Data in the SCCA Road Racing World

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&

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Data Acquisition – 2018 Activity

- Specialty is growing "slowly"

- More Activity

- More visibility

- Lots more "touch points"

- 23 Licensed Race Data Technicians
- 558 data files collected
- Over 250 drivers
- 22 Classes
- 15 Tracks
- Over 80 data reports completed

Data Acquisition – 2018 Changes

- Use of actual weights
- "NO surprises"
- Data report evolution
- Conversion of data collection devices
- Changes in GCR and Operational Manual – per following slides

- All cars "sampled" must be weighed at the end of the session
- Sample Plan posted at registration "NO surprises"
- Data reports continue to evolve to meet requests from Club Racing Board and Advisory Committees
- Initiated conversion to AIM Solo 2 data collection devices
- Changes in GCR and Operational Manual – per following slides

5.11.5. Race Data Technicians

- This program is to assist the Club Racing Board in performance balancing. If selected, drivers' participation is not optional and is not protestable. The data collected will not be used for compliance purposes. ***All cars carrying an SCCA data collection device shall report to impound immediately after their sessions.***

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- Knowing actual weights helps make better Balance of Performance decisions.

Data Technicians are ~~optional~~ Officials whose duties include:

- A. Being responsible for placing, operating and removing SCCA supplied data boxes on cars at all Club races.
- B. Analysis of data retrieved from all sources, including dyno runs, at-race data boxes and data provided by individual racers.
- C. Prepare reports to the applicable Advisory Committees, and to the CRB, with recommendations for competition adjustments.

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D. Data Technicians will be required:

1. To keep all information collected and analysis completed confidential and not share the information outside of other licensed Data Technician, Club Racing Board, respective committees and SCCA National Staff.

2. Not use the information for any purpose other than the performance of duties as a Data Technician on behalf of the SCCA.

Clarify and reinforce the needs to keep data confidential
Identify the "ownership" of the data

9.3.16. DATA COLLECTION DEVICES

A. Driver Data Collection - Data collection devices are considered to be instrumentation and are therefore allowed in all classes that permit the installation, replacement or addition of gauges, indicators or instruments.

B. Official Data Collection - *The Road Racing Board uses SCCA data acquisition devices to assist in performance balancing. Race Data Technicians assist in placing the SCCA data acquisition devices at events. If selected, drivers' participation **is not optional and is not protestable.** The data collected will not be used for compliance purposes. All cars carrying an SCCA data collection device shall report to impound immediately after their sessions.*

- Better define the allowable use of data collection by drivers
- Insert the use of data by the club into the GCR to eliminate the need to rely on Supplemental Regulations

9.1.8.C.I. DATA COLLECTION
(P1 – similar FA & P2)

- All P1 Sports Racing Cars competing in Majors Races and the Runoffs must have the AIM part #X47KPF- SOLO2R0 data box mount installed on their vehicle to provide the necessary mounting of the AIM Solo or Solo 2 data box. The mounting surface is to be approximately oriented either horizontally or vertically either parallel or perpendicular to the longitudinal axis of the car and must be accessible from the exterior of the car with the driver on board -- it should have a view of the sky, and not be located under carbon fiber or metallic bodywork. Sufficient space should be left between the mounting plate and the surface to which it is attached to permit the use of zip ties/tie straps to restrain the data box to the mounting plate. The purpose of this requirement is to allow the random placement of data boxes on cars on pre-grid by SCCA assigned personal and the collection of the box when the car exits the race track. Contact AIM and their distributors for direct purchase.

Clarify the proper installation and identify the correct mounting plate to use going forward.

Upcoming Changes

- Tested at Blackhawk Farms Divisional

- In use at Sonoma Runoffs – over 200 data files collected……..

- Use of newly developed roll bar mounting system allows for easy placement and removal of data boxes.

- Can now be installed on the grid greatly reducing time and effort finding cars in the paddock.

- Works on most production based cars.

- Drivers will still be notified of sampling efforts before sessions.

Race Data Technicians

- Still a specialty and process under development.
- Help needed in both data collection and data analysis.

"Without data you're just another person with an opinion."
- W. Edwards Deming, Data Scientist.

