

# On Track Vision Basics and Tips

## NNJR Track Side Classroom Series



## ***Disclaimer***

*The techniques shown here have been compiled from experienced sources believed to be reliable and to represent the best current opinions on driving on track. But they are advisory only. Driving at speed at Watkins Glen, or any other track, requires skill, judgment and experience. These techniques assume the reader has high performance driving knowledge and applies them as applicable to their level of driving experience.*

*High-performance driving can be very dangerous, carries inherent risks and may result in injury or death. NNJR and PCA make no warranty, guarantee or representations as to the absolute correctness or sufficiency of any representation contained herein. Nor can it be assumed that all acceptable safety measures are contained herein or that other or additional measures may not be required under particular or exceptional conditions or circumstances.*



- Where to Look
- Adapting to Track Driving
- How to Look?
- When to Look?



# WHERE TO LOOK?



- “Classic” Advice

- Look (far) ahead (20 sec)
- Look where we want to go

- Focus

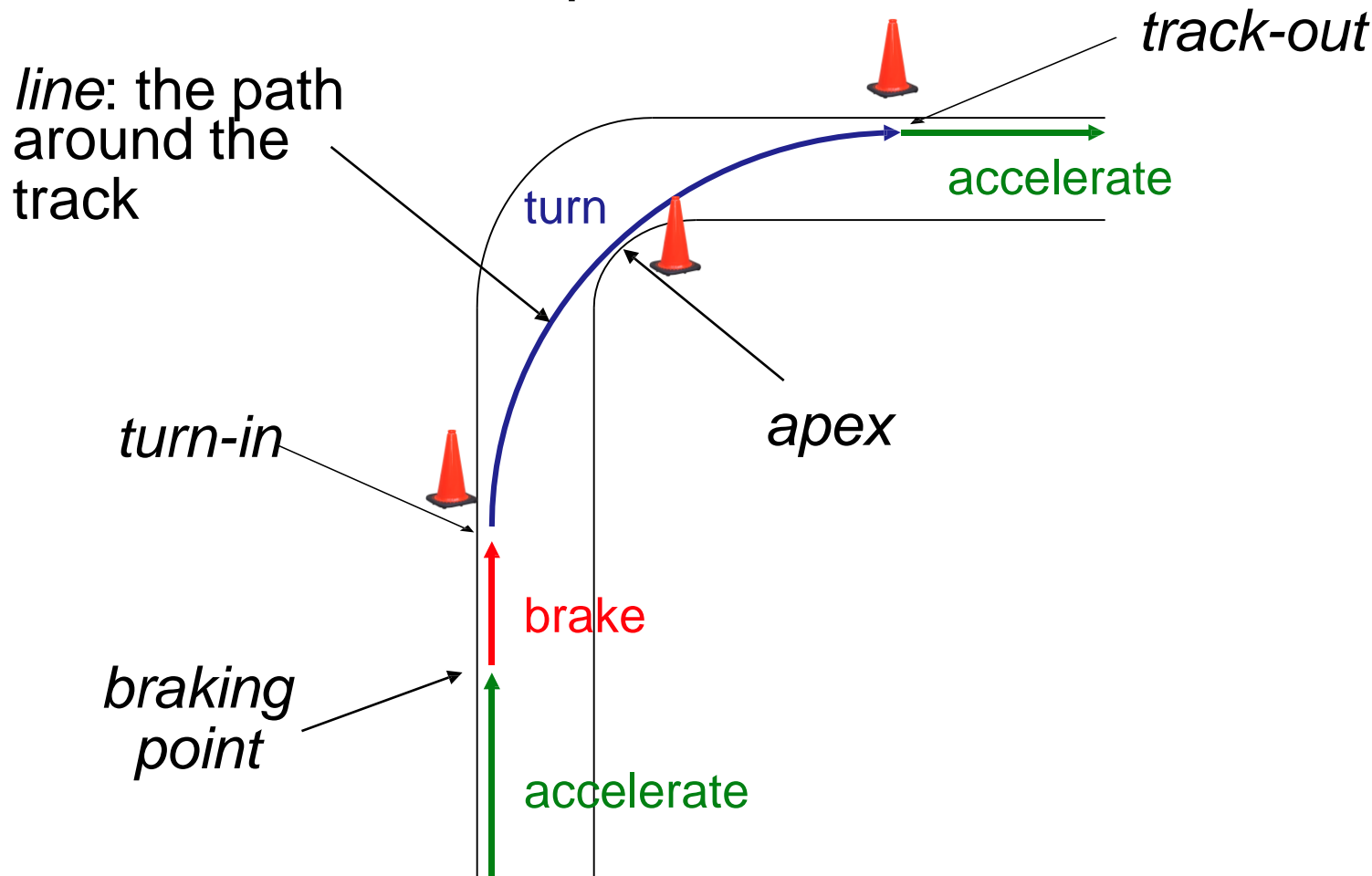
- Approaching brake zone, look at Turn In, Apex (or EOB)
  - Beginning of braking (BOB) is peripheral vision
- Approaching corner, look at apex (or EOB)
  - Turn your head now!
- Approaching apex, look at track out
- Etc.

