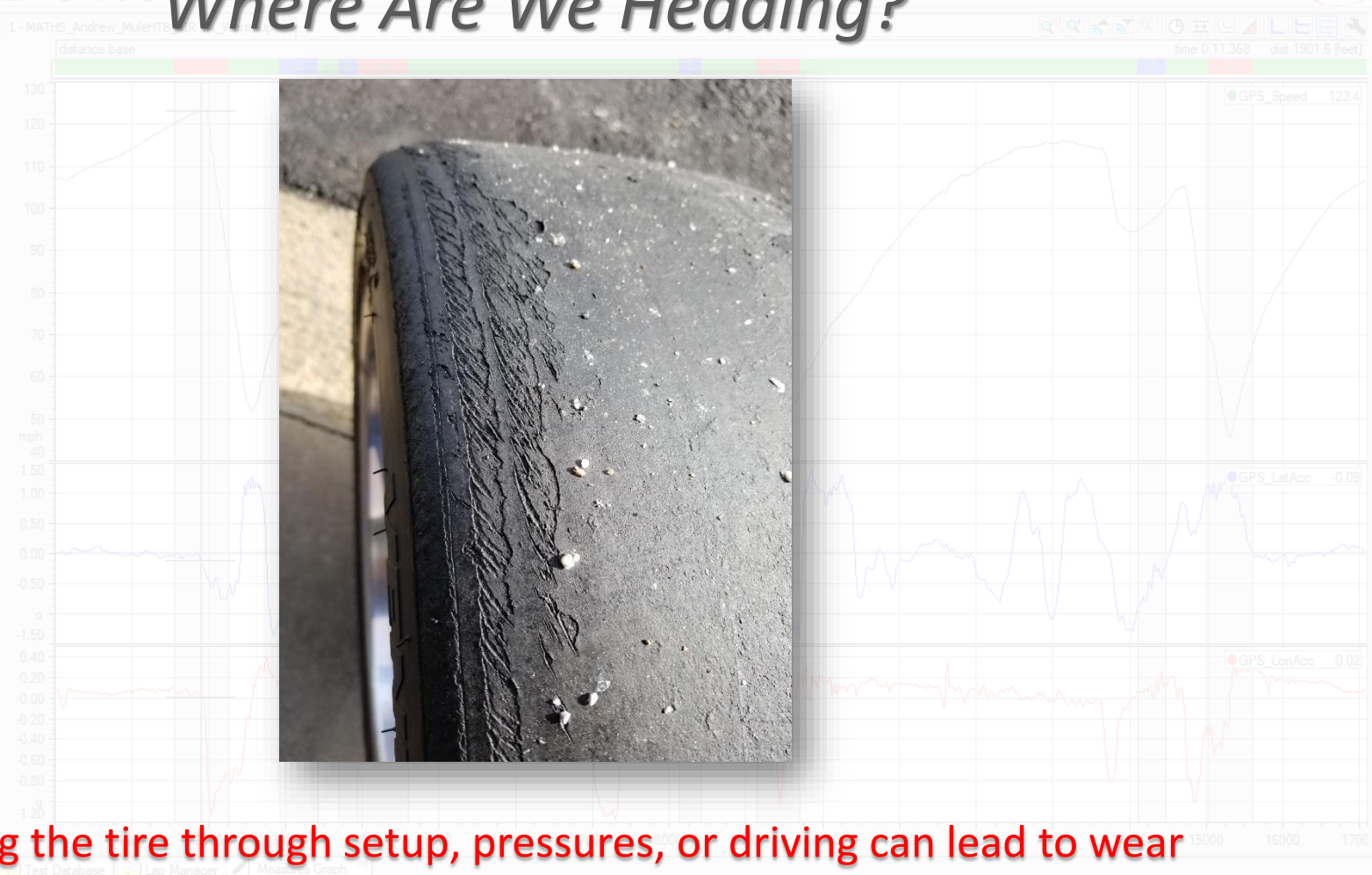
Tests Loaded:

MATHS_Andrew_MuleHT8_VIR_VA_Warm-up

4 02:11.308

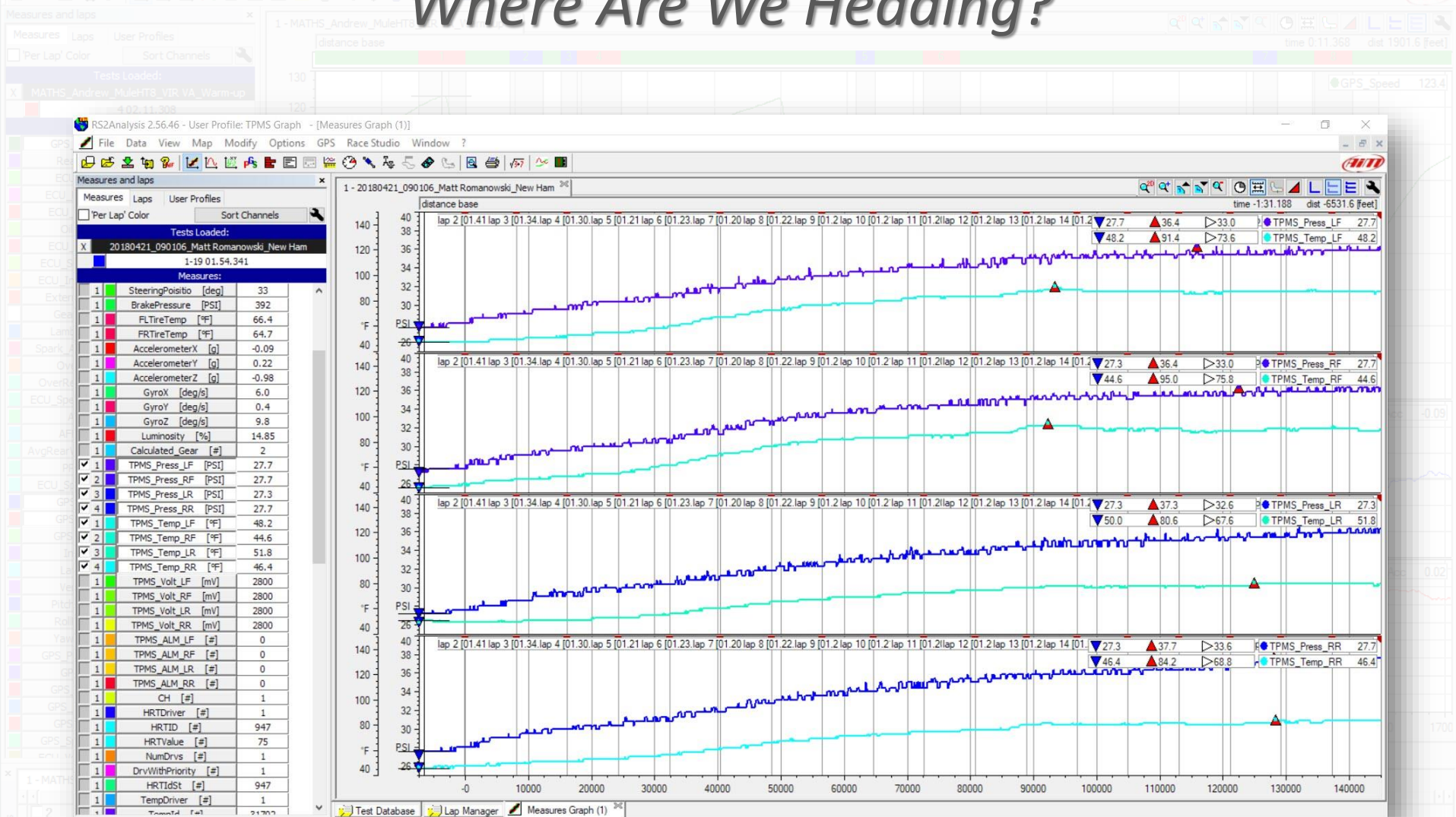
Measures:

GPS_Speed [mph]	123.4
RearDiffCk [%]	0.07
ECU_Rpm [rpm]	7062
ECU_Pedal_Pos [%]	99.500
ECU_Water_T [°F]	198
Oil_Temp [°F]	223.0
ECU_Lambda [A/F]	0.85
ECU_Spark_Adv [deg]	23.50
ECU_Intake_Air_T [°F]	89.6
External_Voltage [V]	13.0
GearRatio [ratio]	1.00
LambdaFiltered []	0.851
Spark_AdvFiltered [deg]	23.50
OverRev [secs]	0.00
OverRevFiltered [secs]	0.00
ECU_SpeedCheckFilt [diff]	2.2
AFR [ratio]	12.51
AFR_Filt [ratio]	12.51
AvgRearWheelSpeed [mph]	121.52
RPS_Diff [%]	100.50
ECU_SpeedCheck [diff]	2.2
GPS_LatAcc [g]	-0.09
GPS_LonAcc [g]	0.02
GPS_Slope [deg]	0.22
InlineAcc [g]	-0.02
LateralAcc [g]	-0.17
VerticalAcc [g]	-1.43
PitchRate [deg/s]	-0.6
RollRate [deg/s]	0.8
YawRate [deg/s]	-0.2
GPS_PosAccuracy [#]	0.940
GPS_Neat [#]	15
GPS_Gyro [deg/s]	-0.9
GPS_Heading [deg]	-23.8
GPS_Speed [mph]	123.4
GPS_Speed [mph]	123.4



Overworking the tire through setup, pressures, or driving can lead to wear problems and suboptimal performance. Using IR Tire Temps and TPMS systems, we can manage the tires in a much more #DATADriven way.

