

4TH DOWN PHYSICS

4D University

FIELD GOAL

TRACKMAN



VS



HEIGHT @ LOS

11.9 FT VS **11.8 FT**

FG BALL SPEED

70.3 MPH VS **67 MPH**

LAUNCH ANGLE

$\geq 30^\circ$ VS **$< 30^\circ$**

4TH DOWN PHYSICS:

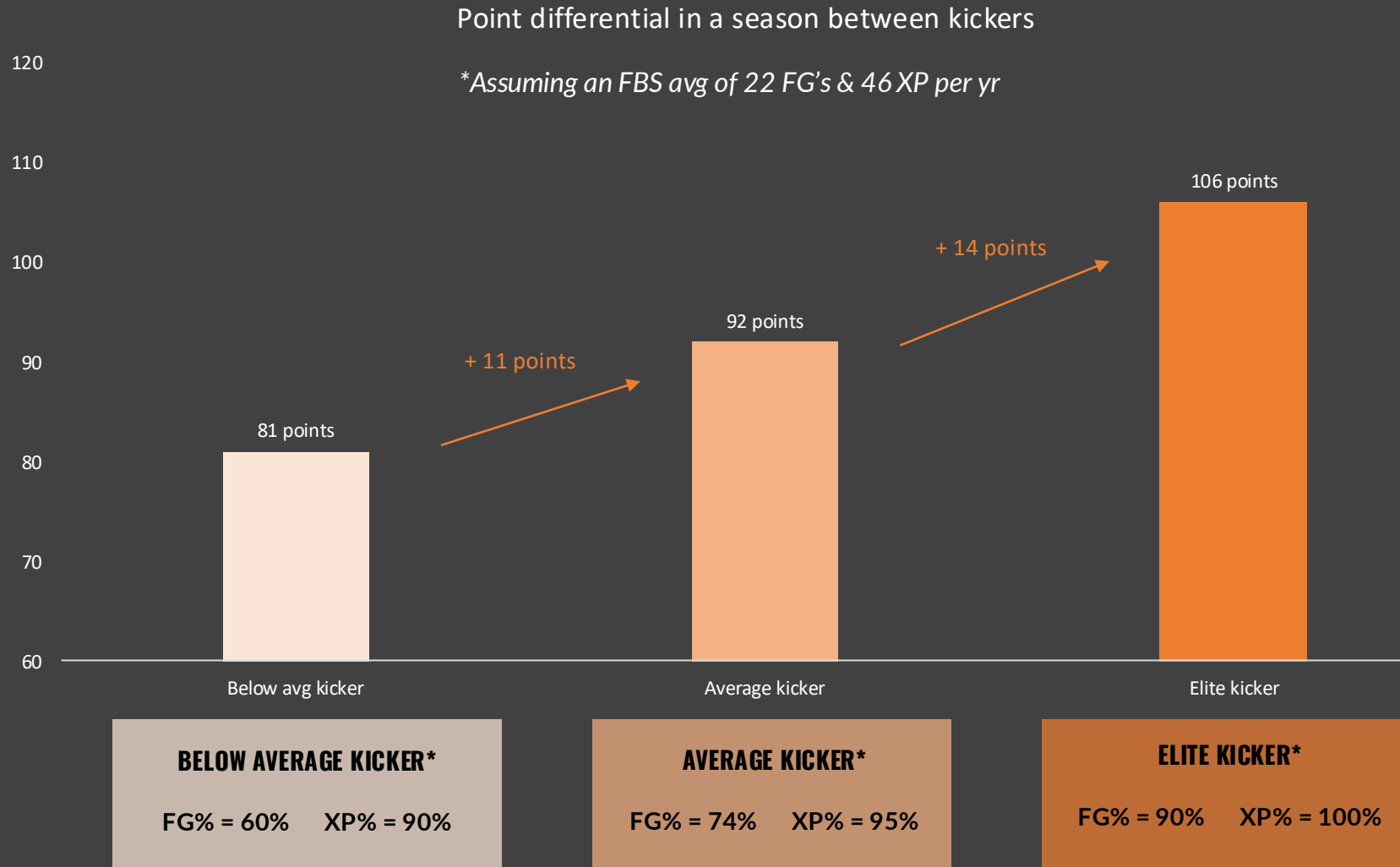
AGENDA

- Importance of the kicking game
 - Metric 1: BALL SPEED**
 - Evaluating its effect on FG%
- **Metric 2: BALL HEIGHT @ LOS**
 - Optimizing FG trajectory
- **Metric 3: LAUNCH ANGLE**
 - Increasing distance & hangtime