- Use Reference Points (RPs)

- Cones
- Fixed items: fence, curb, tire marks, etc.



- Use reference points to drive a consistent line



Slide by Chuck Tucker from community.hagerty.com, used under



# NNJR RP's: You Can't Have Too Many

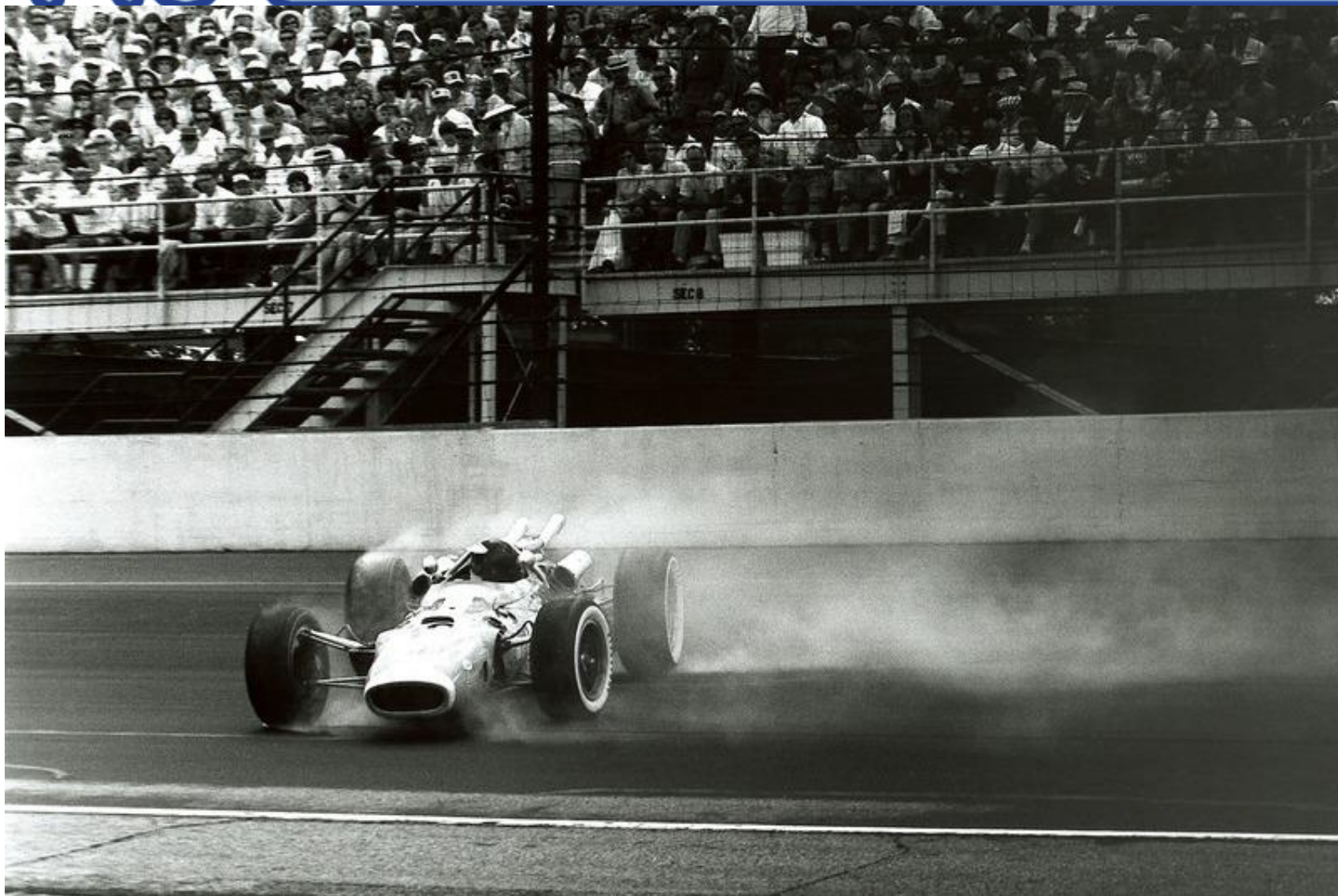


- RP = Reference Point
- Basics
  - BOB, TI, A, TO
- Essential Additions
  - Elevation, surface, color changes
  - All other unique features
- Non-Obvious Additions (not for beginners)
  - EOB, TAP, WOT
- Want to Get Better?
  - More: complete “mental picture”



