DRIVE AT THE LIMIT

LITTLE BEND

EFFICIENCY STUDY

A Garmin Catalyst study of fifteen drivers, one corner, and the difference between feeling fast and being efficient.

ASSEMBLED BY DRIVE AT THE LIMIT

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GREAT DRIVING FEELS LIKE NOTHING.

The fastest sequence is often the one that creates the fewest problems for the next phase.

YOU CAN WIN THE WHOLE WAR WITHOUT WINNING EVERY BATTLE.

The stopwatch does not score entry speed, braking G, minimum speed, radius, rotation or throttle independently. It scores the entire sequence.

THE FASTEST LAP IS NOT AN ACCUMULATION OF MAXIMUMS.

IT IS AN ELIMINATION OF WASTE.

More is not automatically better. Every input has a cost downstream. The question is whether the complete sequence can use what the driver creates.

WHAT WE MEASURED

Every driver is compared through the same Garmin Catalyst Little Bend sequence. Segment time establishes position; the remaining metrics explain how the time was created.

01 SEGMENT

02 ENTRY

03 MINIMUM

04 EXIT

05 STRAIGHT MAX

06 TRACK USE

07 RADIUS

08 APEX

09 TRACK-OUT

10 MAX DECEL

11 DECEL TIME

12 ACCEL TIME

ACHIEVED = one continuous entry-to-exit sequence. COMPOSITE = Garmin theoretical assembly from separate portions. Composite is valuable, but it is not an actually completed continuous segment.

THE BENCHMARK

10.35 SEC

COMPOSITE

DARRYL PAUL

10.61

ACHIEVED

JON ERIC FOUNTAIN

0.26

THEORETICAL -> ACHIEVED GAP

FIFTEEN DRIVERS. ONE CORNER.

The complete ranking establishes the field. Orange marks the theoretical benchmark; validation remains visible because execution matters.

01	Darryl Paul	10.35	BASE	COMPOSITE
02	Jon Eric Fountain	10.61	+0.26	ACHIEVED
03	Eric Sutton	10.67	+0.32	ACHIEVED
04	Sheldon Rosenbaum	10.70	+0.35	ACHIEVED
05	Billy Jack Smith	10.72	+0.37	ACHIEVED
06	CJ Tackman	10.73	+0.38	ACHIEVED
07	Robert Watson	10.76	+0.41	COMPOSITE
08	Ryan Harness	10.79	+0.44	ACHIEVED
09	Adam Poland	10.82	+0.47	ACHIEVED
10	Dan Parmelee	10.84	+0.49	ACHIEVED
11	Bradley Parker	10.88	+0.53	ACHIEVED
12	Wyatt Gooden	10.90	+0.55	ACHIEVED
13	Matt McCardle	10.92	+0.57	COMPOSITE
14	Calvin Bocanegra	10.94	+0.59	COMPOSITE
15	Alex Seybel	11.09	+0.74	ACHIEVED

THE MASTER RECORD

The raw numbers are the foundation. No theory is allowed to replace the record.

RK / DRIVER	SEG (s)	ENTRY	MIN	EXIT	RADIUS (ft)	OUT	DECEL (s)	ACCEL (s)
01 Darryl Paul	10.35	90.3	63.9	72.5	204.7	8.6	1.72	7.07
02 Jon Eric Fountain	10.61	95.5	62.6	71.0	212.3	15.8	2.32	6.96
03 Eric Sutton	10.67	96.4	63.8	71.7	207.3	8.9	2.00	5.00
04 Sheldon Rosenbaum	10.70	90.2	64.1	71.5	225.4	5.3	1.73	7.36
05 Billy Jack Smith	10.72	91.3	59.3	71.0	201.5	10.5	1.54	7.83
06 CJ Tackman	10.73	90.1	60.8	72.2	207.4	12.4	2.98	6.11
07 Robert Watson	10.76	99.3	63.6	70.8	208.9	10.3	2.23	5.96
08 Ryan Harness	10.79	93.4	60.9	70.4	186.3	9.5	3.07	5.79
09 Adam Poland	10.82	90.7	65.9	73.7	235.7	9.4	2.25	6.05
10 Dan Parmelee	10.84	95.8	62.2	71.5	199.7	2.0	2.71	5.38
11 Bradley Parker	10.88	86.8	61.5	69.3	189.6	8.2	1.95	7.48
12 Wyatt Gooden	10.90	97.1	63.3	70.5	207.1	11.1	2.12	5.04
13 Matt McCardle	10.92	87.4	61.8	70.9	227.9	7.3	2.48	5.38
14 Calvin Bocanegra	10.94	90.9	61.1	73.1	196.5	4.8	1.81	7.40
15 Alex Seybel	11.09	93.3	60.2	70.8	213.0	7.2	1.93	6.86

RADIUS DOES NOT WIN THE CORNER

Shortest to longest arc. The fastest drivers are distributed throughout the range, and the largest radius is not the fastest solution.