TRACKMAN
FOOTBALL

4D University™

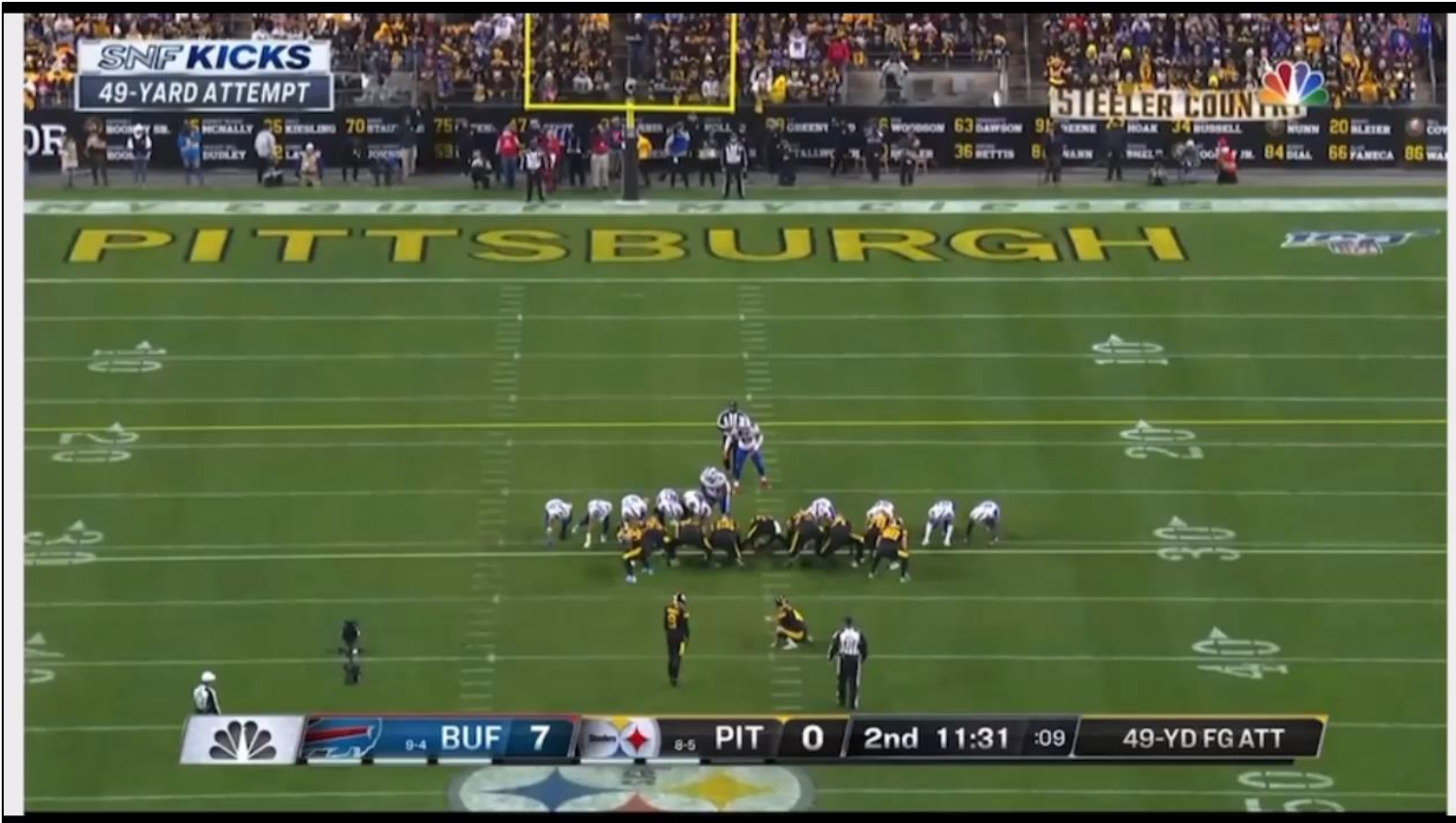
KICKING GAME IMPORTANCE: WHY ELITE KICKERS = 3+ WINS EACH SEASON



- Kickers = 24% of FBS points
- 1/3 of FBS margins = <7 points
- Avg. FBS scoring margin = 9 points

"A +25 point differential between "below average" & "elite" kickers equals a scoring margin of 3 games"

METRIC 1: FG BALL SPEED



WHY DOES IT MATTER?

- BEST LEG STRENGTH INDICATOR
- IMPROVES EVALUATION STANDARDS
- NFL vs NCAA BENCHMARKS

LEVEL	BALL SPEED
NFL	70.3 MPH
NCAA (FBS)	67.0 MPH

METRIC 1: FG BALL SPEED

- KICKERS SELECTED IN THE LAST 2 NFL DRAFTS HAD AN AVERAGE FG BALL SPEED OF **72.7 MPH**
- TOP TIER NFL KICKERS PRODUCE BALL SPEEDS BETWEEN **75-80 MPH**