- 
- 4TH GEAR THRU 10  
3RD GEAR THRU 11  
2ND GEAR THRU 12  
1ST GEAR THRU 14
- USE ALL THE EAST BUT MAKE OUT THE LEFT SIDE OVER TO THE LEFT FOR T11
- LATE BRAKE BUT NO DOWNSHIFTS
- SUBTLE TO CASEY AS MUCH SPEED AS POSSIBLE
- SHOULD BE MAX REV'S IN 4TH!
- LATE apex to square off a corner
- TIGHTEN UP THIS AS A NON-TURN. CARET SPEED THRU T10 INTO T11, BUT, T11 IS BASICALLY JUST THE FIRST PART OF T12
- GET TO THE INSIDE & HOLD IT, AS THE ROAD BOWS AWAY THE CAR WILL EXIT NATURALLY. WHEN YOU COME EAST, BUT REAR HURTS
- W.D.T.
- DOWN HILL...
- ROTATE THE CAR AS YOU COME UNDER THE BRIDGE TO APEX
- LATE APEX
- BRUSH! BUMP!
- CARRY THAT SPEED! IN 4TH! IT'S EAST TO 12TH STREET THAT BUMP! BUMP! BUMP! THE CAR'S GOING TO BE A BUMP!
- THIS IS A TOUGH SECTION YOU START T10 REAR EAST, AND APEX T14 REAR SLOWDOWN! I TRIED TO THRU IT AS A PROGRESSIVE SLOW THRU EACH TURN. 12 : 14 THE POWER TURNS...
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- Slide 8
- PORSCHE





# ADAPTING TO TRACK DRIVING



- Eyes take .7 sec to see, brain another .7 sec to react to something new (unexpected)
  - Means we need to look a minimum of 2 seconds ahead
- Our eyes have to be trained
  - Genetically programmed for 19 mph; not for 100+
  - Looking 30' ahead is natural
  - Human eyes/brain not designed to drive fast cars on a race track!
  - Avoid “target fixation”
    - <https://www.youtube.com/watch?v=v7xFXxwZMNA>