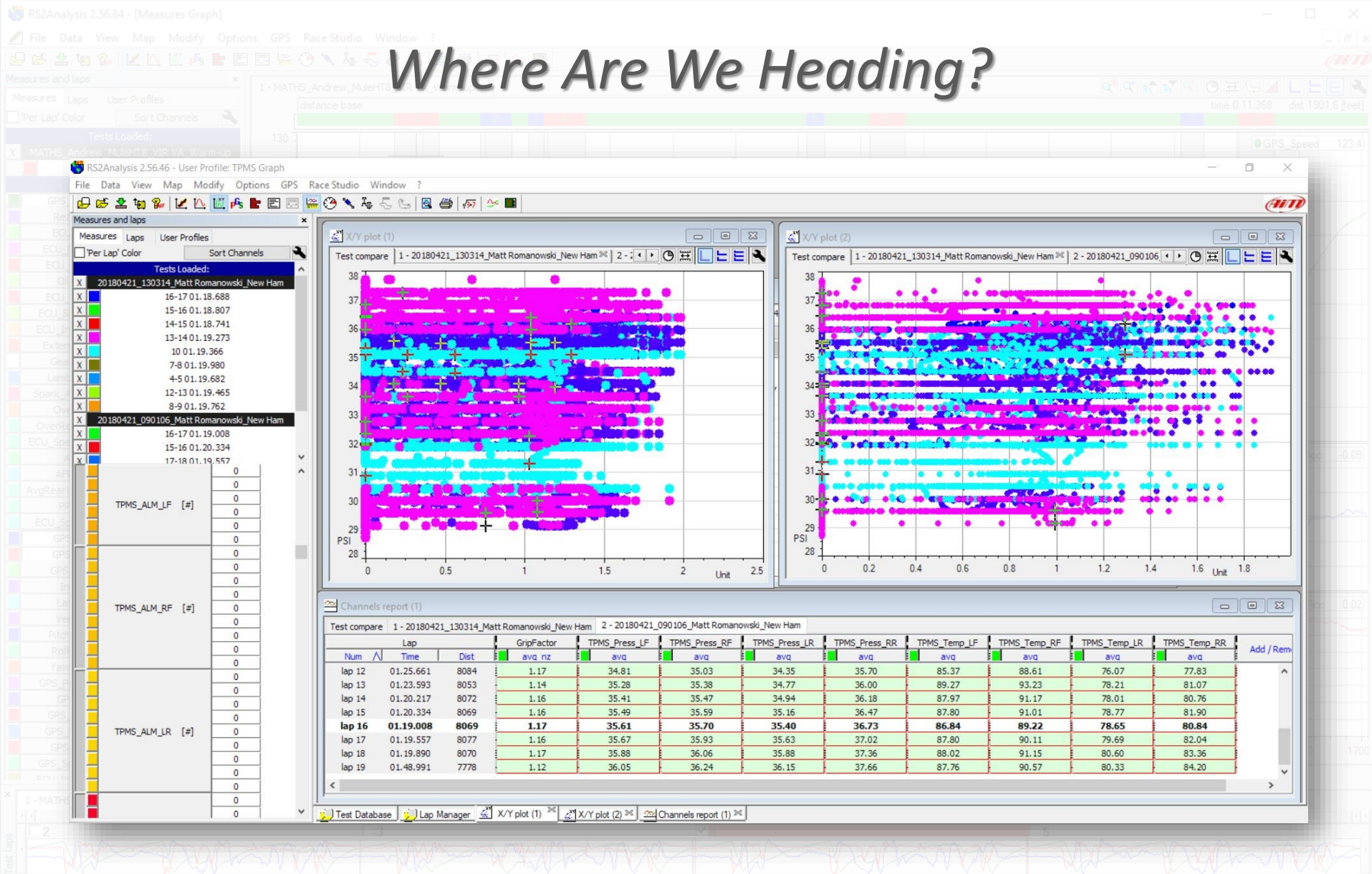
Where Are We Heading?



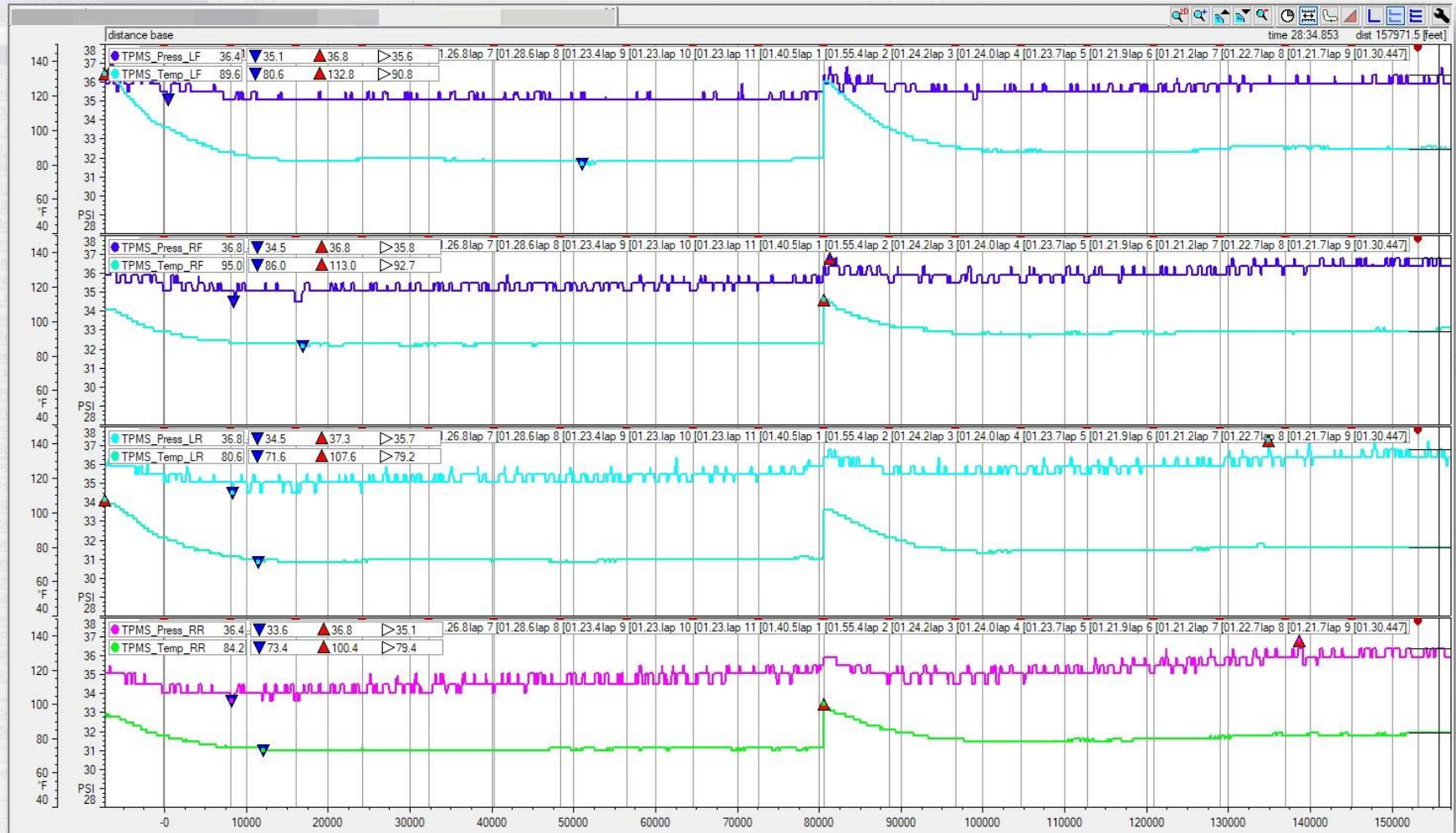
Where Are We Heading?



Where Are We Heading?



Where Are We Heading?



The Best Outcome!

