

Validating Setup Changes

Using Racing Simulator Data



Host:

Roger Caddell

AiM Sports - National Training Manager



Guest:

Ray Phillips

Precision Driving Analytics



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

Tuesday August 3rd, 2021

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Ray Phillips

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- Owner of Precision Driving Analytics
- Involved in Motorsports for 27 Years
- Driver for 17 Years
- Data Engineer for 2019 Ferrari Challenge Championship Team
- 5 Time Aim LearnFast Webinar Co-Host!



Ray Phillips

Precision Driving Analytics

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Getting The Data

Assetto Corsa => Race Studio 2 Analysis

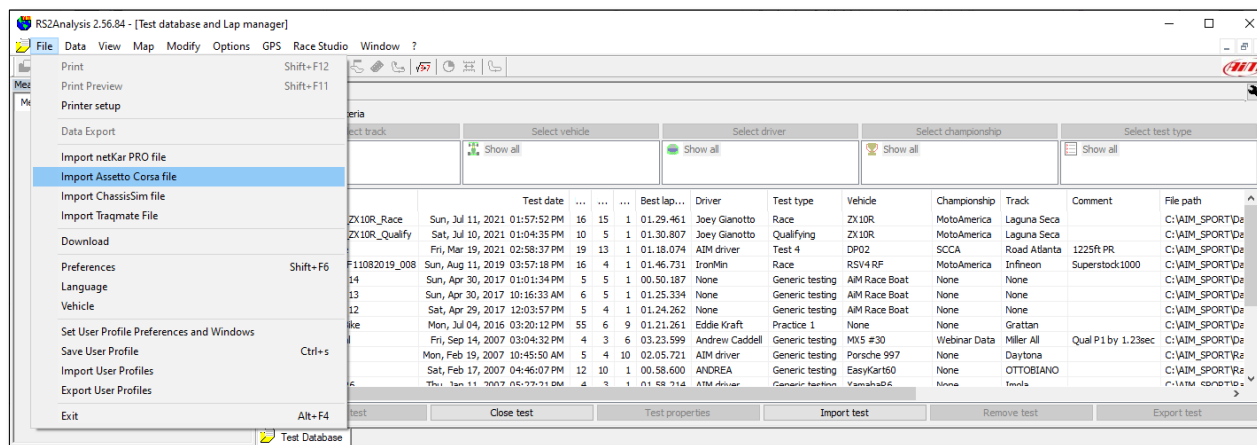
1. You need the *telemetry_dump.act* file which can be found here:

C:\Users\xxxx\Documents\Assetto Corsa\aim

Note: This file is overwritten every time you start a new session in Assetto Corsa
Make sure you import the file into AIM every time you want to analyze a session

2. Import the file into AIM RS2 Analysis
3. Click on the “File” tab and then “Import Assetto Corsa file”

Note: All other data sessions must be closed in order to import the file



Validating Setup Changes

Assetto Corsa – Getting The Data

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Assetto Corsa

Ferrari 488 GT3 Initial Setup





Ferrari 488 GT3





INFORMATION

The Ferrari 488 GT3 is the racing version of the latest 488 GTB, presented at the Ferrari Finali Mondiali, as replacement for the 458 Italia.

This car features large side intakes to provide a better air flow to its twin-turbocharged 3.9-liter V8.

TECH SPECS

Weight 1270kg

Power 500bhp

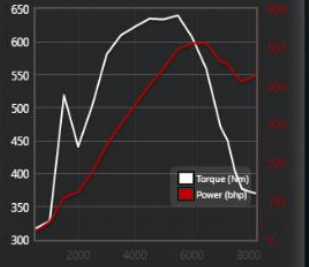
Torque 640Nm

Top Speed --km/h

Acceleration --s 0-100

Weight/Power Ratio 2.54kg/hp

POWER GRAPH



The graph shows Torque (Nm) in white and Power (bhp) in red. The x-axis represents RPM from 0 to 8000, and the y-axis represents both Torque (0 to 650 Nm) and Power (0 to 600 bhp).