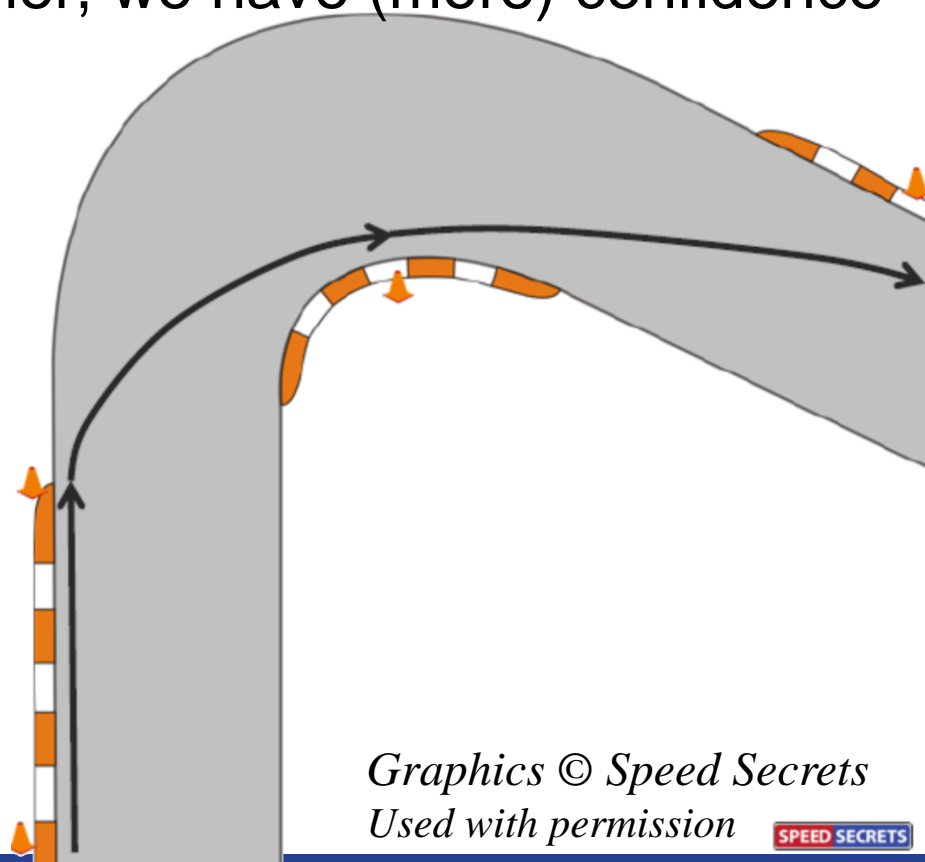
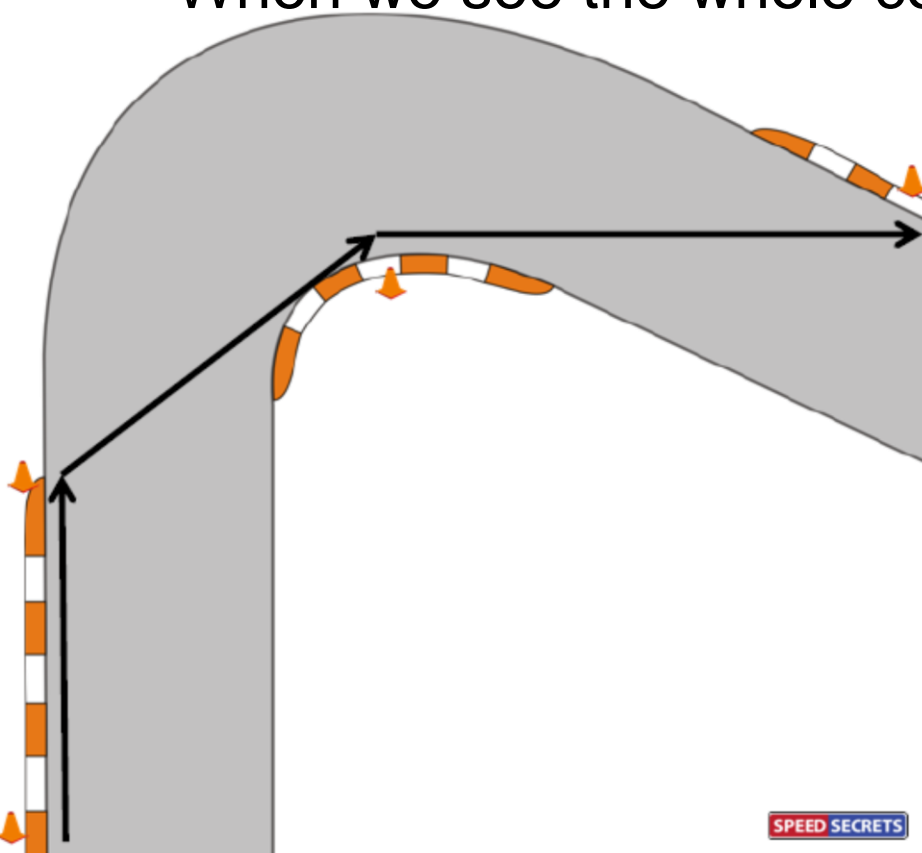
\* *Dennis Macchio*



# NNJR How We "See" a Corner



- A curve requires 3 points (basic geometry)
  - Our eyes have to "see" the whole corner
  - When we see the whole corner, we have (more) confidence



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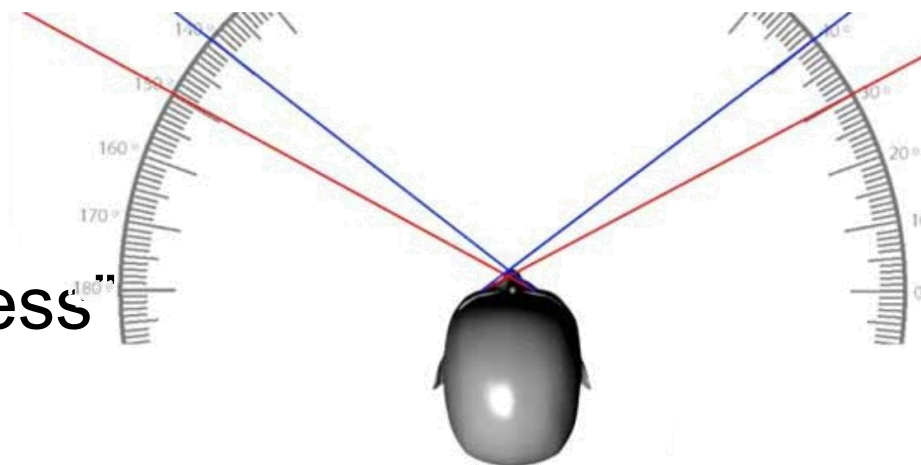
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Slide 12