Tire Pressure Calculations

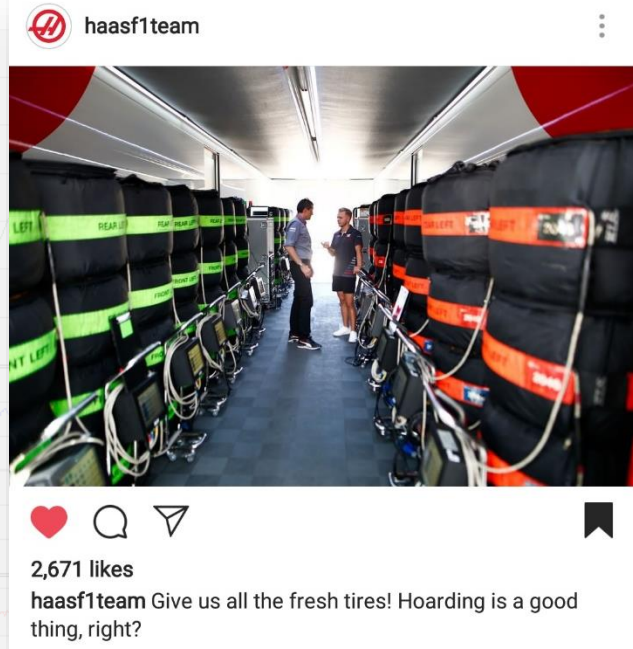
Info

PSI/F

Start Tire Pressure	27
Start Tire Temp	70
Hot Pressure	36.5
Hot Temp	155

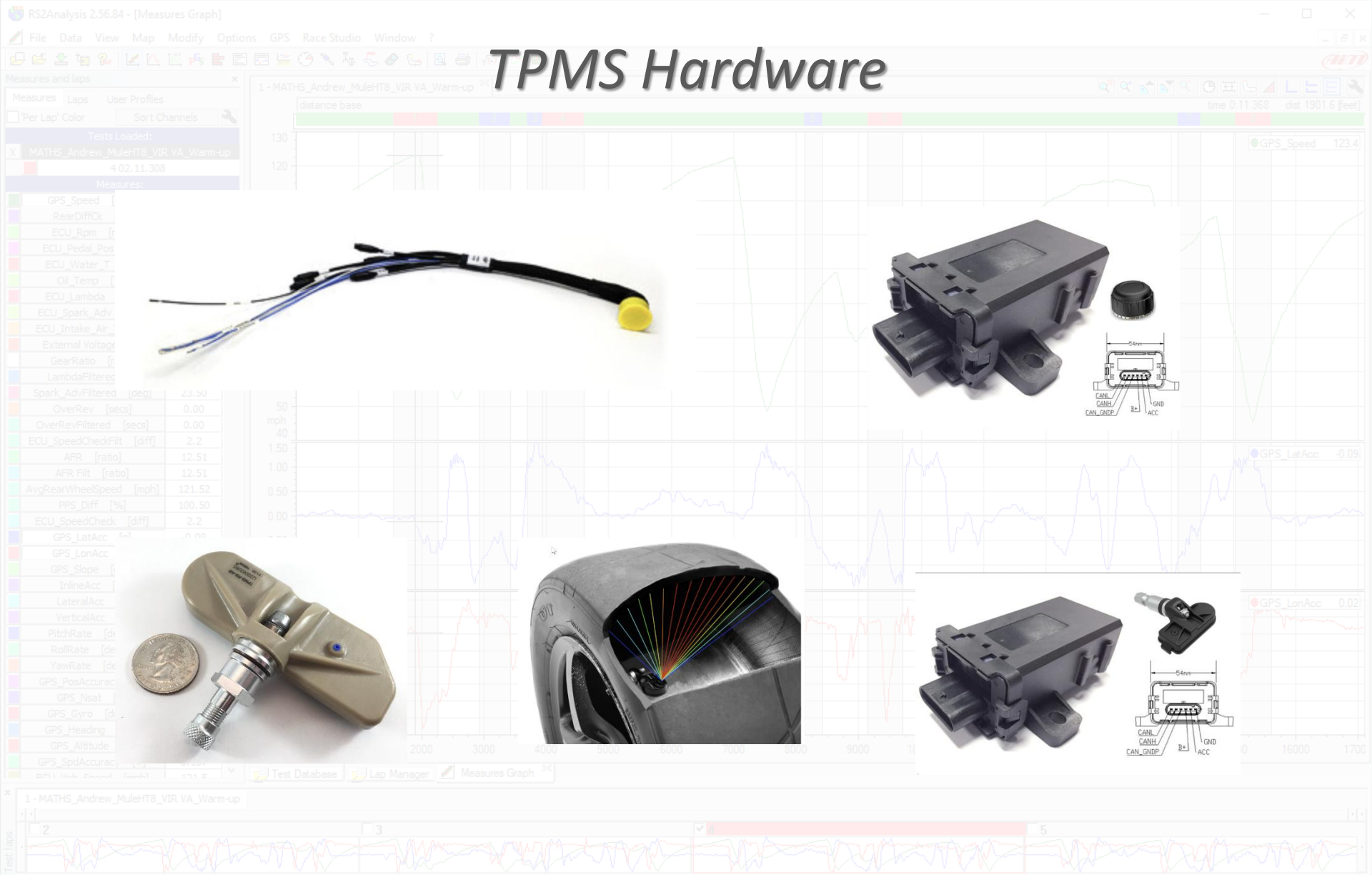
Calculations

Hot Pressure PSI	36.5
Cold Pressure PSI	27.0

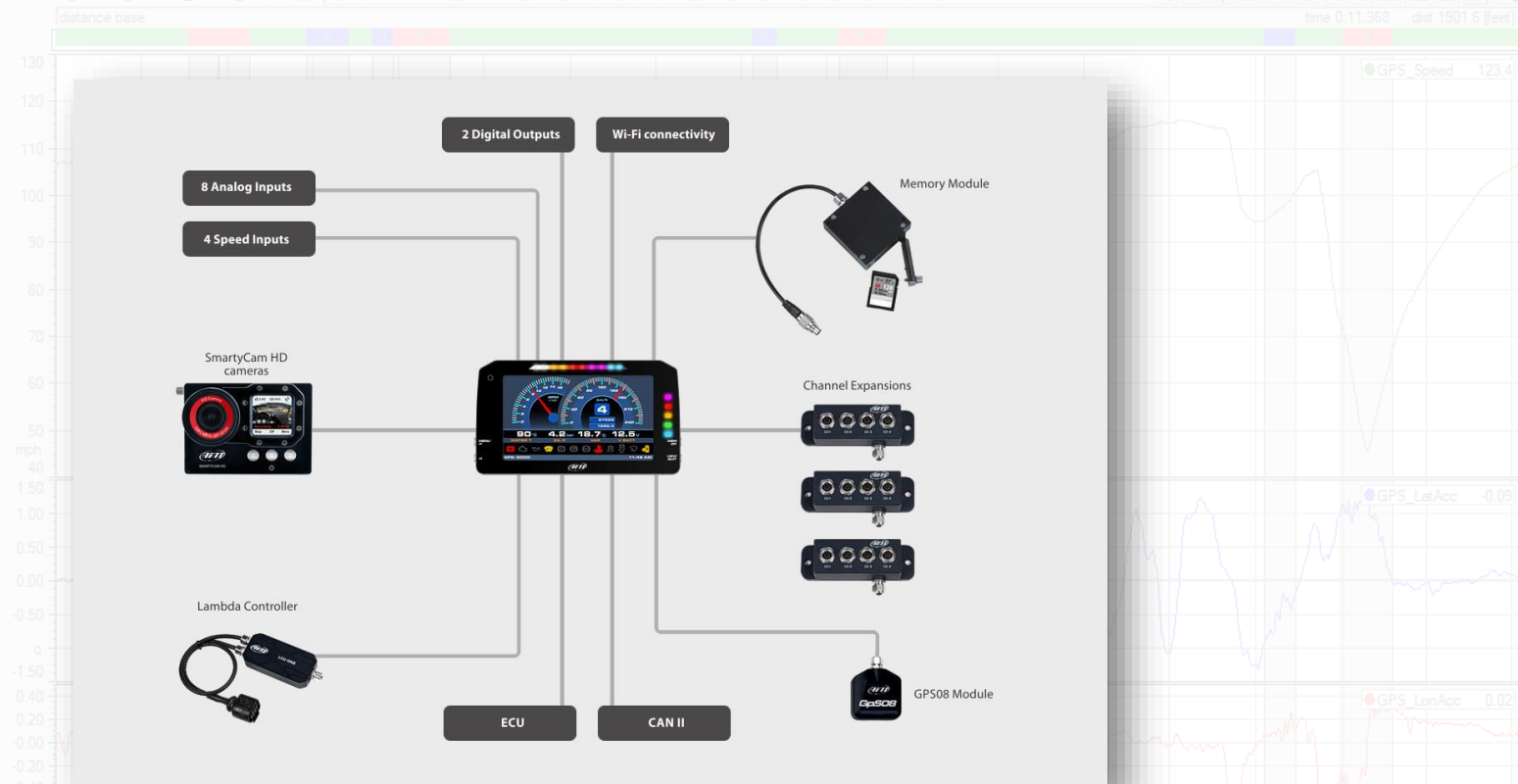


Using the Ideal Gas Law, you can use the cold temp and pressure along with the expected hot pressure to calculate the hot pressure! No more guessing at tire growth (HINT! – humidity is crucial!)





How To Connect It All



For Analog IR Temp Sensors, they connect to the system analog channels (straight to the Dash/Logger or to a Channel Expansion).

CAN based devices connect to CAN1 or CAN2 depending on your configuration.