01	Ryan Harness	186.3 FT	P8 / 10.79
02	Bradley Parker	189.6 FT	P11 / 10.88
03	Calvin Bocanegra	196.5 FT	P14 / 10.94
04	Dan Parmelee	199.7 FT	P10 / 10.84
05	Billy Jack Smith	201.5 FT	P5 / 10.72
06	Darryl Paul	204.7 FT	P1 / 10.35
07	Wyatt Gooden	207.1 FT	P12 / 10.90
08	Eric Sutton	207.3 FT	P3 / 10.67
09	CJ Tackman	207.4 FT	P6 / 10.73
10	Robert Watson	208.9 FT	P7 / 10.76
11	Jon Eric Fountain	212.3 FT	P2 / 10.61
12	Alex Seybel	213.0 FT	P15 / 11.09
13	Sheldon Rosenbaum	225.4 FT	P4 / 10.70
14	Matt McCardle	227.9 FT	P13 / 10.92
15	Adam Poland	235.7 FT	P9 / 10.82

Across the full field, turn radius has essentially no linear relationship with segment time (r approximately +0.02). Radius is a tool - not the objective.

ENTRY SPEED DOES NOT EXPLAIN IT.

99.3
MPH ROBERT / ENTRY

10.76
SEC ROBERT / SEGMENT

90.3
MPH DARRYL / ENTRY

10.35
SEC DARRYL / SEGMENT

Robert enters 9.0 mph faster than Darryl, yet Darryl is 0.41 s faster theoretically. Entry speed is a resource. It is not the objective.

ADAM WINS THE NUMBERS. NOT THE SEGMENT.

65.9
MPH HIGHEST MINIMUM

73.7
MPH HIGHEST EXIT

235.7
FT LARGEST RADIUS

10.82

P9 / SEGMENT

The data forces a distinction between velocity efficiency and total segment efficiency. Preserving more speed can still lose time if the path, distance, orientation or transition costs more.

06 / ACHIEVED ONLY

FASTEST FIVE VS SLOWEST FIVE

Removing composite records produced the first phase-level signal. The groups entered at almost identical speed.

	FAST 5	SLOW 5
ENTRY	92.70 MPH	92.74 MPH
MINIMUM	62.12 MPH	62.62 MPH
TRACK-OUT	10.58 °/S	7.58 °/S
EXIT	71.48 MPH	71.16 MPH
ACCEL TIME	6.65 SEC	6.16 SEC
RADIUS	210.8 FT	209.0 FT
TRACK USE	78.6 %	79.9 %

THE THEORY EVOLVES

TRANSITION EFFICIENCY.

The full field initially suggested that the ability to convert deceleration into rotation and rotation into acceleration was the central Little Bend mechanism.

THEN WE NARROWED THE LENS.

Among the top eight, track-out rate stopped separating the leaders. The elite group pointed instead toward retained useful speed and a more concise deceleration event.

P1-P4 VS P5-P8

This is the comparison that refined the study. The fastest four do not arrive faster. They preserve more useful speed and spend less time decelerating.

	P1-P4	P5-P8
SEGMENT	10.583 SEC	10.750 SEC
ENTRY	93.10 MPH	93.53 MPH
MINIMUM	63.60 MPH	61.15 MPH
EXIT	71.68 MPH	71.10 MPH
STRAIGHT MAX	80.80 MPH	79.70 MPH
DECEL TIME	1.94 SEC	2.46 SEC
ACCEL TIME	6.60 SEC	6.42 SEC

0.51 SEC

LESS DECELERATION TIME

P1-P4 average 1.94 s decelerating. P5-P8 average 2.46 s. That half-second difference is enormous in a segment where only 0.44 s separates P1 from P8.

+2.45 MPH

MINIMUM SPEED / P1-P4

+1.10 MPH

STRAIGHT MAX / P1-P4

The elite subset suggests: make the braking event effective, accomplish the required speed change, release it, and preserve useful speed downstream.

08 / DARRYL PAUL

THE QUIET BENCHMARK

Darryl does almost nothing extreme. His theoretical segment is compelling because the sequence is coherent rather than heroic.

10.35
SEC SEGMENT

COMPOSITE

90.3
MPH ENTRY

63.9
MPH MINIMUM

72.5
MPH EXIT

81.5
MPH STRAIGHT

1.72
SEC DECEL

7.07
SEC ACCEL

No isolated hero metric. The segment time is the hero number.