Meet interesting people

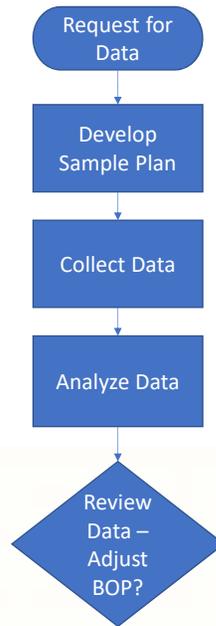Learn new skills

For more information CONTACT:

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Race Data Technician
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WANTED -
RACE DATA
TECHNICIANS

SCCA Road Racing

Data Acquisition is a volunteer specialty within the Sports Car Club of America. "Data Techs" place small GPS driven data collection devices in race cars at various SCCA events. The data (speed, acceleration, g-forces) is then downloaded, analyzed, and reports written and provided to the Club Racing Board and Class Advisory Committees to aid in making Balance of Performance adjustments. Volunteers are needed, and an opportunity exists to learn a new specialty and put your social and analytical skills to work. Guidance, training, and moral support provided.

The Process

Request for Data → Develop Sample Plan → Collect Data → Analyze Data → Review Data – Adjust BOP?

- Sample plan for event developed in advance with input from CRB and Advisory Committees identifying class and specific cars.

- Sample plan communicated to drivers at registration, drivers' meeting or on grid the session prior to data box placement.

- Data collected, downloaded, analyzed per requests and reports posted to SCCA SharePoint site.

- CRB and Committees review and utilize available reports for Balance of Performance adjustments.

Data Collection – Sample Plan/Log Sheet

Race Data Acquisition Log

Track: Buttonwillow Race Park 25 cw Sanction # 18-ST 5310-5

Data Box #	Date	Time	Class	Race / Qualifying	Driver Name	Make/Model	Notes (restrictor/weight)
1.	1/28/18	6:20	P-2	Qua.	LOHR RENE #6		NO SHOW
2			P-2	Qua.	MORAN JOSEPH #7	Yellow Bike	
3			P-2	Qua.	DAY JR. TIM #8	- NO SHOW -	NO SHOW
4			P-2	Qua.	BONNA CHUCK #42		SAT @ 1466
5			P-2	Qua.	FERGUSON, DAVID #75	75 2003 Mazda Van Dieman RF3-03 Purpl	
6			P-2	Qua.	BOSSO, JOHN 95	1997 cheetah RF-1 Red/White Blu	SAT. Q 1065 R
#3				Qua.	OBRIEN, ERIC #4	1999 A-Mac-AMG Yellow	SAT. Q 1014 R
1	4/28/18	1:15	P-2	RACE	#6 LOHR RENE	2004 Radical SR3	NO SHOW
2			P-2		#7 MORAN, JOSEPH	1999 Ford	1368
3					#8 DAY Jr. TIM	2006 STOHR WF1 Blk	NO SHOW
4					#42 Bonna, Chuck	-009 STOHR WF1/Blk	/
5					#75 Ferguson, David	2003 MAZDA Van Dieman RF3-03	1366
6					#95 Bosso, John.	1997 Cheetah RF-1	1057
3					#4 OBRIEN, ERIC.	1999 A MAC-AMG	Weight: 1066
							Weight:
3	4/29/18	10:25	P-2	RACE	#4 OBRIEN, ERIC	1999 A MAC AMG	1061
2					#7 MORAN, JOSEPH	1999 FORD	1314
4					#42 BONNA CHUCK	2009 STOHR	1166
5					#75 FERGUSON, DAVID	2003 MAZDA	1356
6					#95 BOSSO JOHN.	1997 A MAC-AMG.	1090

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Data Reports

- Standard across all classes
- Committee liaisons can request specific areas
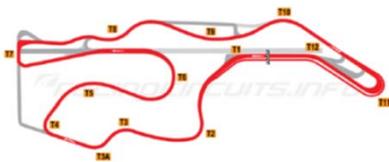- Between 10-20 pages for each class