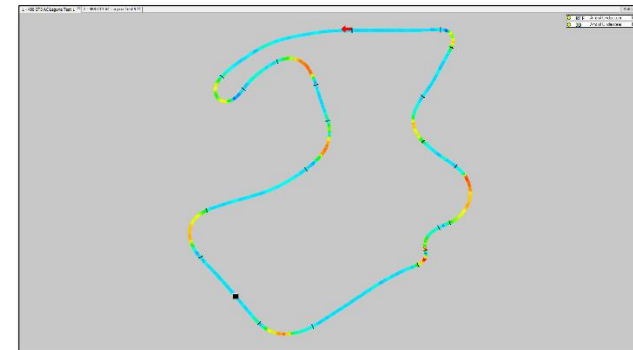
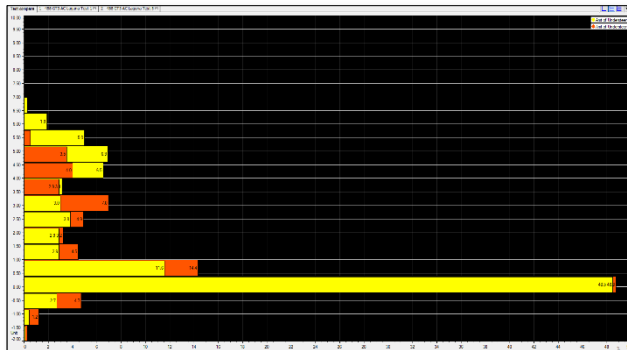
RPM	Torque (Nm)	Power (bhp)
0	300	0
2000	450	100
4000	600	350
6000	640	500
8000	300	400

Assetto Corsa

Ferrari 488 GT3 Initial Setup



Tires:	Medium Compound, all tires set to 16 psi cold
Fuel:	30 liters
ABS:	Set to 5 out of 12
Aero:	Front Splitter set to 1 which is the max Rear Wing set to 6 out of 10
Front Camber:	Approximately -3.4 degrees
Rear Camber:	Approximately -2.8 degrees



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Assetto Corsa – Initial Setup

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Ferrari 488 GT3 Initial Setup (Cont'd)



Front Toe:

Approximately .08 degrees or 1.0mm in on both sides

Rear Toe:

Approximately .12 degrees or 1.5mm in on both sides

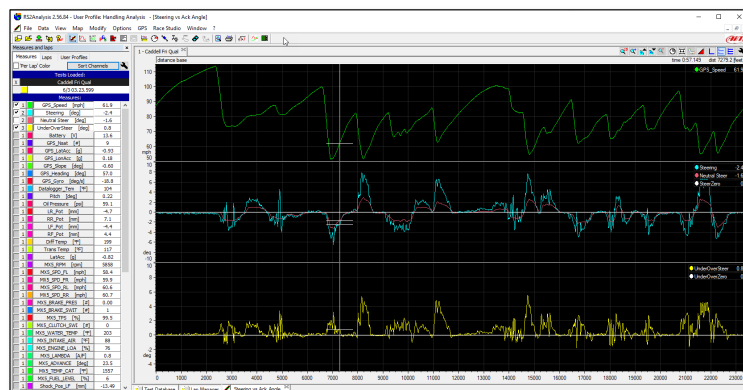
Front Dampers:

Low Speed Bump 5 out of 16

High Speed Bump 2 out of 16

Low Speed Rebound 10 out of 16

High Speed Rebound 10 out of 16



Validating Setup Changes

Assetto Corsa – Initial Setup (Cont'd)



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Ferrari 488 GT3 Initial Setup (Cont'd)

Rear Dampers:

- Low Speed Bump 7 out of 16
- High Speed Bump 1 out of 16
- Low Speed Rebound 11 out of 16
- High Speed Rebound 6 out of 16

Drivetrain:

- Differential Power 40% out of 90%
- Differential Coast 65% out of 85%

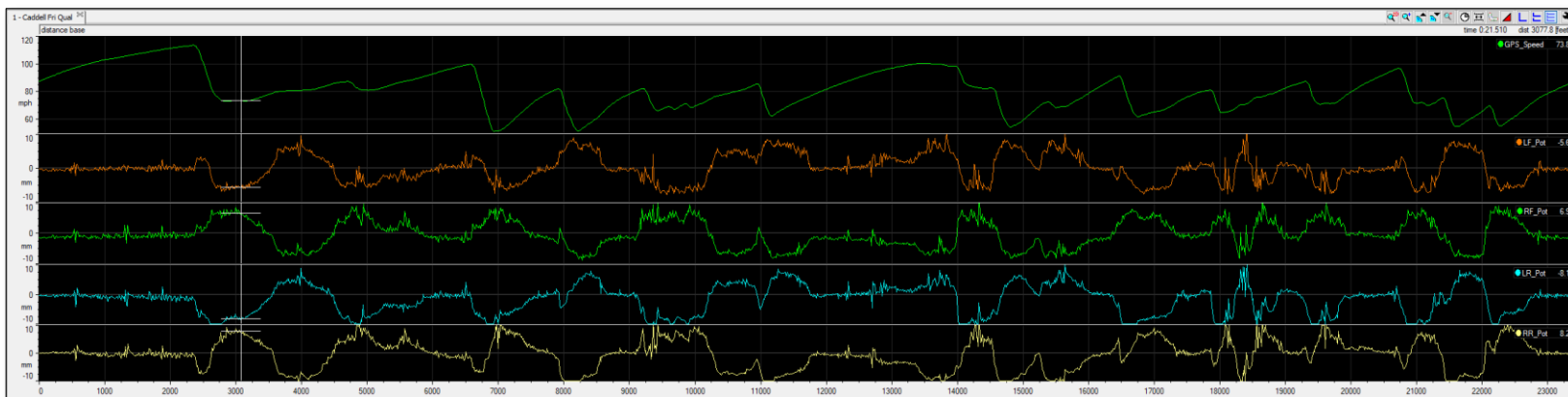


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Ferrari 488 GT3 Initial Setup (Cont'd)



Brake Bias:	67% to the front
Front Shock Travel Range:	59 mm
Rear Shock Travel Range:	70 mm
ARB Front:	15 out of 15 (Full Hard)
ARB Rear:	0 out of 9 (Full Soft)
Front Ride Height:	69 mm
Rear Ride Height:	70 mm
Front Wheel Rates:	130 N/mm
Rear Wheel Rates:	125 N/mm



Validating Setup Changes

Assetto Corsa – Initial Setup (Cont'd)

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What Is Understeer?

If a steady state cornering state is assumed and there is no slip angle at the front or rear, then the steering angle required to negotiate the corner is called the Ackermann Steering Angle.

Authors Milliken and Milliken give the following definitions for neutral steer, understeer, and oversteer:

- Neutral Steer: $\text{Steered Angle} = \text{Ackermann Steering Angle}$
- Understeer: $\text{Steered Angle} > \text{Ackermann Steering Angle}$
- Oversteer: $\text{Steered Angle} < \text{Ackermann Steering Angle}$

Note: This definition can be found in Analysis Techniques for Racecar Data Acquisition written by Jorge Segers

Calculating Understeer



Compare the theoretical (Neutral or Ackermann Steering Angle) amount of steering required to the actual steering input

If the actual steering input is more than the theoretical amount of steering required than that is Understeer

If the actual amount of steering input is less than the theoretical amount of steering than that is Oversteer

Formula for Neutral or Ackermann Steering Angle:

$$\left(\text{atan} \left(\frac{\text{Wheelbase (Inches)}}{12} \right) / \left(\frac{(\text{Speed (mph)} * 1.467)^2}{(\text{Lateral G} * 32.167)} \right) \right) * 57.2958$$

Feet

Feet²/Sec²

Feet/Sec²

Radians

Degrees

Calculating Understeer (Cont'd)



Steering At Wheels:

Steering Wheel Angle (deg)/Steering Ratio

Or you can put the front tires on turn plates and measure it

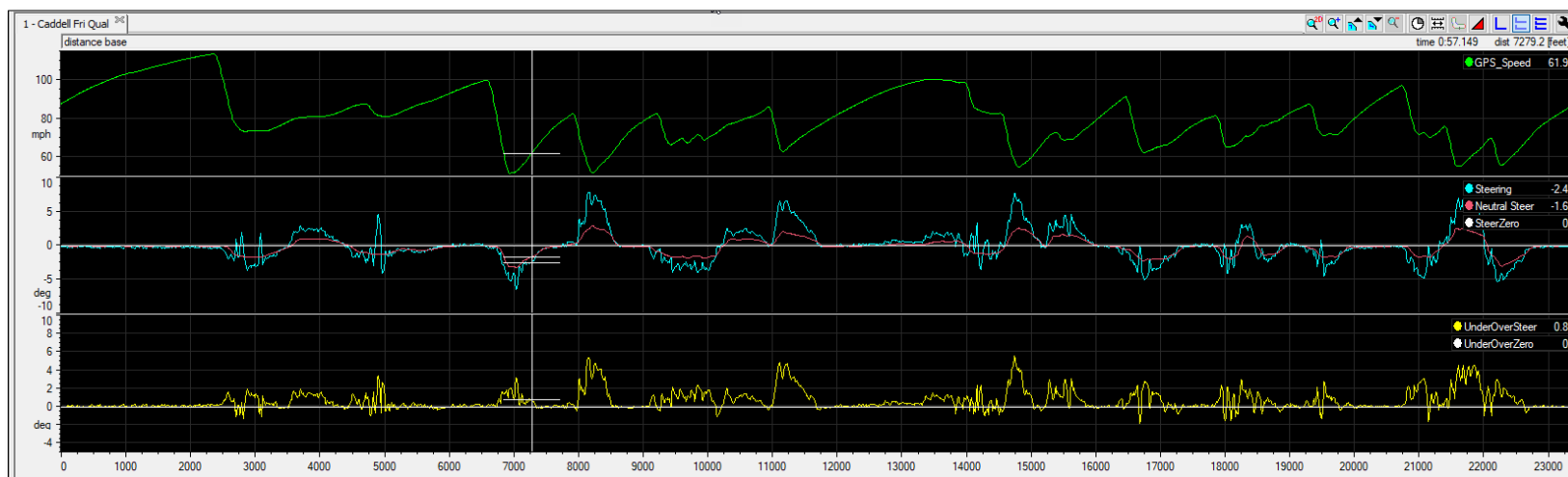
You definitely need to do this if you have a car with a variable steering ratio