Measures and laps

Measures Laps User Profiles

Per Lap Color Sort Channels

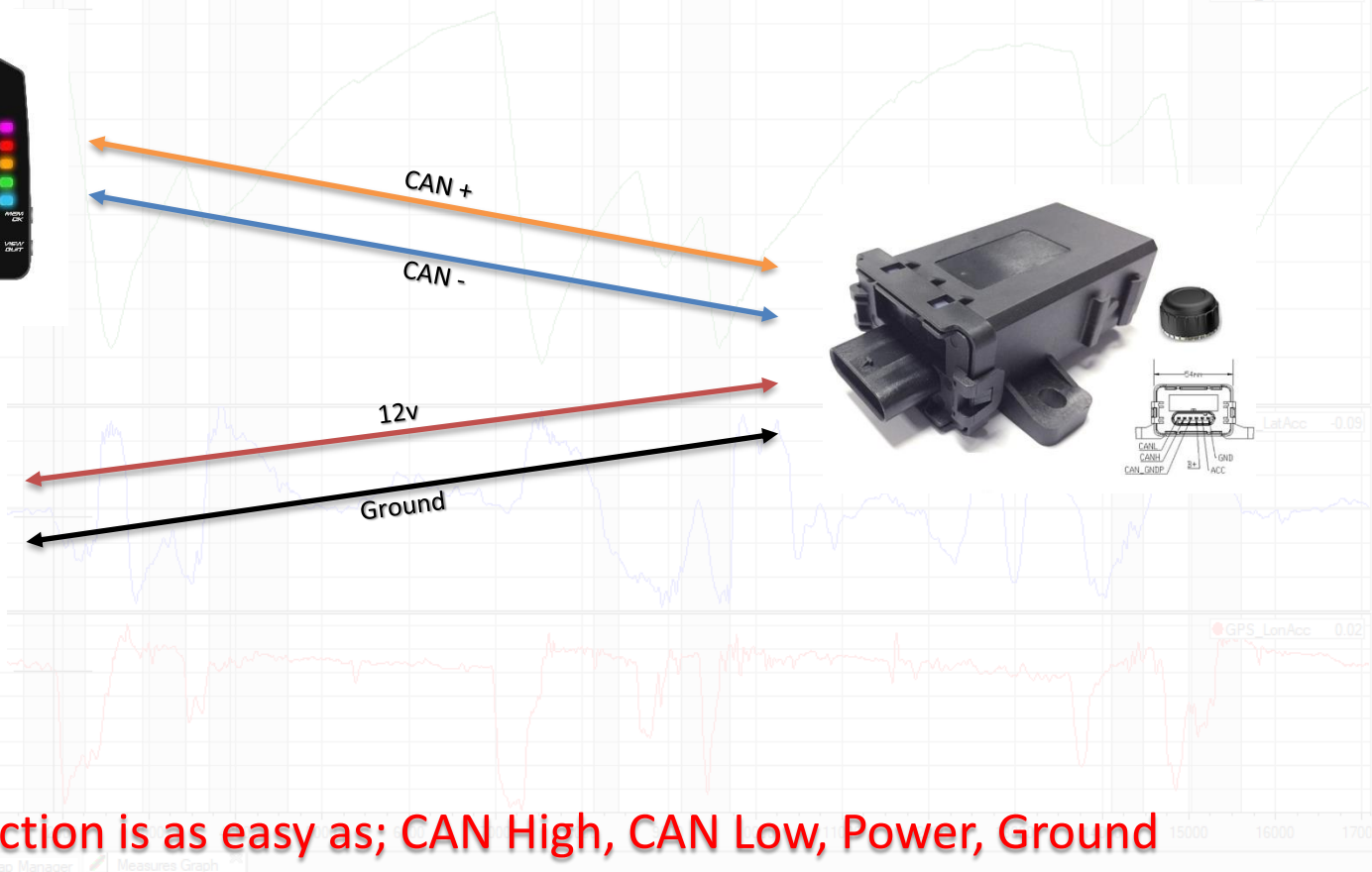
Tests Loaded:

MATHS_Andrew_MuleHT8_VIR_VA_Warm-up

GPS_Speed	
RearD	
ECU_F	
ECU_Pet	
ECU_Wi	
Oil_Ti	
ECU_La	
ECU_Spa	
ECU_Intal	
External	
GearRu	
Lambda	
Spark_AdvFiltered [deg]	23.50
OverRev [secs]	0.00
OverRevFiltered	
ECU_SpeedCheckF	
AFR [rat]	
AFR_Flt [ra	
AvgRearWheelSpeed	
RPS_Diff [	
ECU_SpeedCheck	
GPS_LatAcc	
GPS_LonAcc	
GPS_Slope [	
InlineAcc	
LateralAcc	
VerticalAcc	
PitchRate [deg/s]	-0.0
RollRate [deg/s]	0.8
YawRate [deg/s]	-0.2
GPS_PosAccuracy [m]	0.940
GPS_Hea [m]	15
GPS_Gyro [deg/s]	-0.9
GPS_Heading [deg]	-23.8
GPS_Altitude [m]	142.9
GPS_SpdAccuracy [m]	0.157



CAN Connections



CAN connection is as easy as; CAN High, CAN Low, Power, Ground

Tire Temps Overview

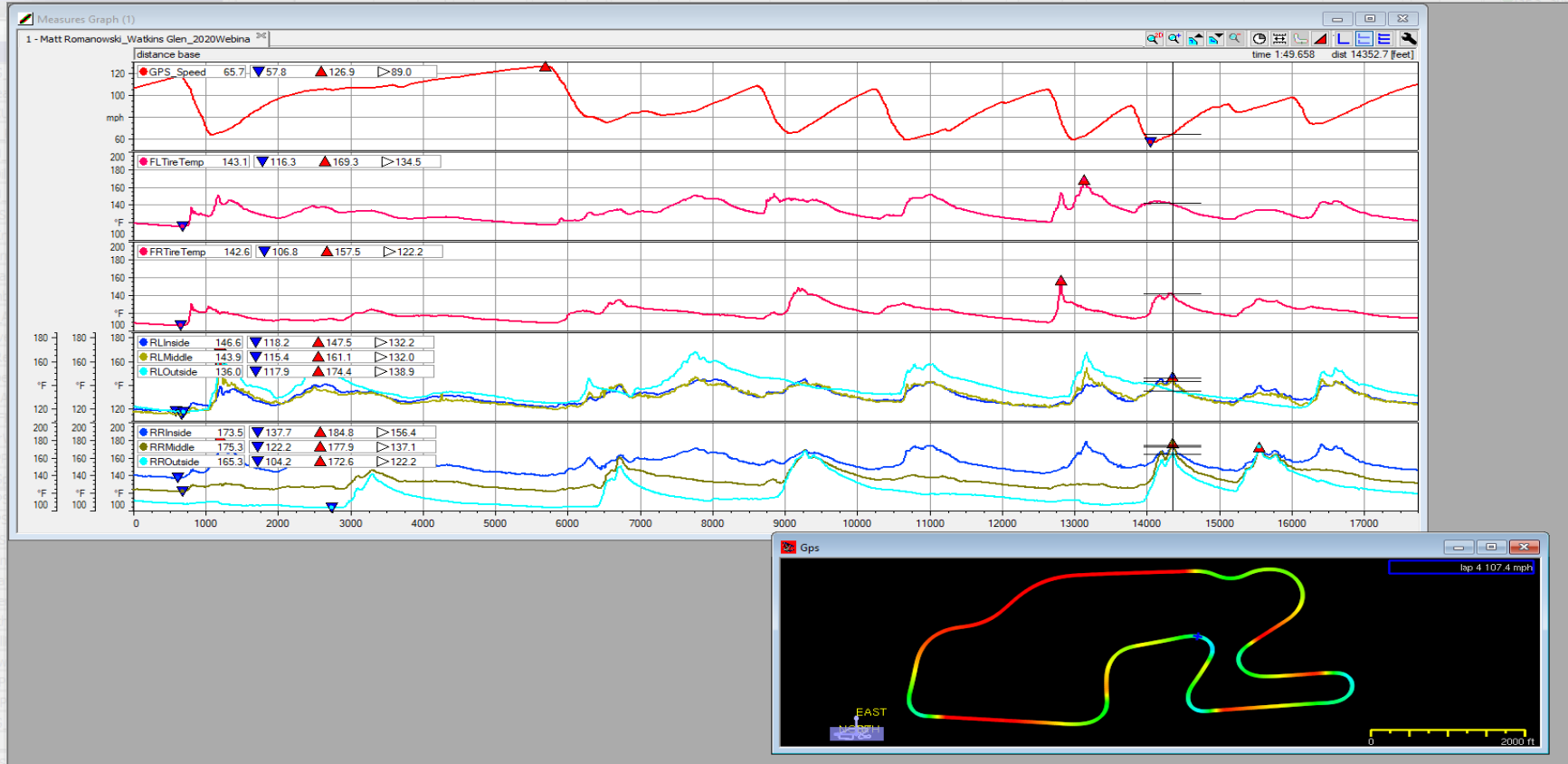
General Tire Temp Overview:

- Outside Section Cooler
- Inside Section Warmer
- Roughly 20-30° Difference Outside to Inside
- Tire Manufactures Will Often Have Recommendations
- Excessive Hot Outside:
 - Need More Negative Camber
- Excessive Hot Inside:
 - Need Less Negative Camber
- Higher Middle Temps:
 - Tire Pressure Too High
- Cooler Middle Temps:
 - Tire Pressure Too Low
- Check Out:
 - "The Racing & High-Performance Tire: Using Tires to Tune for Grip & Balance"

Pitlane Measurements



Tire Temps 'On Track'