HOW MUCH SPEED MUST DISAPPEAR?

DARRYL	26.4	MPH SHED	90.3 -> 63.9
JON	32.9	MPH SHED	95.5 -> 62.6
ERIC	32.6	MPH SHED	96.4 -> 63.8
BILLY	32.0	MPH SHED	91.3 -> 59.3

Jon, Eric and Billy each convert roughly 32-33 mph from entry to minimum. Darryl converts only 26.4 mph - and still exits faster than all three.

ATTACK VS ECONOMY

	DARRYL	JON
ENTRY	90.3 MPH	95.5 MPH
MINIMUM	63.9 MPH	62.6 MPH
EXIT	72.5 MPH	71.0 MPH
PEAK DECEL	-0.74 G	-1.14 G
DECEL TIME	1.72 S	2.32 S
TRACK-OUT	8.6 °/S	15.8 °/S

Jon arrives 5.2 mph faster, brakes 0.40 g harder at peak and spends 0.60 s longer decelerating. Darryl still carries 1.3 mph more minimum and 1.5 mph more exit. Commitment is valuable only while the corner can use it. Beyond that point, attack becomes something the driver has to undo.

DO NOT COPY DARRYL'S LINE.

BORROW HIS ECONOMY.

Test a modest 2-3 mph reduction in entry while preserving Jon's decisive rotation. Then ask whether decel duration falls, minimum rises and exit improves. The exact target is a hypothesis - not a prescription.

PRESERVE

ROTATION

REMOVE

CLEANUP

THE COST OF OVERSLOWING

	DARRYL	BILLY
ENTRY	90.3 MPH	91.3 MPH
MINIMUM	63.9 MPH	59.3 MPH
EXIT	72.5 MPH	71.0 MPH
DECEL TIME	1.72 S	1.54 S
ACCEL TIME	7.07 S	7.83 S
TRACK-OUT	8.6 °/S	10.5 °/S

Billy wins the braking-duration battle and the acceleration-duration battle - yet loses the segment by 0.37 s. His 59.3 mph minimum is 4.6 mph below Darryl. Short braking is not the goal. The goal is the shortest braking event necessary without overslowing.

ENTRY SPEED THAT DOES NOT SURVIVE

	DARRYL	ERIC
ENTRY	90.3 MPH	96.4 MPH
MINIMUM	63.9 MPH	63.8 MPH
EXIT	72.5 MPH	71.7 MPH
RADIUS	204.7 FT	207.3 FT
TRACK-OUT	8.6 °/S	8.9 °/S
DECEL TIME	1.72 S	2.00 S

Eric brings 6.1 mph more entry speed. By minimum, the advantage is gone. Their geometry and track-out are remarkably similar, yet Darryl exits 0.8 mph faster. This is one of the cleanest examples of entry speed creating braking work without a downstream payoff.

DIFFERENT BATTLES. SAME WAR.

JON

ROTATION

95.5 entry / -1.14 g / 15.8°/s track-out

Fastest achieved. Decisive direction change; possible cost is entry energy that must be removed.

ERIC

FLOW

96.4 entry / 63.8 minimum / early apex

Momentum solution. Fast, but some entry speed appears unnecessary versus Darryl.

BILLY

ROTATE + DRIVE

1.54 s decel / 7.83 s accel / 59.3 minimum

Short brake, long acceleration. The boundary case for overslowing.

DARRYL

ECONOMY

90.3 -> 63.9 -> 72.5 -> 81.5

No hero metric. Minimal unnecessary conversion. The theoretical reference.

DATL / COACHING TRANSLATION

WASTE NOTHING.

APPROACH	**Can the rest of the corner use this speed?**
BRAKING	**Remove only the speed the car actually needs removed.**
ROTATION	**Give up speed only when it buys useful orientation.**
GEOMETRY	**Use the road because it helps time - not because it exists.**
TRACK-OUT	**Do not create a correction you must pay for later.**
ACCELERATION	**Power matters when it advances the car efficiently.**

GREAT DRIVING IS NOT DOING EVERYTHING AT THE LIMIT.

GREAT DRIVING IS WASTING NOTHING.

You can lose entry speed. You can lose peak braking G. You can lose minimum speed, radius, track usage or acceleration duration. You can lose almost every individual statistical battle and still win the corner - because the stopwatch only scores the complete sequence.

YOU CAN WIN THE WHOLE WAR WITHOUT WINNING EVERY BATTLE.

PRECISION WITHOUT WASTE.

Little Bend / Garmin Catalyst / BRZ Comparative Driver Study

PRECISION COACHING / DRIVER DEVELOPMENT / DATA-LED PERFORMANCE