Performance Comparisons

Sonoma Runoffs - T3 Race

General Information

- Report based on best 5 laps from Championship Race
- Cars identified by Model Year/Model/Minimum Weight/Actual Weight
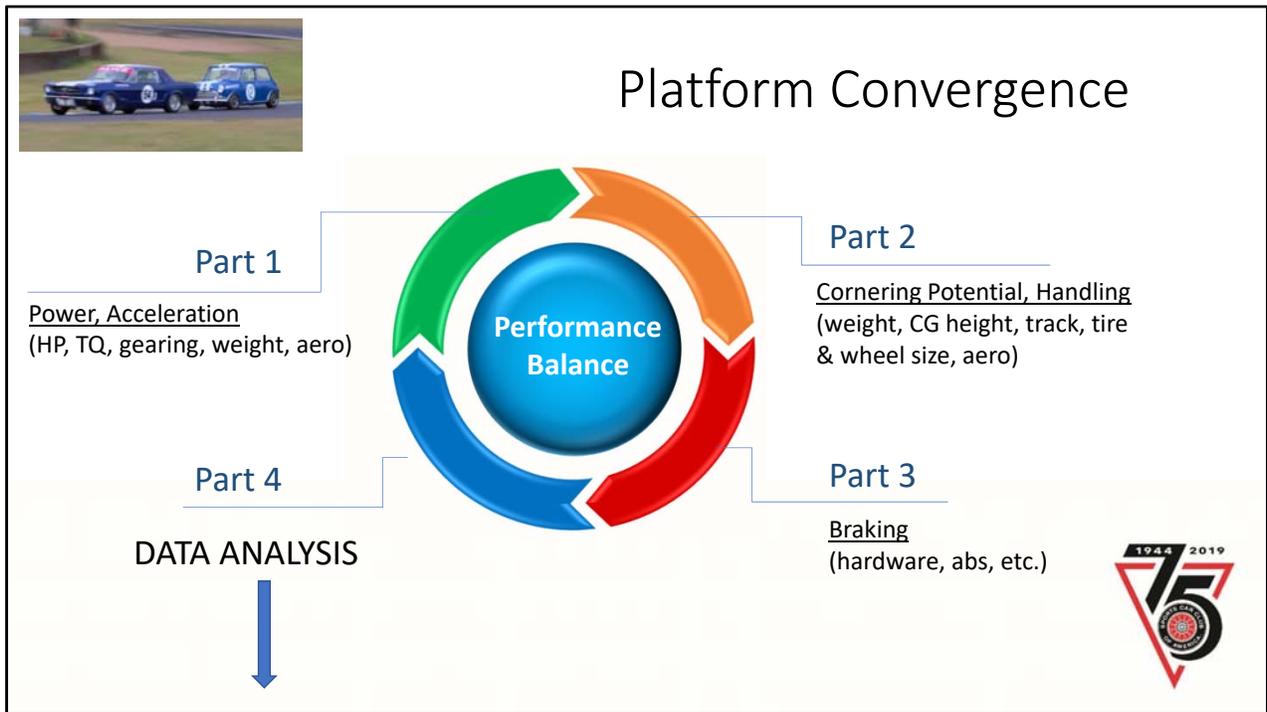
Sonoma Runoffs Track Map

Data Reports are the result of hours of analysis of the top cars in each class

We know the driver is the biggest part of performance, but the analysis works to focus on the car potential

Each Page tells a different story, when combined should produce evidence that balanced is achieved, or more work is needed.

Platform Convergence

Part 1

Power, Acceleration
(HP, TQ, gearing, weight, aero)

Part 2

Cornering Potential, Handling
(weight, CG height, track, tire
& wheel size, aero)

Performance Balance

Part 4

DATA ANALYSIS

Part 3

Braking
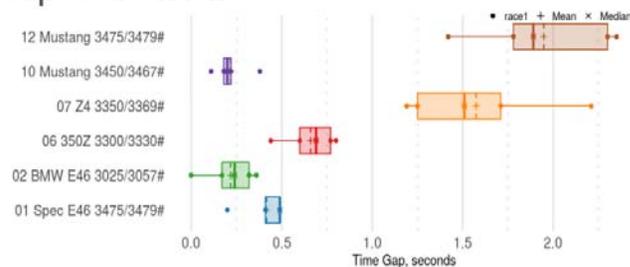(hardware, abs, etc.)

These elements make up a balanced field.

If you have one strength, the other should be a balanced weakness.

This will allow parity depending on the track we race at.

Some cars are centered on each, with no particular strength, and makes them versatile at all tracks.