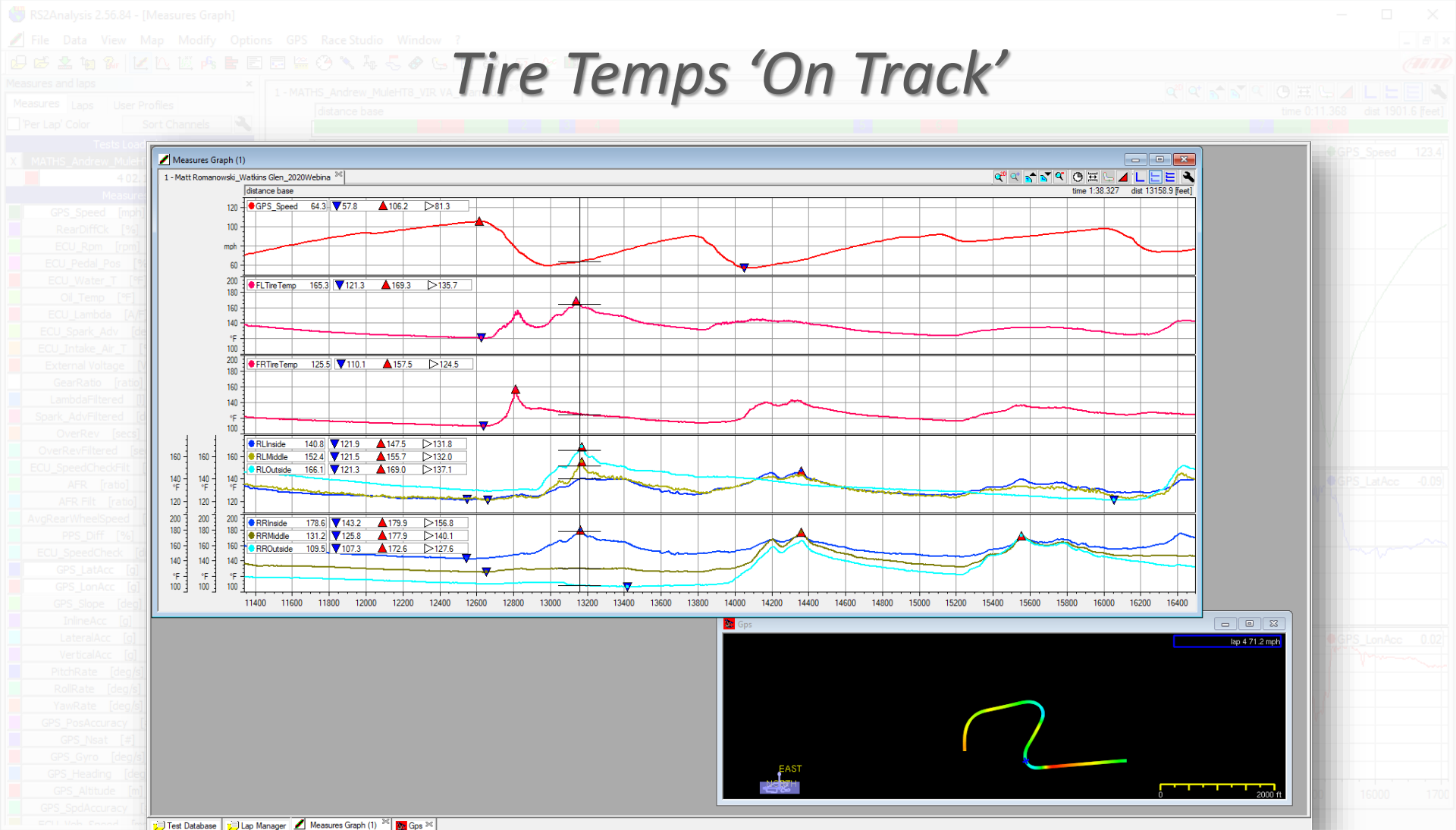


You can review all of your tire temps IN ACTION with IR sensors. Now instead of trying to infer what happened on track, we know!

Tire Temps 'On Track'

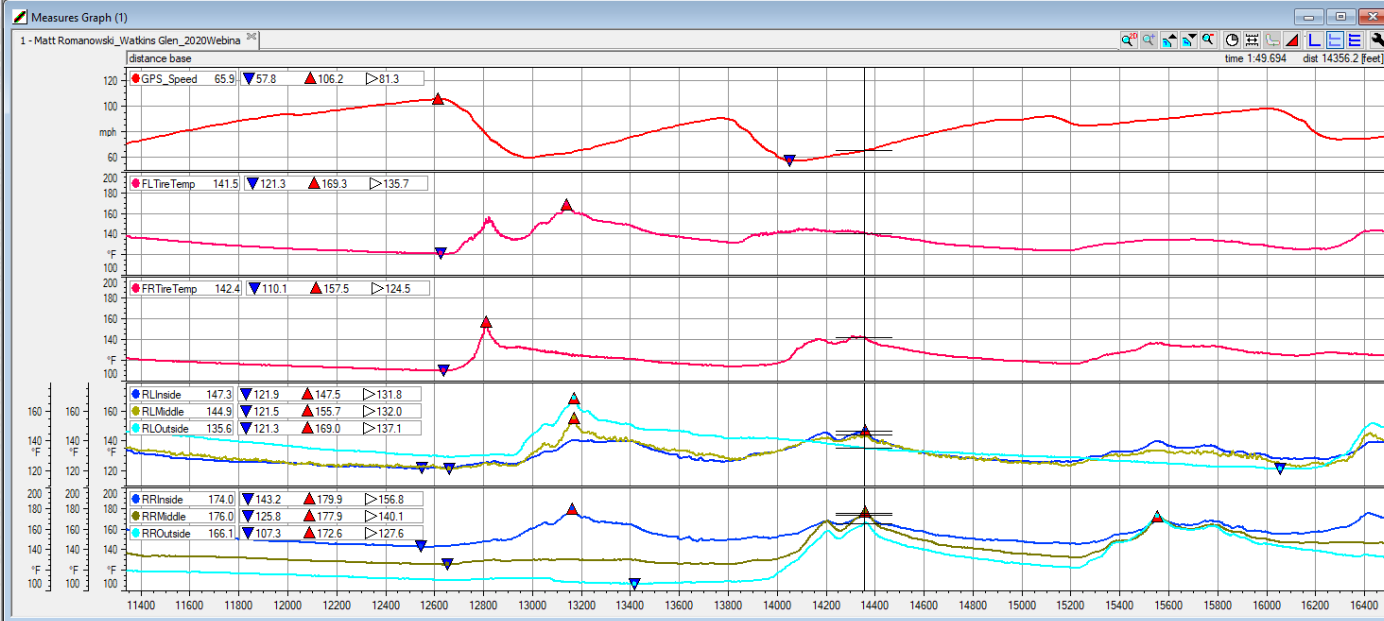


Zoom into corners and areas of interest. Notice the temps go from pretty far apart on the straights to even in the corners.