BALL SPEED
80.0
mph

HEIGHT AT LOS
12.5
ft

END OVER END
636
rpm

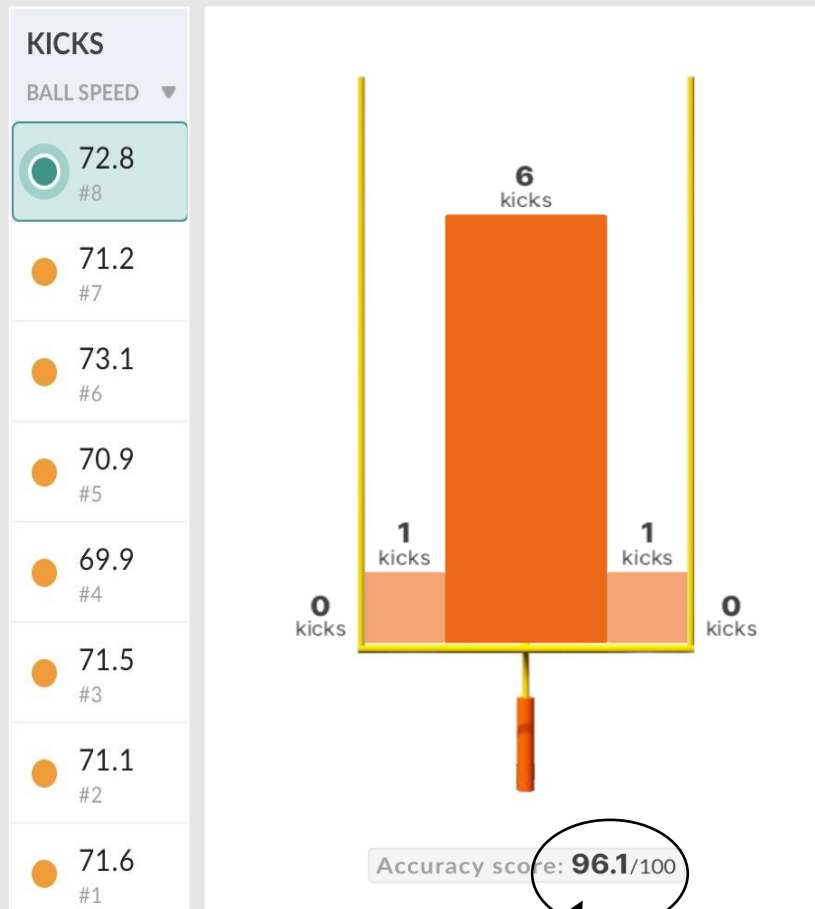
ATTEMPT FROM
56
yds

GOOD FROM
70
yds

METRIC 1: FG BALL SPEED

PLAYER DEVELOPMENT: BALL SPEED & EFFECT ON ACCURACY

AVERAGE BALL SPEED = 71.5 MPH

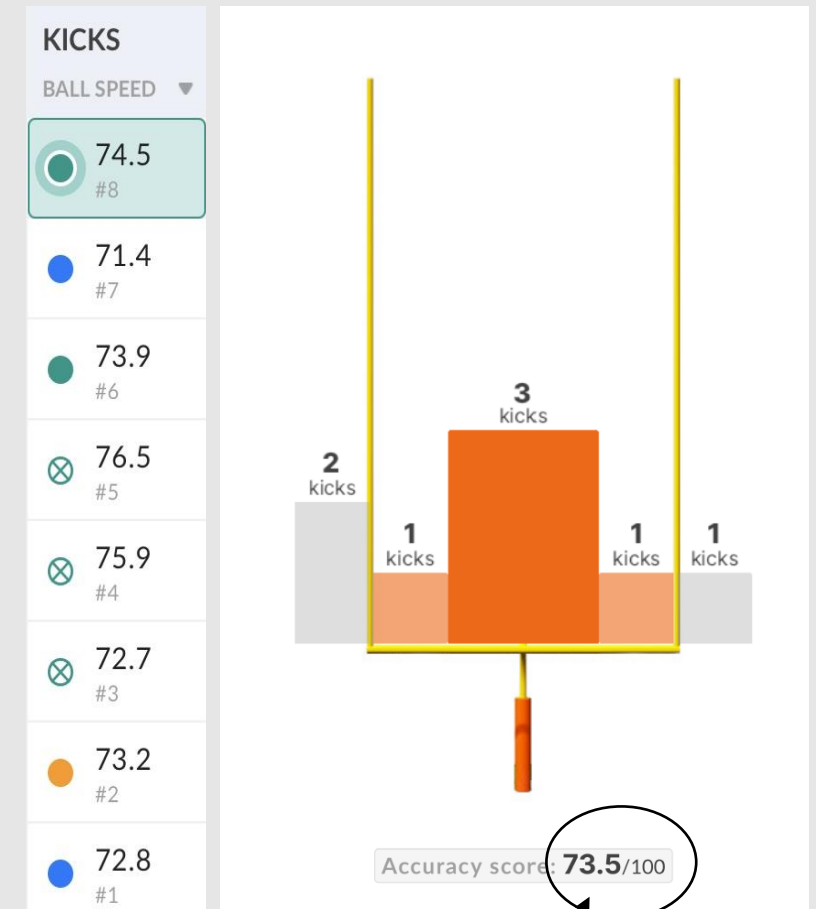


*WHEN IS A 71 MPH
BALL SPEED BETTER
THAN A 74 MPH BALL
SPEED?*

CONSISTENT BALL SPEED = BETTER ACCURACY

TRACKMAN
FOOTBALL

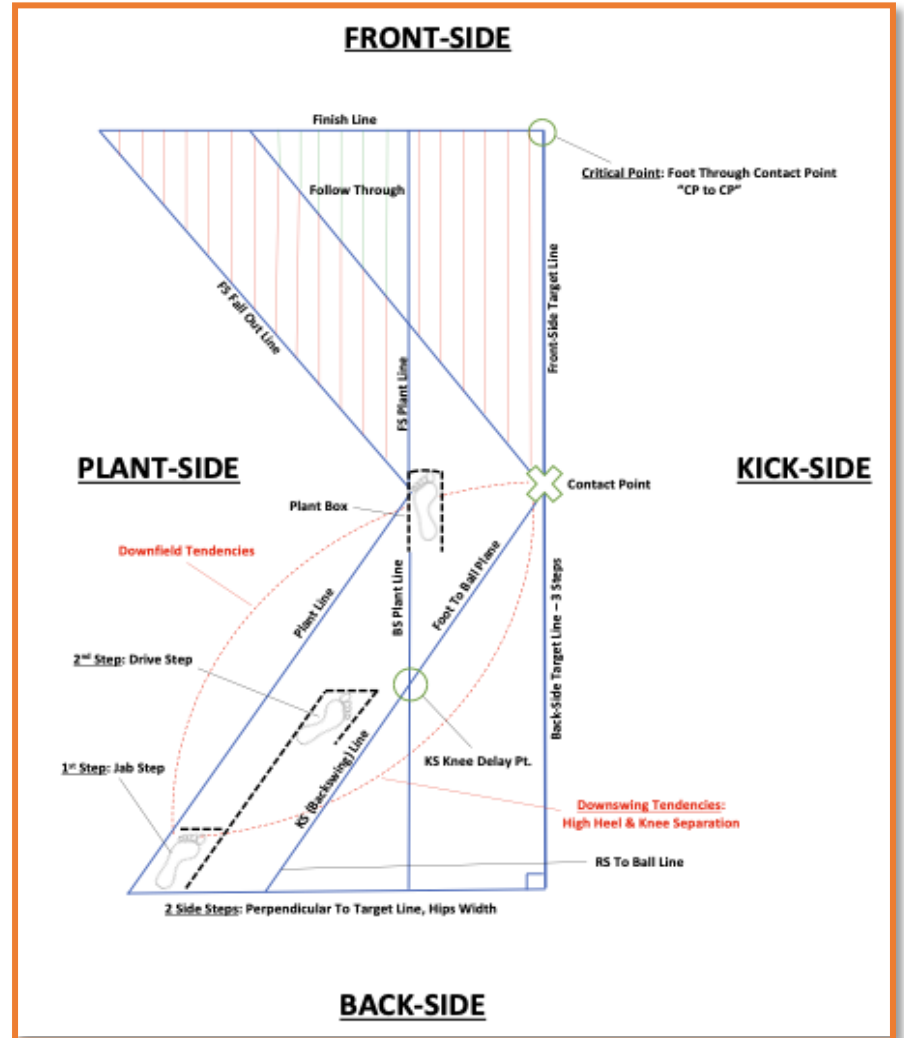
AVERAGE BALL SPEED = 74 MPH





BACKSIDE SPLIT LINE ANGLE