Data Analysis

Lap Time Results

- race1 + Mean × Median

12 Mustang 3475/3479#
10 Mustang 3450/3467#
07 Z4 3350/3369#
06 350Z 3300/3330#
02 BMW E46 3025/3057#
01 Spec E46 3475/3479#

0.0   0.5   1.0   1.5   2.0
Time Gap, seconds

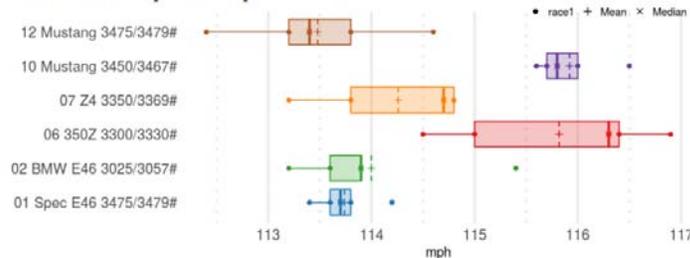· Gap from fastest recorded lap by any car in analysis.
· Lower is better.

- Start with Lap times
- Who is consistent?
- Which platforms are we looking at?

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75
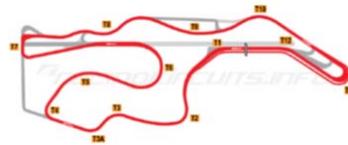
Lap time gaps don't show actual lap times, but you can quickly see which cars are performing on a lap time basis relative to each other

It won't show things like the effects of traffic, drafting, and other important variables, but it's a good start

Here, we have 4 platforms in T3 that are in the top group.

Data Analysis

Max MPH per Lap Results

- 12 Mustang 3475/3479#
- 10 Mustang 3450/3467#
- 07 Z4 3350/3369#
- 06 350Z 3300/3330#
- 02 BMW E46 3025/3057#
- 01 Spec E46 3475/3479#

race1 + Mean × Median

113   114   115   116   117
mph

· Max recorded speed per lap regardless of location.
· Does not take into account differences of braking locations.
· Higher is better.

- Quickly see top speed
- Look at the range
- Why the difference?
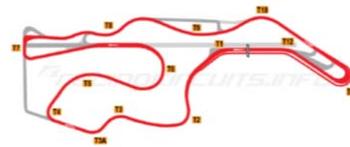
We already know the tire sizes and power levels of these cars, so the data should be in harmony with these characteristics.
The Mustang has the torque, but is heavy, the 350Z has the best aero and low cg, and the E46 is the lightest. (-300 lbs.).
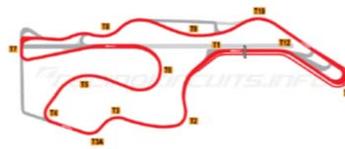If the BOP is correct, each strength will show up in the data and will balance against each other into lap time performance

Data Analysis

Speed Prior to Turn 1 Results
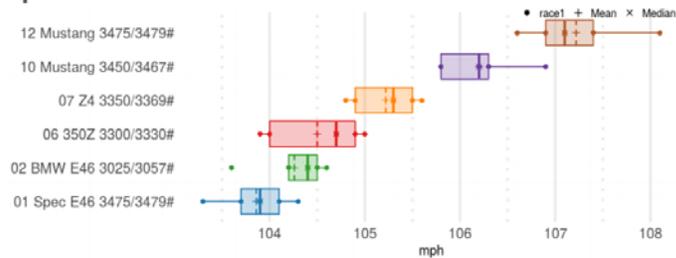
- Speed recorded at point between S/F and Turn 1 where all cars still under acceleration.
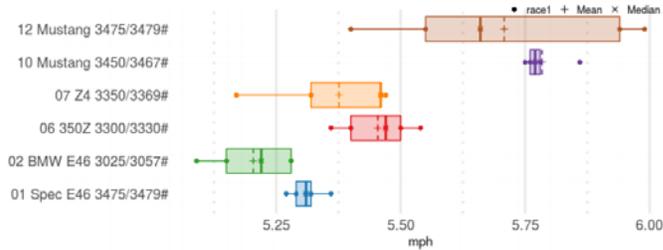- Eliminates issue of different brake points.
- Higher is better.

- High speed acceleration
- Will have aero effects, and gearing
- Mostly power driven

. Straight line performance, shows how well a car moves through the air on a long straightaway
Any deltas over 5mph tends to be difficult to balance at 100 mph

Data Analysis

Acceleration Rate from 60 to 90 MPH Exit Turn 11 Results

- race1 + Mean × Median

12 Mustang 3475/3479#	
10 Mustang 3450/3467#	
07 Z4 3350/3369#	
06 350Z 3300/3330#	
02 BMW E46 3025/3057#	
01 Spec E46 3475/3479#	

5.25   5.50   5.75   6.00
mph

- Acceleration rate in MPH gained per second in the first 1000 feet exiting Turn 11 from 60 to 90 mph.
- Higher is better.