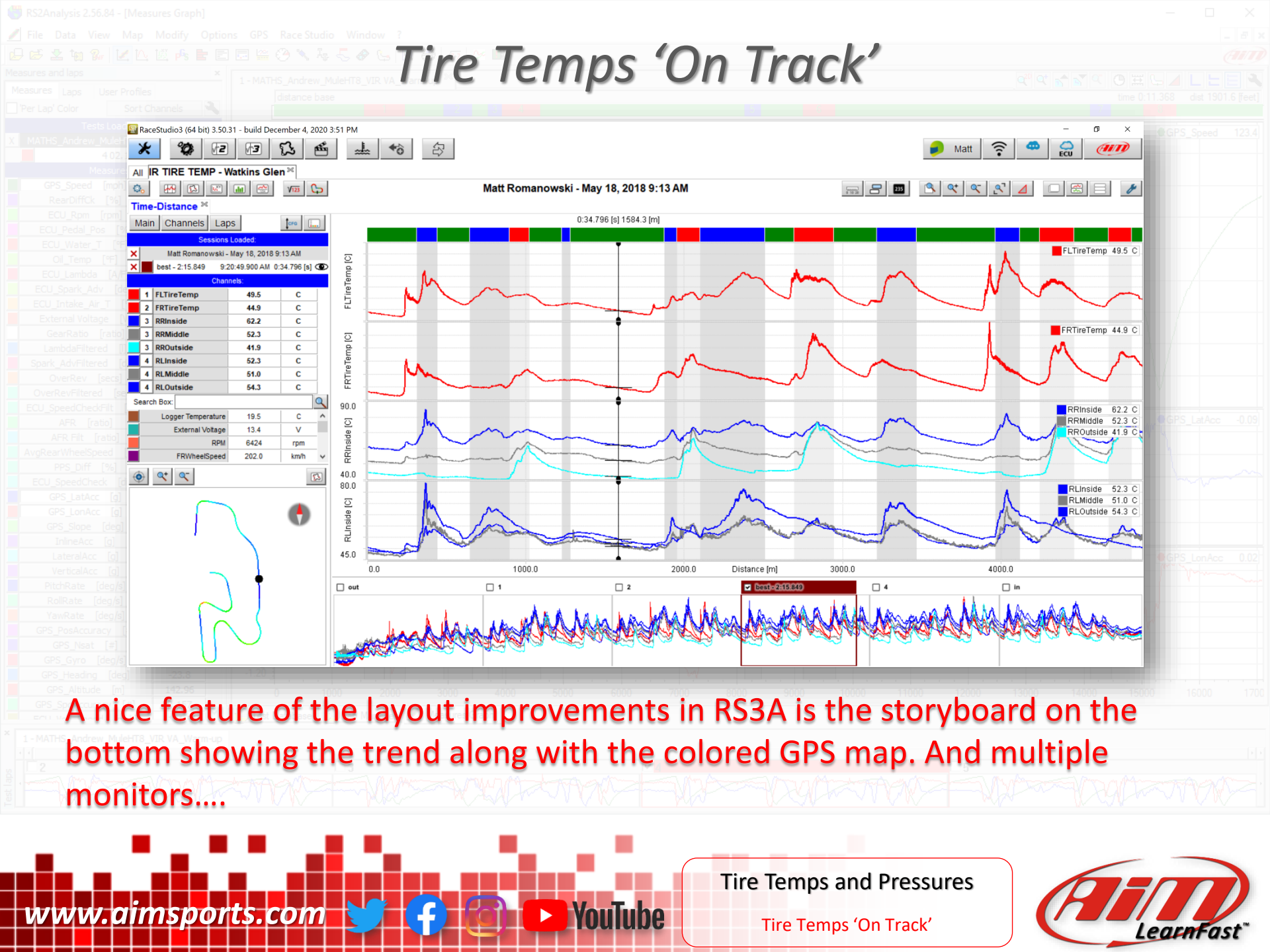


Once in the corner, temp gradients are down to 26° or better on the outside tire (loaded). Inside tire temps are showing 68° because of the camber curve in droop.

Tire Temps 'On Track'