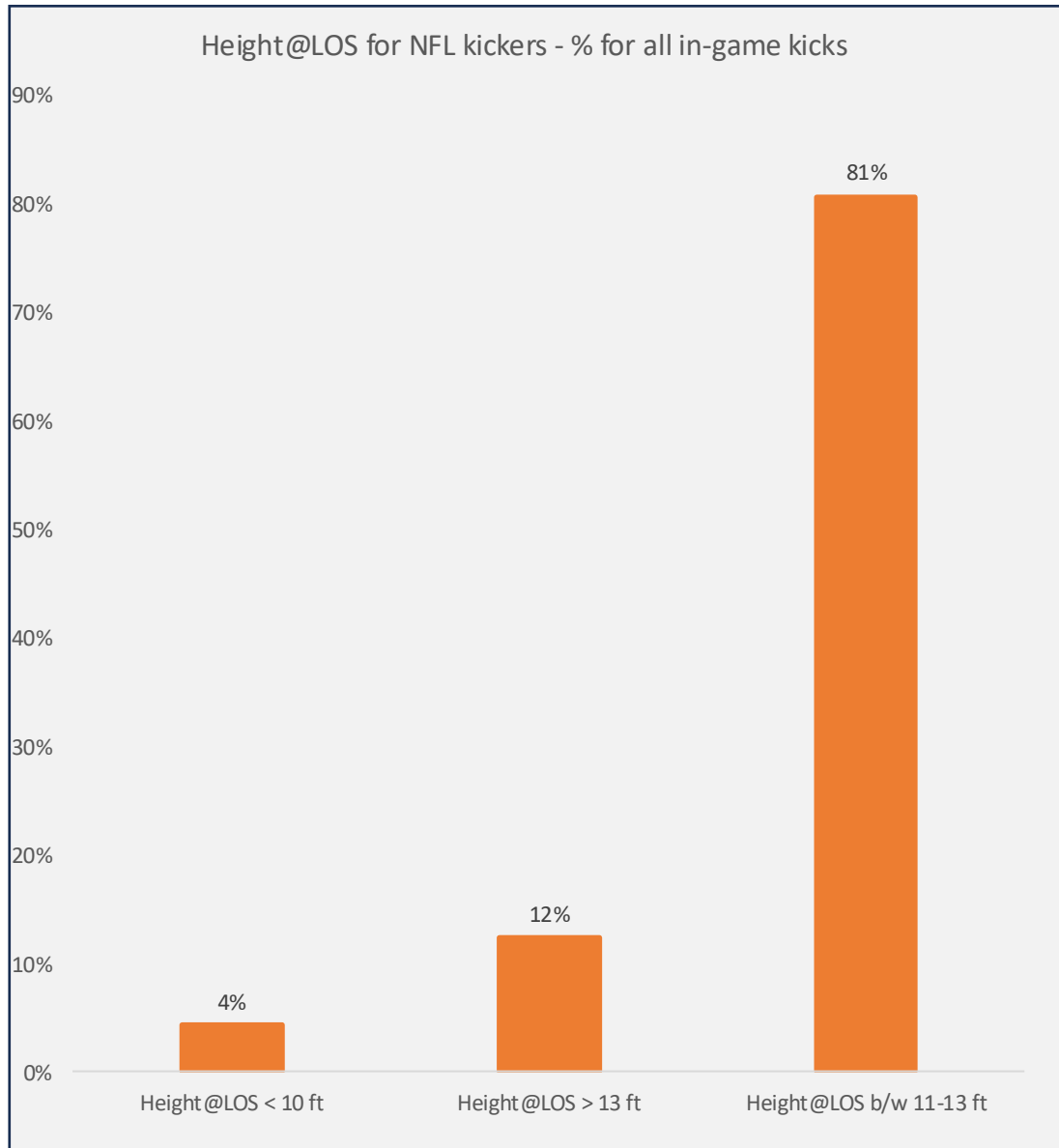
KICKOMETRY



METRIC 2: BALL HEIGHT @ LOS

OPTIMIZING FG TRAJECTORY

Height@LOS for NFL kickers - % for all in-game kicks



AVERAGES (FIELD GOAL)	HEIGHT @ LOS (FT)
NFL	11.9 FT
NCAA	11.8 FT

1. Minimize chance of blocked kicks (low trajectory)
 - Rule: Height @ **LOS +10 ft** to avoid blocks
2. Minimize winds affects on ball flight (high trajectory)
 - Rule: Height @ **LOS +13 ft** likely to be affected by wind
3. Optimal trajectory between **11-13 ft**
 - Avoid blocked kicks & less wind effect on ball flight