You will need to create a custom sensor as well

Use the measurement of the outside wheel

Amt of Understeer/Oversteer:

$\text{abs}(\text{Steering at Wheels}) - \text{abs}(\text{Neutral Steering})$



Validating Setup Changes

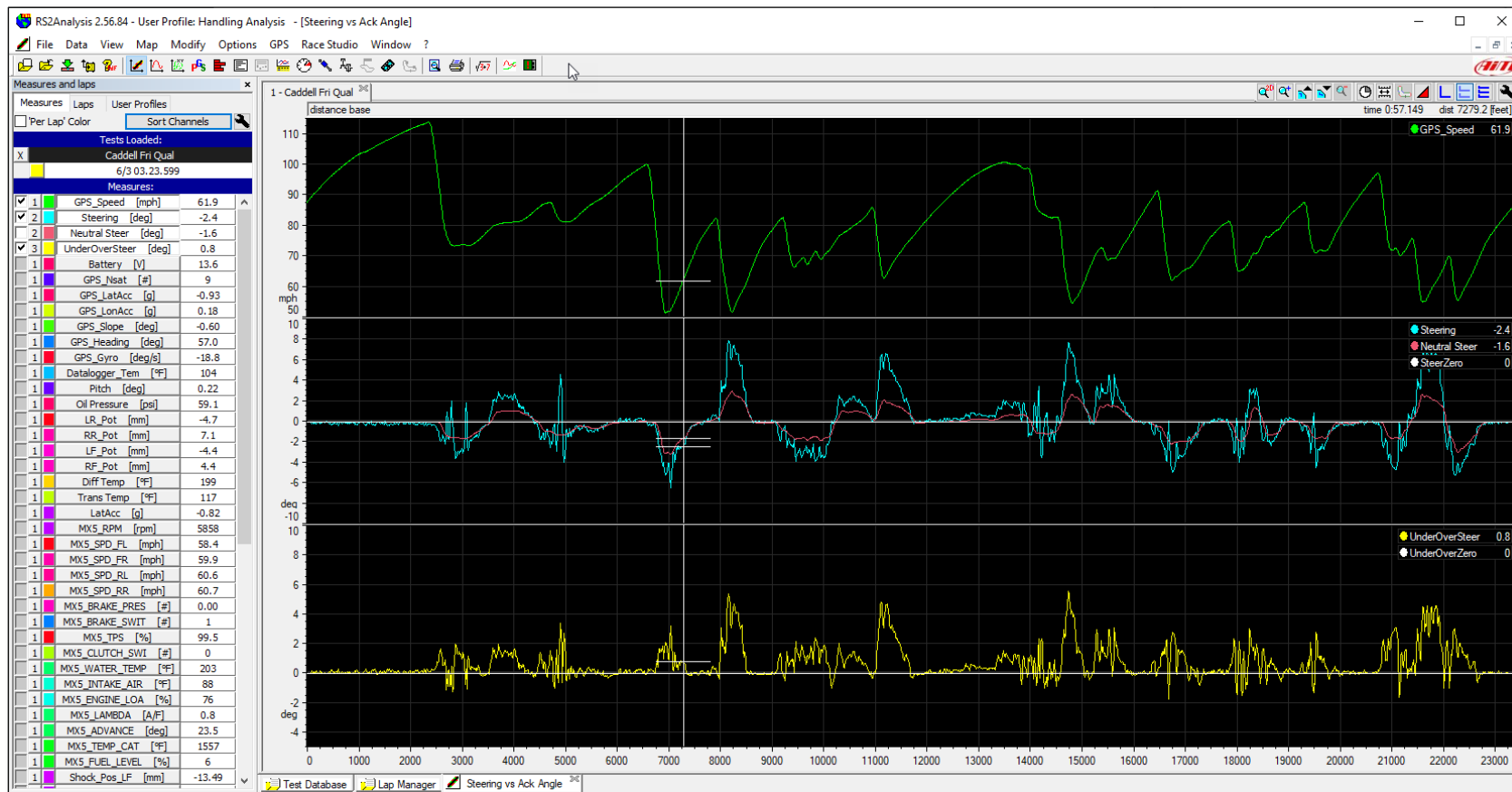
Calculating Understeer (Cont'd)