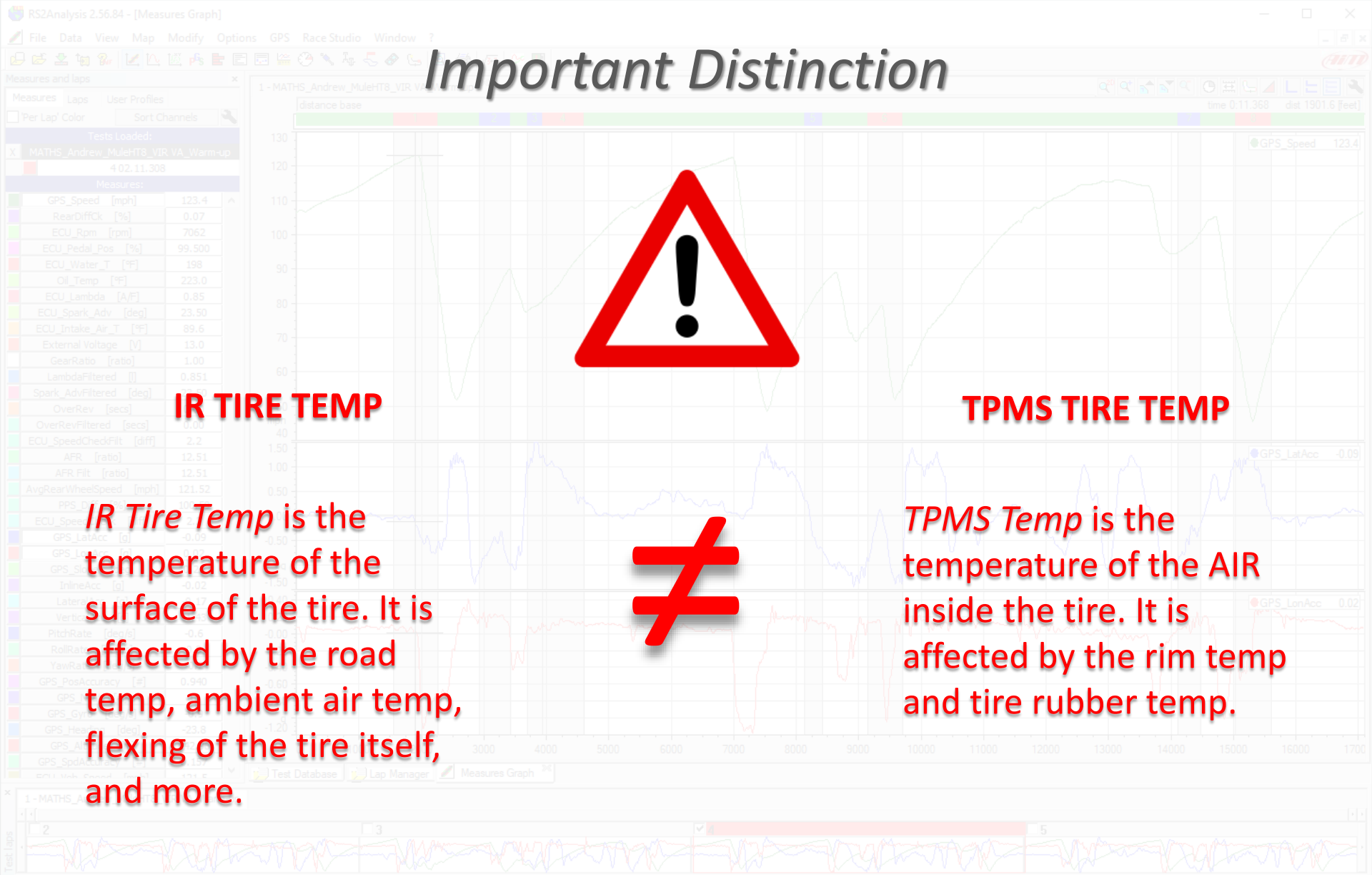


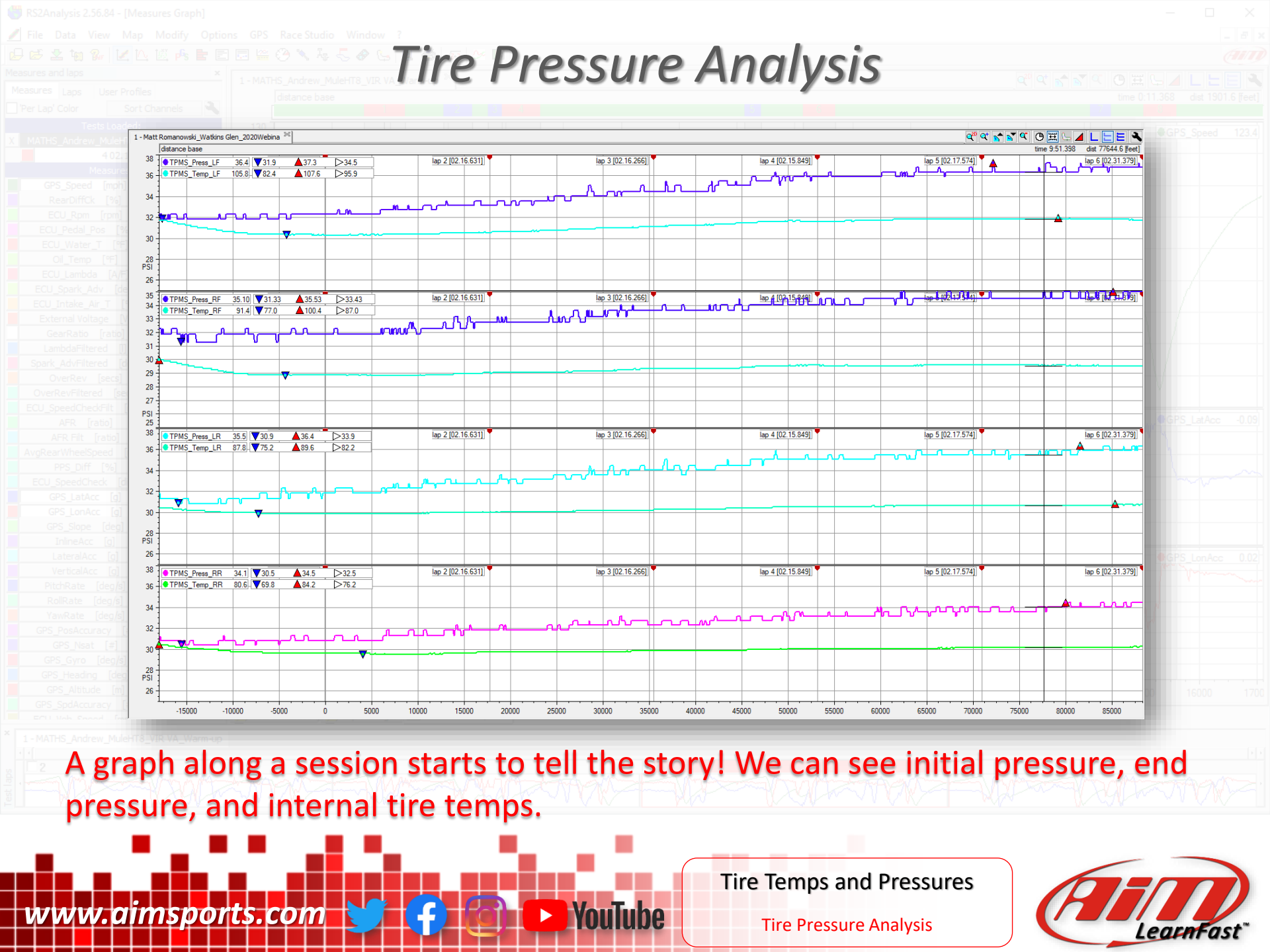
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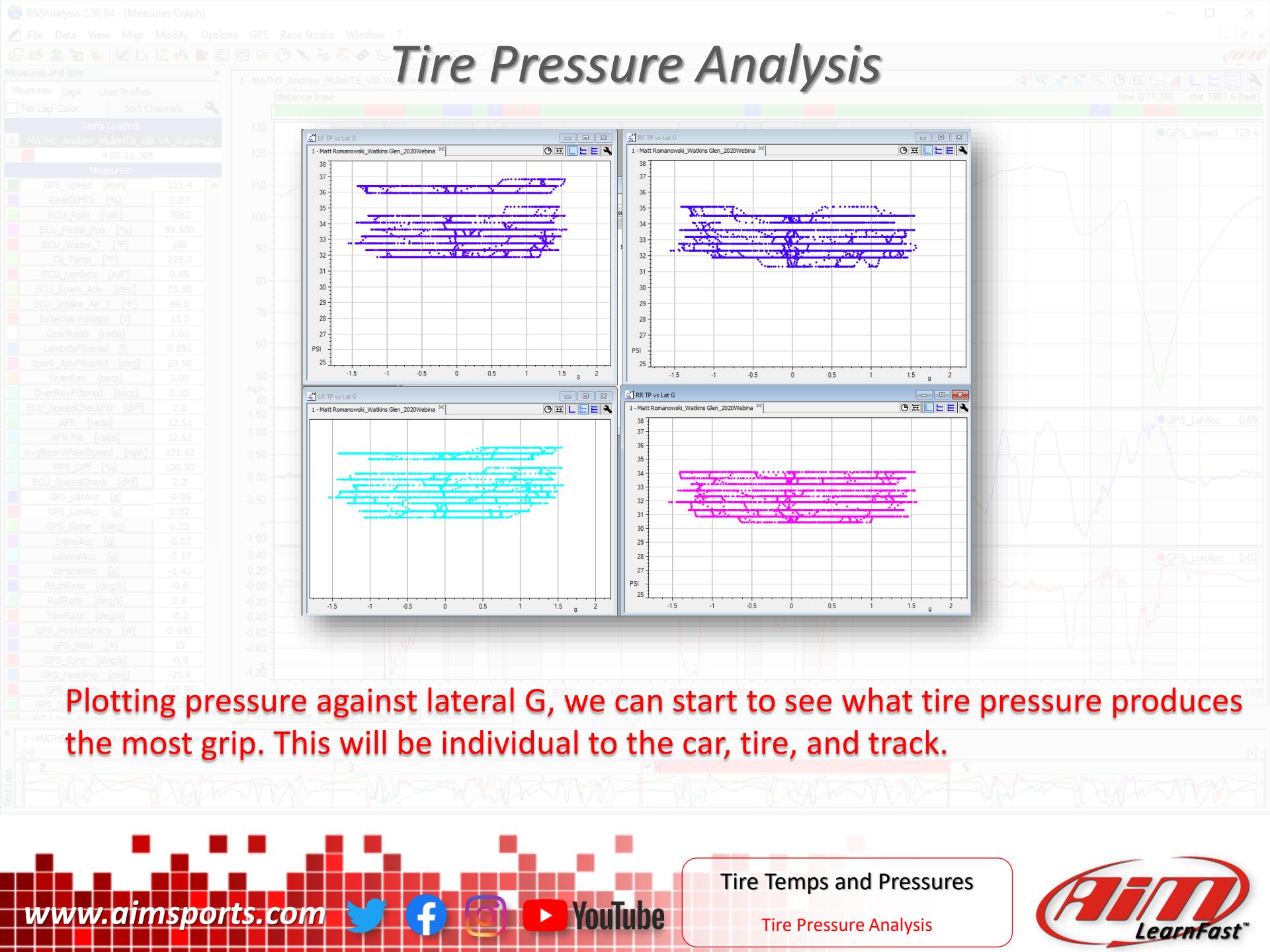


A nice feature of the layout improvements in RS3A is the storyboard on the bottom showing the trend along with the colored GPS map. And multiple monitors....









Tire Pressure Analysis

RS2 Analysis 2.56.84 - [Measures Graph]

File Data View Map Modify Options GPS RaceStudio Window ?

Measures and laps

Measures Laps User Profiles

1 - MATHS_Andrew_MuleHT8_VIR_VA

[distance base]

time 0:11.368 dist 1301.6 feet

Speed 123.4

All Tire Press vs Lat G - Watkins Glen

Scatter

Main Channels Laps

Search Box:

Logger Temperature	67.1	F
External Voltage	67.1	V
	67.1	
	67.2	
	68.0	
	68.9	
	13.5	
	13.5	
	13.5	
	13.4	
	13.4	
	13.4	
	6530	
	6396	
	6438	
	6402	
	6464	
	6505	
	106.4	
	125.8	
	126.8	

Watkins Glen International

Temporarily closed

Leaflet | © Google Maps

GPS LatAcc -0.04

GPS LatAcc -0.04

GPS LatAcc -0.04

GPS LatAcc -0.04

out - 2:38.465

1 - 2:16.631

2 - 2:10.265

Best - 2:13.640

4 - 2:17.573

In - 2:31.378

RS3 Analysis gives us a great view of pressures vs lateral G, colored for distance. You can also use the test laps toolbar at the bottom to see how the pressures increased over the length of the session.

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Tire Temps and Pressures

Tire Pressure Analysis

Tire Pressure Analysis

RS2 Analysis 2.56.84 - [Measures Graph]

Measures and Laps

Measures Laps User Profiles

Per Lap Color

All Tire Press vs Lat G - Watkins Glen

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	6464	
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	126.8	

Watkins Glen International
Temporarily closed

Leaflet | © Google Maps

Matt Romanowski - May 18, 2018 9:13 AM

GPS LatAcc -0.04

GPS LatAcc -0.04

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Tire Temps and Pressures

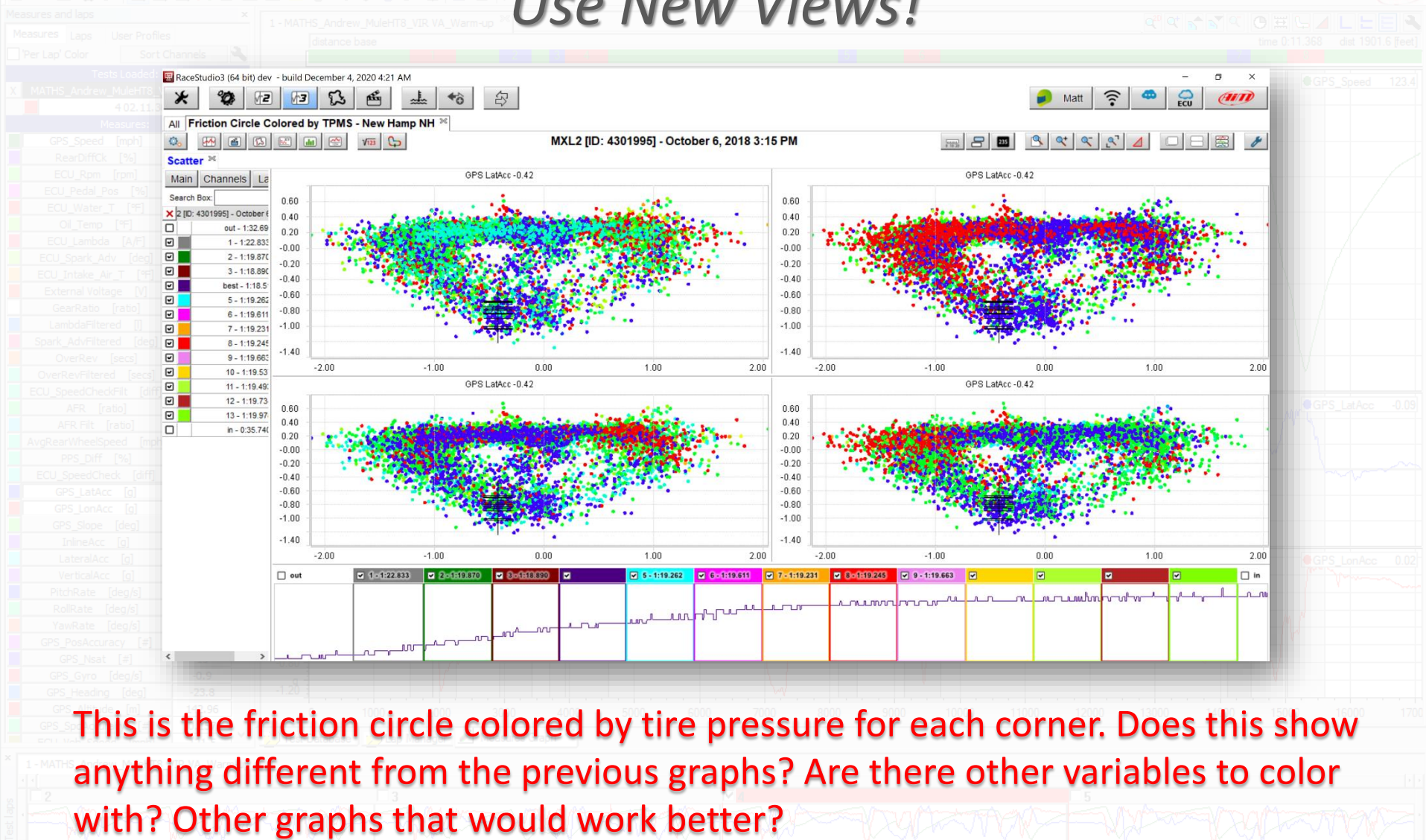
Tire Pressure Analysis

Experiment!