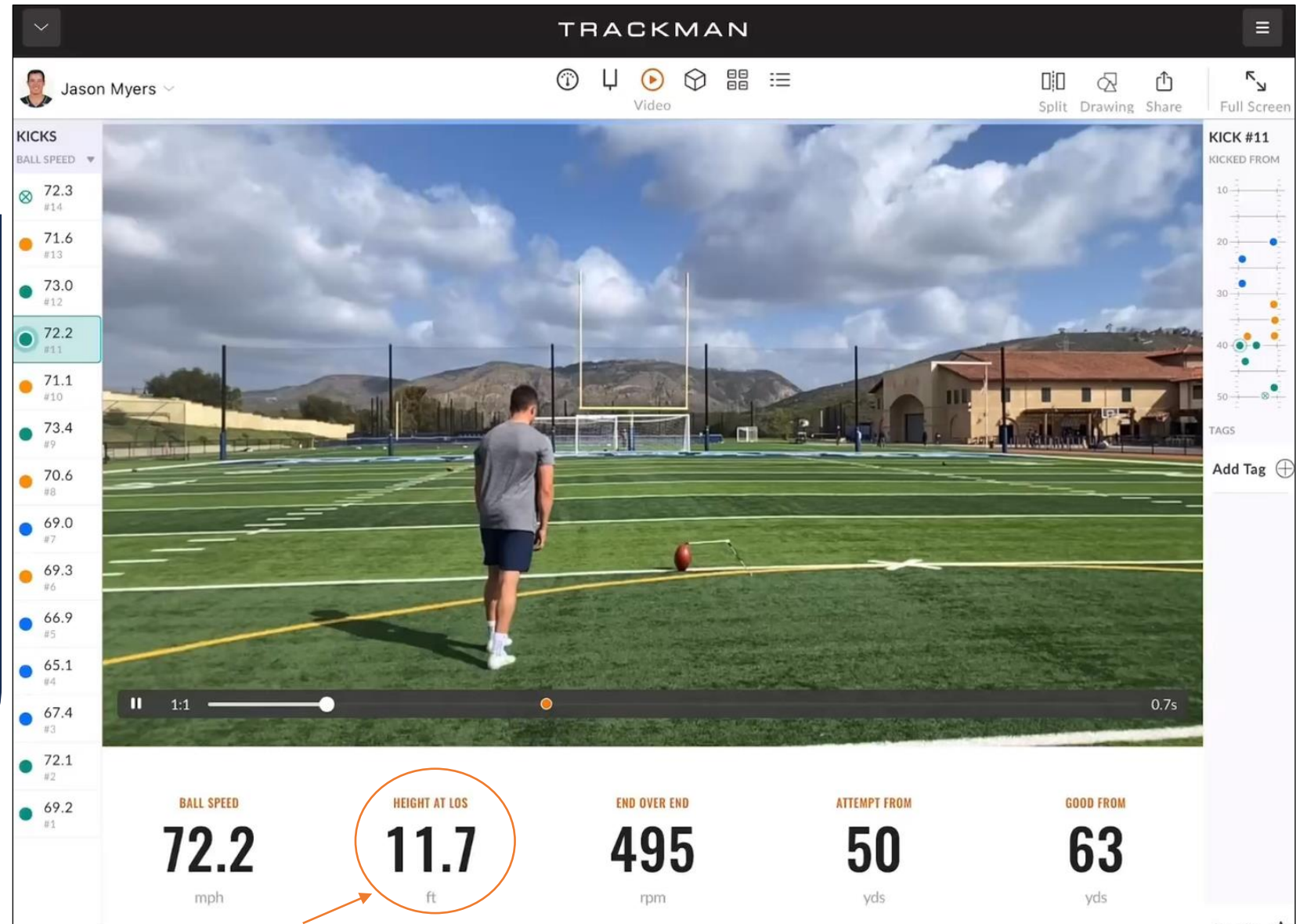
METRIC 2: BALL HEIGHT @ LOS

OPTIMIZING FG TRAJECTORY



ALL-PRO KICKER | J. MYERS

- Tough Seattle conditions
- Emphasis:
 - Height @ LOS (11-12FT)
- Linear ball flight is in this range