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Live Race Studio Data Analysis



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Host:
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Motorcycle Racing Data - V2
With Motorcycle Data Engineer, Chisel Lewis

Host:
Roger Caddell
AiM Sports - National Training Manager

Guest:
Chisel Lewis
Motorcycle Data Engineer

aimsports.com Tuesday July 27th, 2021 LearnFast™

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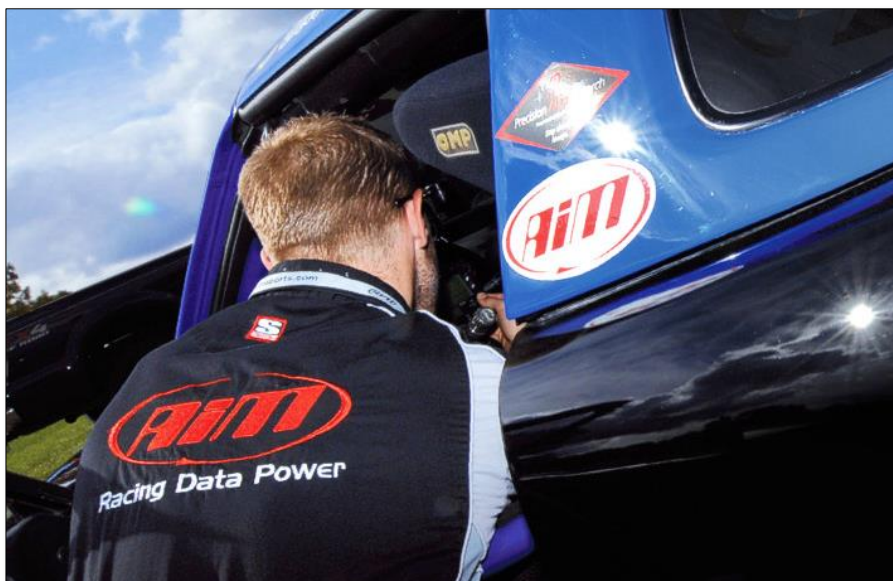
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Customer Support

At An Event Near You!

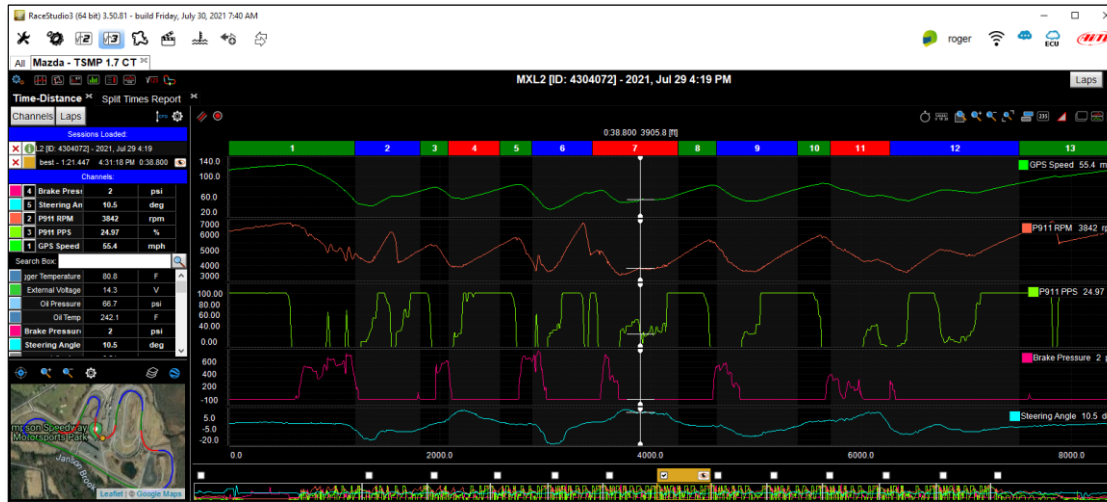
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Chasing a Laptime in Your Own Data

Goal Oriented Data Analysis



Host:

Roger Caddell

AiM Sports - National Training Manager

Co-Host:

Matt Romanowski

TrailBrake.com

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



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Chasing a Laptime in Your Own Data

Goal Orientated Data Analysis

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Tuesday August 3rd, 2021

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