Use the TPMS to do “pressure sweeps” at each track to find what is the optimal pressures are for that tire/track. You will find differences!

Use New Views!



Educated Decisions!

Tire Pressure Calculations

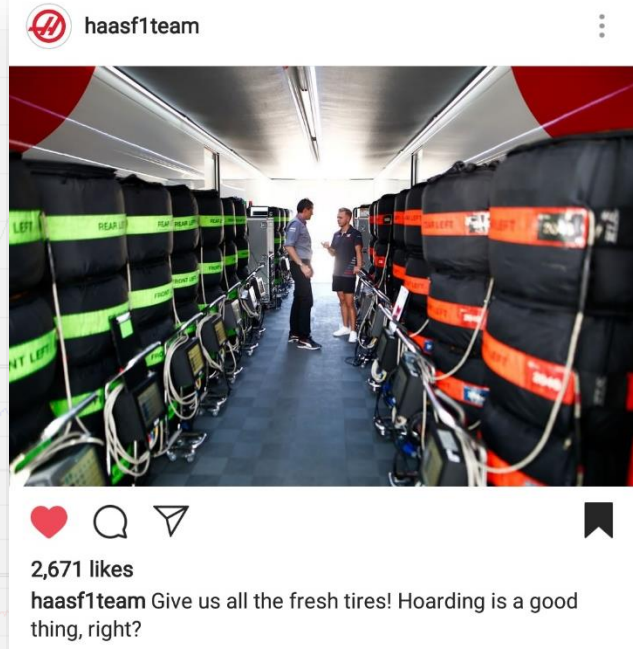
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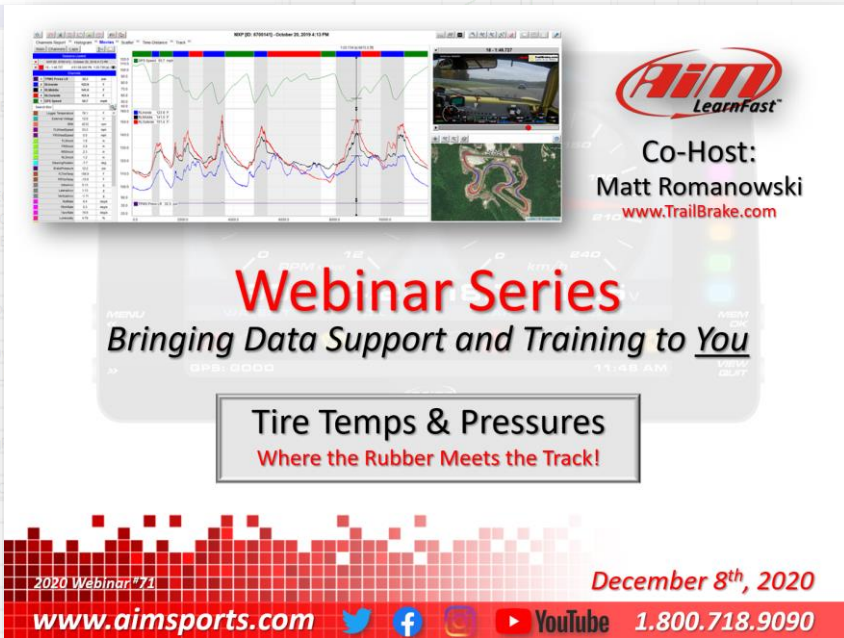


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- Pre-Calculated Gear Position Function
- Configuring WiFi Communication
- Customizing AiM Device Logos
- Race Studio 3 Basic Configuration - Part 1
- Race Studio 3 Basic Configuration - Part 2
- **I Have Downloaded my Data, Now What - Part 1*
- **I Have Downloaded my Data, Now What - Part 2*
- GPS Lap Insert
- Data Views
- Measure Units
- Sort Channels
- Test Properties
- Per Lap Color
- Export Tests
- Channel Reports
- Setting Time
- Track Mapping
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Next Webinar

Thursday Dec 10th, 2020

10:00am Pac / 1:00pm East



POINTKARTING

Co-Hosts

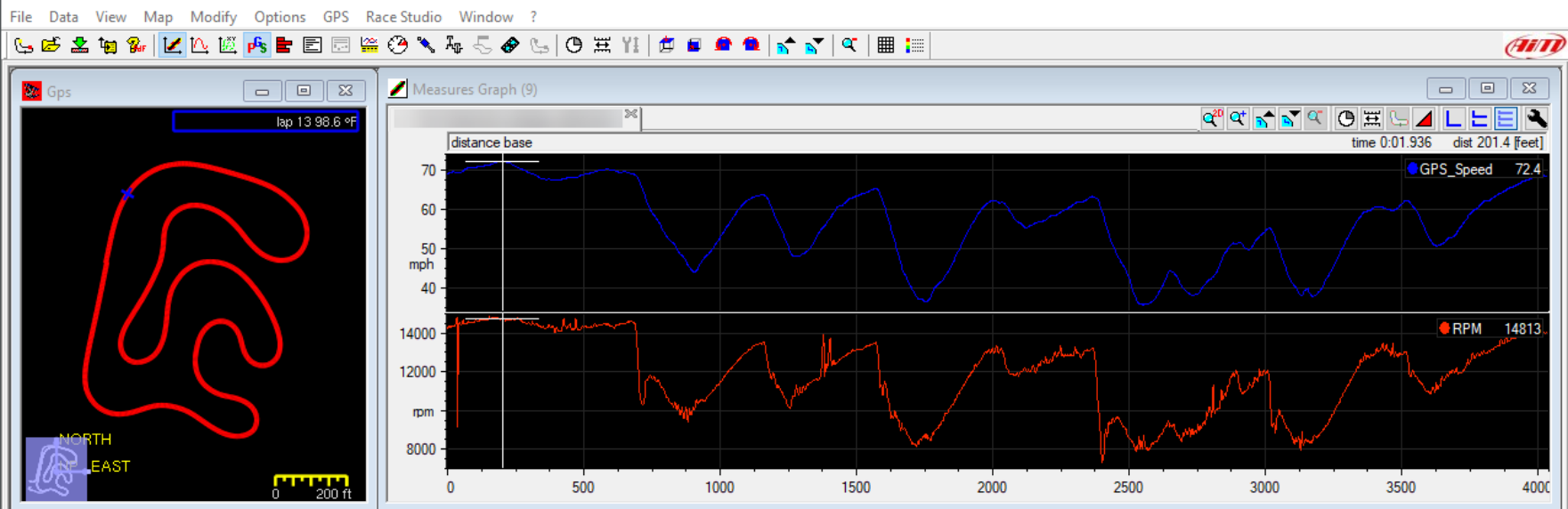
Eric Gunderson

Davin Sturdivant



Remote Data Coaching

Using AiM Data and Race Studio Software



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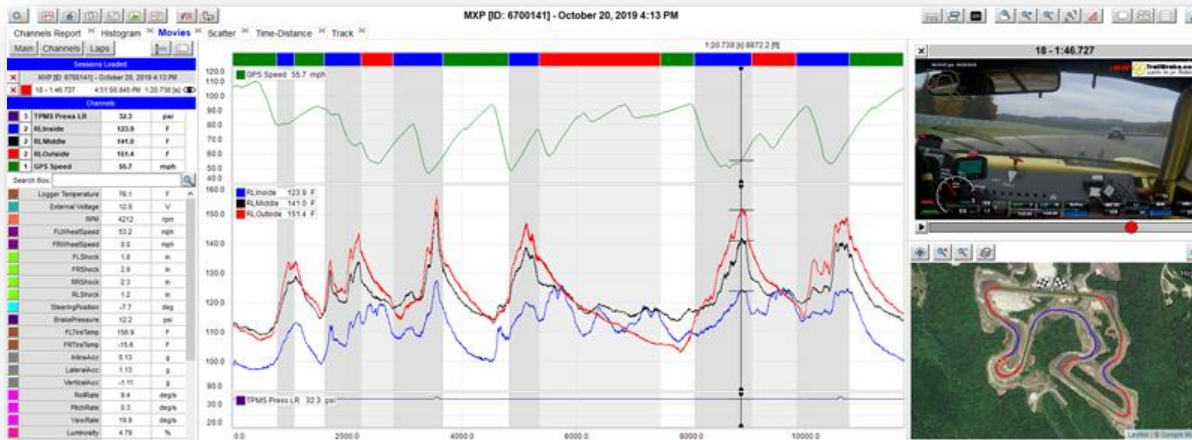


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Next Webinar Topic

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Contact Info

Roger Caddell
roger@aimsports.com

Matt Romanowski
matt@TrailBrake.net
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