METRIC 2: BALL HEIGHT @ LOS

OPTIMIZING FG TRAJECTORY



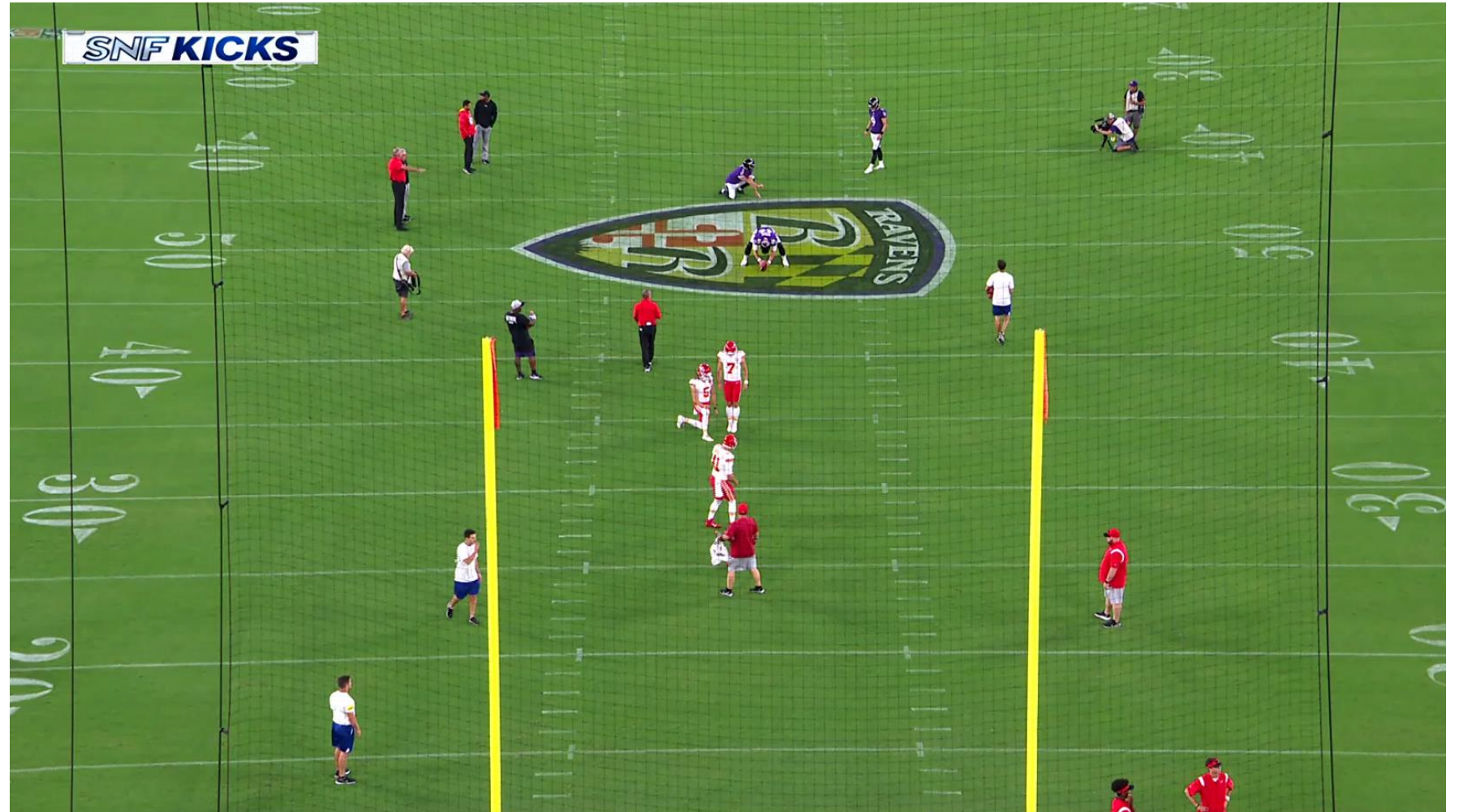
ALL-PRO K | J. TUCKER

65 Yd Attempt (Pre-Game)

Ball Speed = 77.0 MPH

Height @ LOS = 11.0 FT

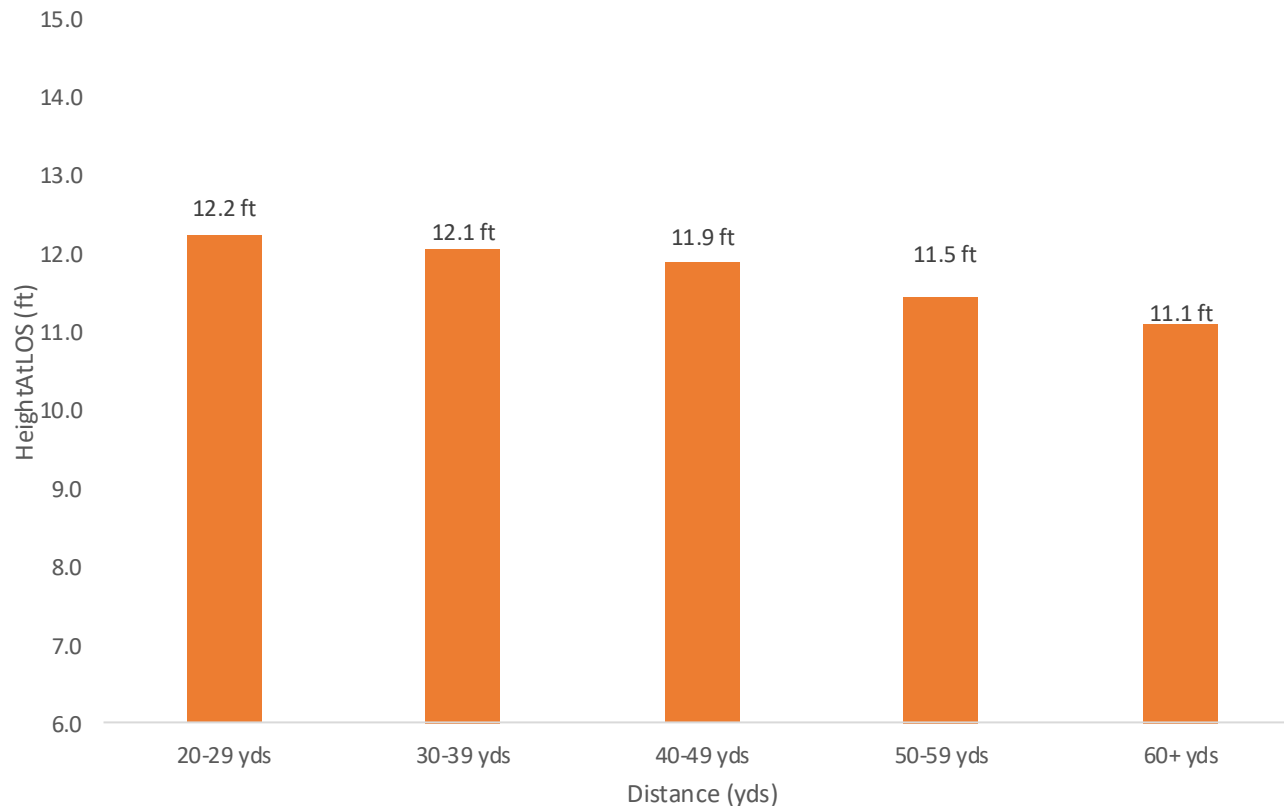
Good From = 67 YDS



METRIC 2: BALL HEIGHT @ LOS

OPTIMIZING FG TRAJECTORY

FG distance vs HeightAtLOS



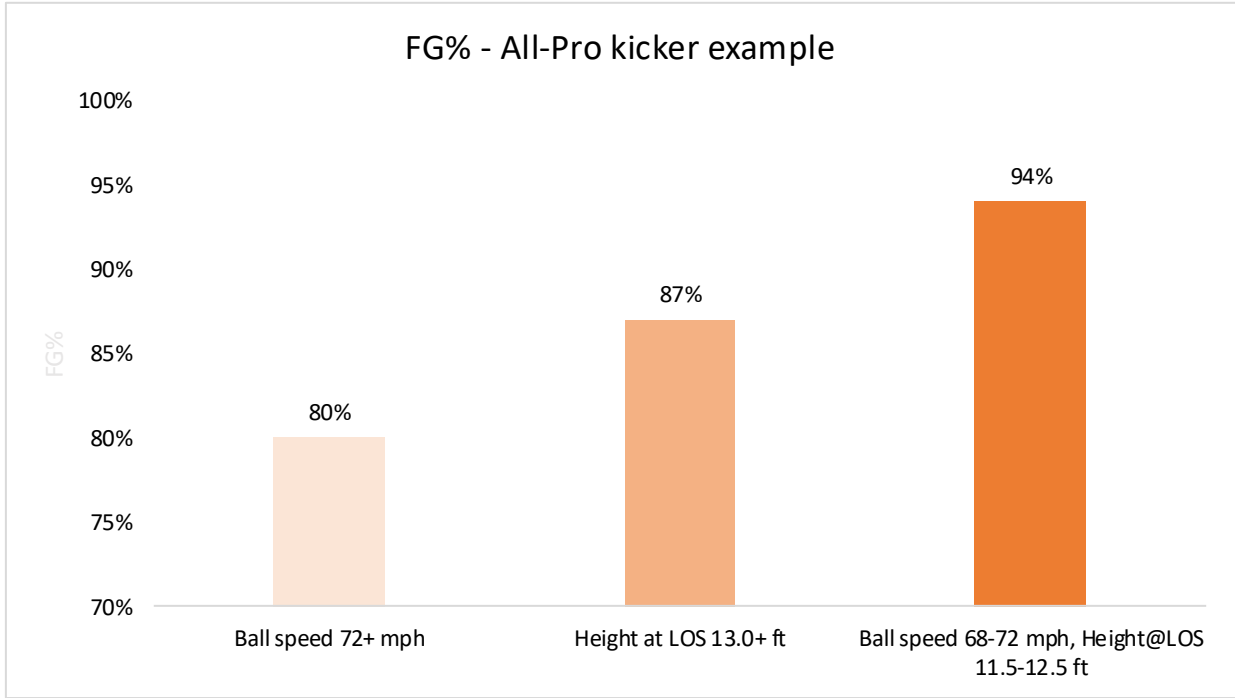
MYTH:

"LOWER YOUR TRAJECTORY ON LONG FG'S"

- Minimal differences in trajectory vs. distance
- Only lower trajectory while kicking into a strong headwind
- Refer to chart (**left**) for Trackman data from NFL games

- Lundy: How I utilize "Good From" to validate this belief
- Lundy: Coaching this generation requires technology (validation).
Evidence based athletes

PLAYER DEVELOPMENT: WHAT CREATES HIGH FG%



- Trackman data identifies which ball flight & metrics produce the highest FG%
- Example, the highest FG% occurred w/
- **BALL SPEED** between **68-72 MPH** & a **HEIGHT @ LOS** between **11.5-12.5 FT**
- FG% drops significantly when kicking harder & higher than these metrics

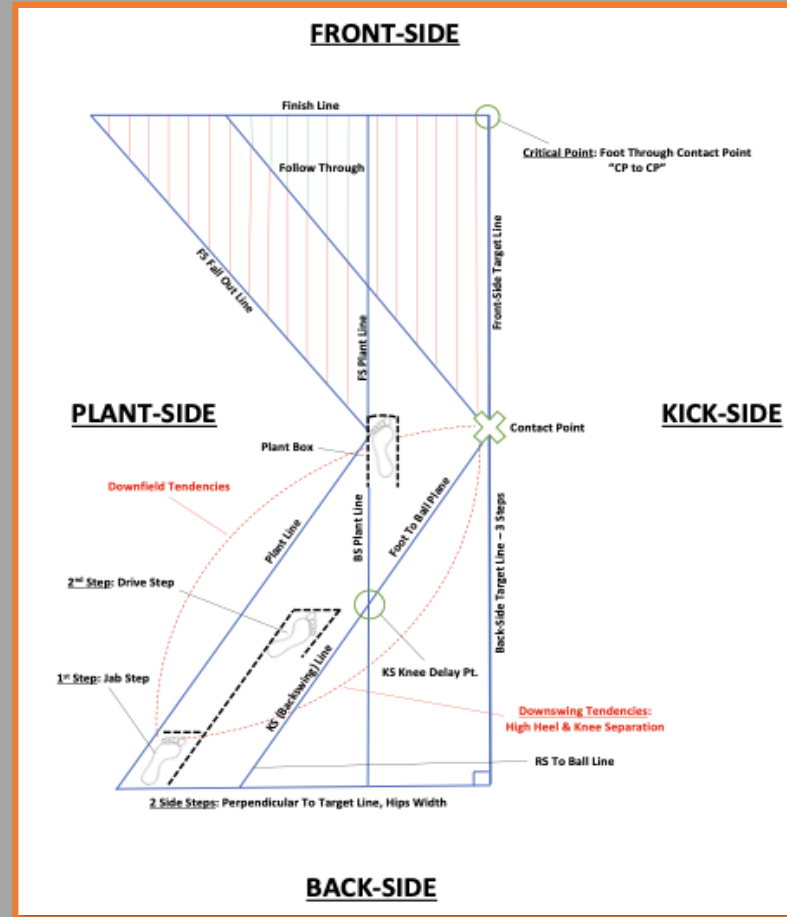
FG %	30-39 YDS	40-49 YDS	50-60 YDS	AVG. GOOD FROM
BALL SPEED 72+ MPH	94%	91%	79%	63 yds
HEIGHT @ LOS 13.0+ FT	93%	89%	60%	56 yds
BALL SPEED 68-72 MPH & HEIGHT @ LOS 11.5-12.5 FT	97%	97%	87%	59 yds

FG% is higher from **50+** yds at **68-72 MPH** ball speed than at **72+ MPH**.

FG SWING ANALYSIS: OPTIMIZING THE PROCESS



noun, plural **Kickometrics**
[kick-om-eh-trix]: the
measurements of kicking



METRIC 3: LAUNCH ANGLE (PUNT)