- Power down exit
- Torque wins here
- One Mustang has a tight range, the other is scattered
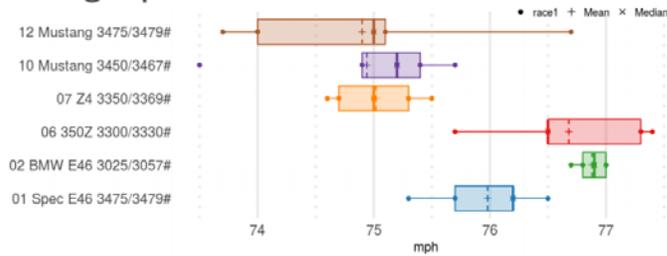
How well do the cars launch out of a slow turn
Can show gearing problems
Lap times are very sensitive here
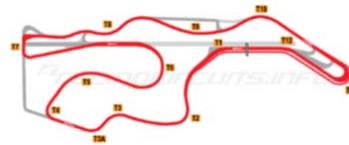We were concerned about the E46 power levels initially, but they look good

Data Analysis

- High Speed Steady state cornering potential
- Z is best, followed by E46
- Good balance here
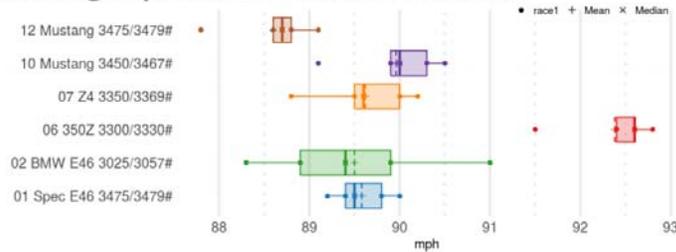
Average Speed thru Turn 6 Results

- · Avg Speed in MPH thru Turn 6
- · Indication of handling performance
- · Higher is better.

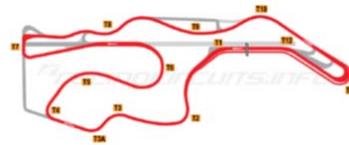. Steady state cornering, the handling cars must make up time here.

Data Analysis

- Transitional handling
- Aggressive loading
- Long track section, the Z wins here

Average Speed Thru Turns 8 9 Results

- Avg Speed in MPH thru Turns 8-9
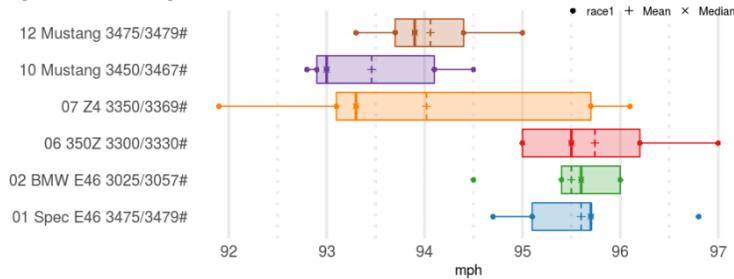- Indication of handling performance
- Higher is better.

Transitional Handling is extremely important to stay on the throttle in this fast section

Big tires and low CG allow the Z to win

Data Analysis

Speed at Apex Turn 10 Results

- race1   + Mean   × Median

12 Mustang 3475/3479#	
10 Mustang 3450/3467#	
07 Z4 3350/3369#	
06 350Z 3300/3330#	
02 BMW E46 3025/3057#	
01 Spec E46 3475/3479#	

mph: 92, 93, 94, 95, 96, 97

- Average speed over 50-foot distance at Mid-point of Turn 10
- Indication of high-speed handling capabilities.
- Higher is better.

- Hero Turn
- Must commit
- Large influence on lap times
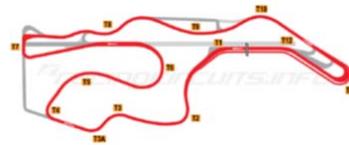
This turn tells us how much courage the driver can find to really fly through the kink.

If the data shows a very low speed, it will show up in lap times

The End Goal

- Standardize across all classes
- Drive out the opinions
- Stabilize the classes by ignoring weak signals
- Hold committees accountable to defend decisions
- If the data doesn't support a change, DON'T make one.
- Develop trust and confidence in the process

Thank you, Data Technicians!

On behalf of the CRB and committees, let me say Thank you to all the Race Data Technicians out there!!