BALL SPEED + LAUNCH ANGLE = DISTANCE & HANGTIME

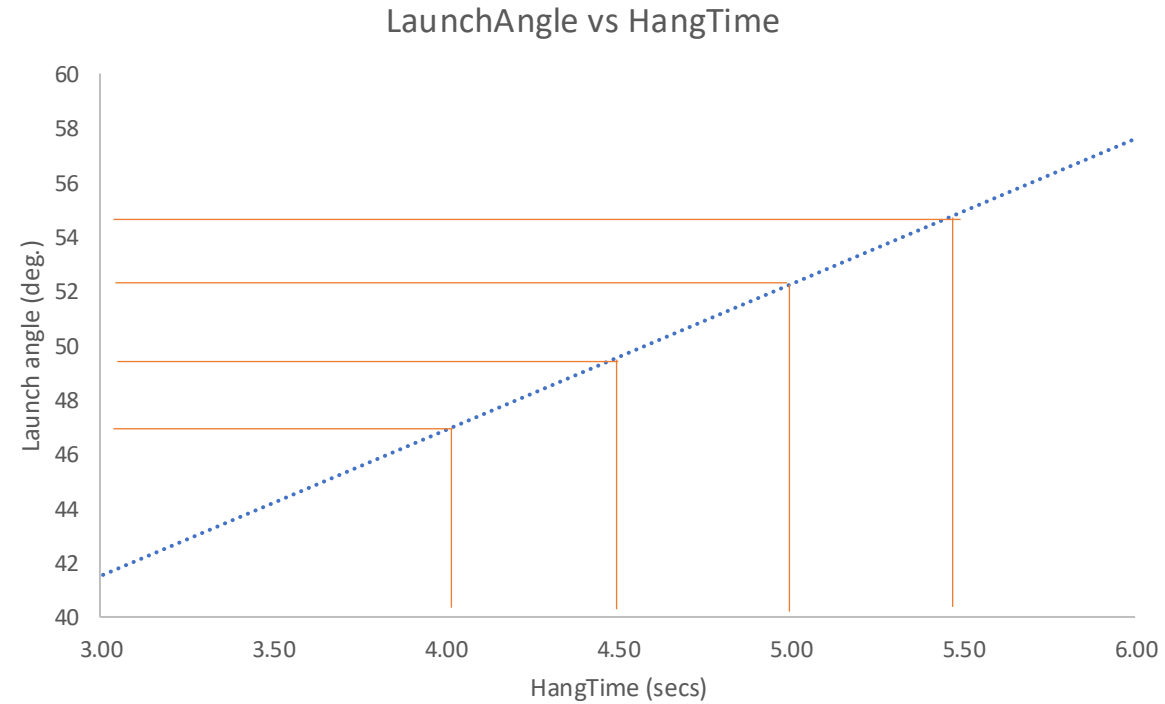


BALL SPEED
65.5
mph

LAUNCH ANGLE
52.6
deg

DISTANCE
58.9
yds

HANG TIME
4.91
sec

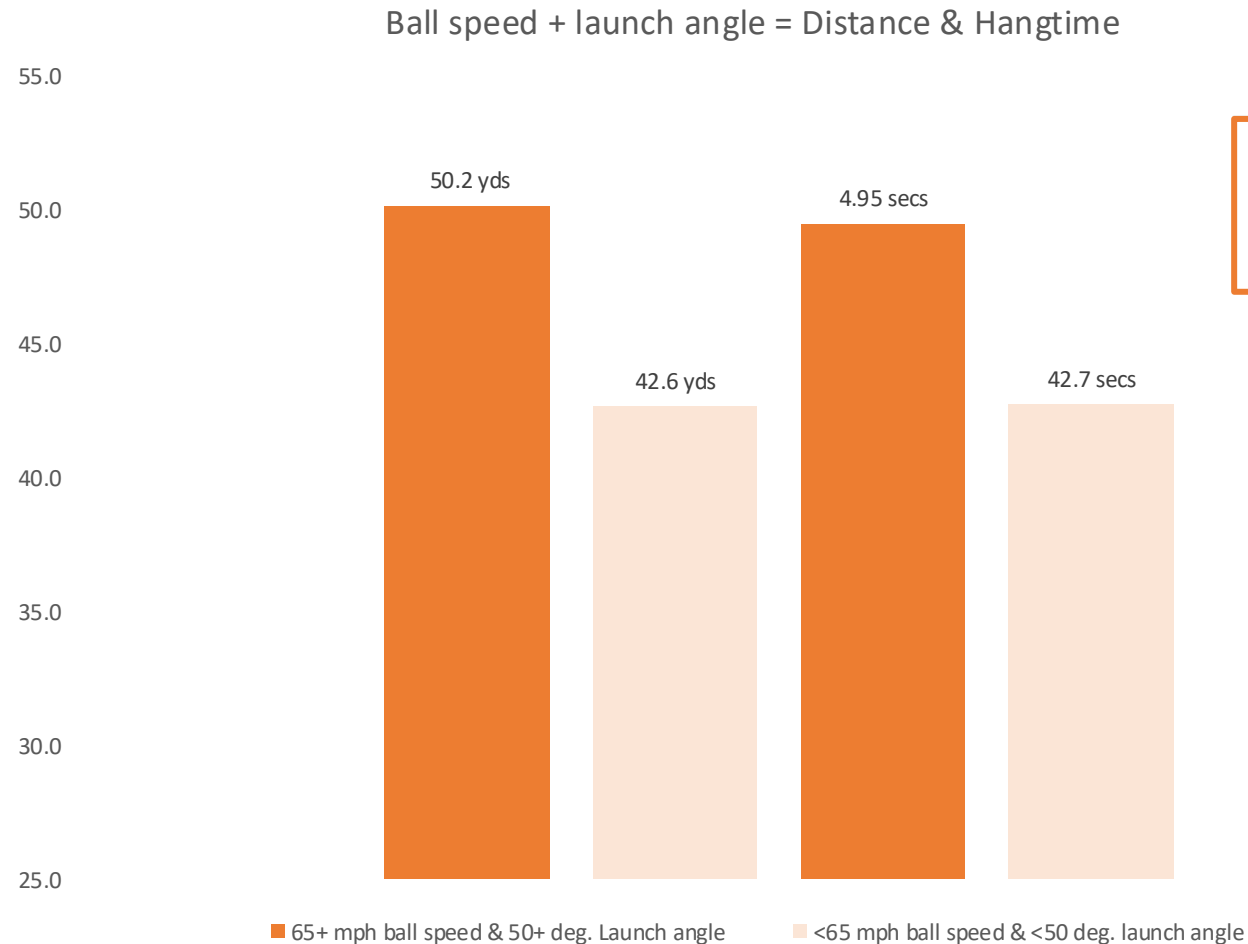


LAUNCH ANGLE DICTATES HANGTIME

METRIC 3: LAUNCH ANGLE (PUNT)

WHAT'S THE DIFFERENCE BETWEEN THESE 2 PUNTING AVERAGES?

50 YARDS/5.0 SECONDS VS. 42 YARDS/4.2 SECONDS



Metrics needed for a 50yd/5.0 sec avg:

- Ball Speed = 65+ mph
- Launch Angle = 50+ degrees

METRIC 3: LAUNCH ANGLE COMPARISON (PUNT)



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