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- Focus ahead and use peripheral vision when close to RPs
- Part of depth perception
- Essential for “track awareness”
  - Mirrors
  - Cars, objects in motion



- Critical part of Situational Awareness
  - MUST be aware of cars behind
- Should never be surprised by a car in mirror
- Scan mirrors (esp. rear view)
  - On and end of straightaway
    - Are cars closer or further away?
  - Exiting a corner
    - Confirms how close the next car is



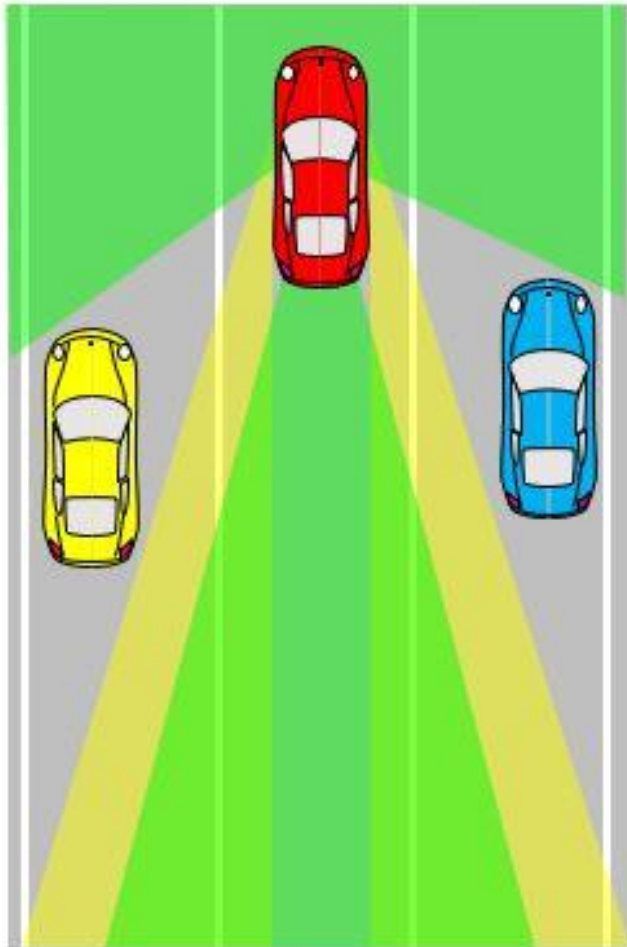
- **Start in correct seating position!**
  - Height tradeoff: up helps vision, down helps kinesthetics

## MIRRORS

- **Rearview Mirror**
  - Adjust to see entire rear window
- **Left Mirror**
  - Rest head against driver's window
  - Adjust to barely see left rear fender
- **Right Mirror**
  - Lean right so head is under rearview mirror
  - Adjust to barely see right rear fender



Common



G. Plazer, "The Geometry of Automotive Rearview Mirrors—Why Blind Zones Exist and Strategies to Overcome Them," SAE Tech. Paper 950601 (1995).



- **Focus**
  - Central vision, 1 second or more
- **Peripheral**
  - Side/surround vision
- **Glance**
  - Central vision, 1/2 second or less
- **Mental**
  - Your “mind’s eye”

Source: Central Indiana PCA

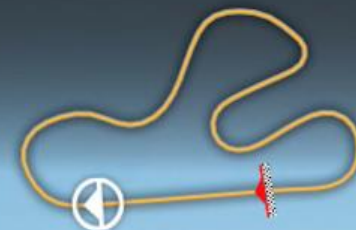
# NNJR Putting it all Together...



Chuck Tucker, Cayman GT4, 09/10/2017  
Putnam Park, Lap 7/15  
Sector – Sector 1

Total Time: 0:08:19.8  
Lap Time: 00:08.3

Glance  
Mental  
Focus  
Peripheral



Source: Central Indiana PC



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Slide 18



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# WHEN TO LOOK?

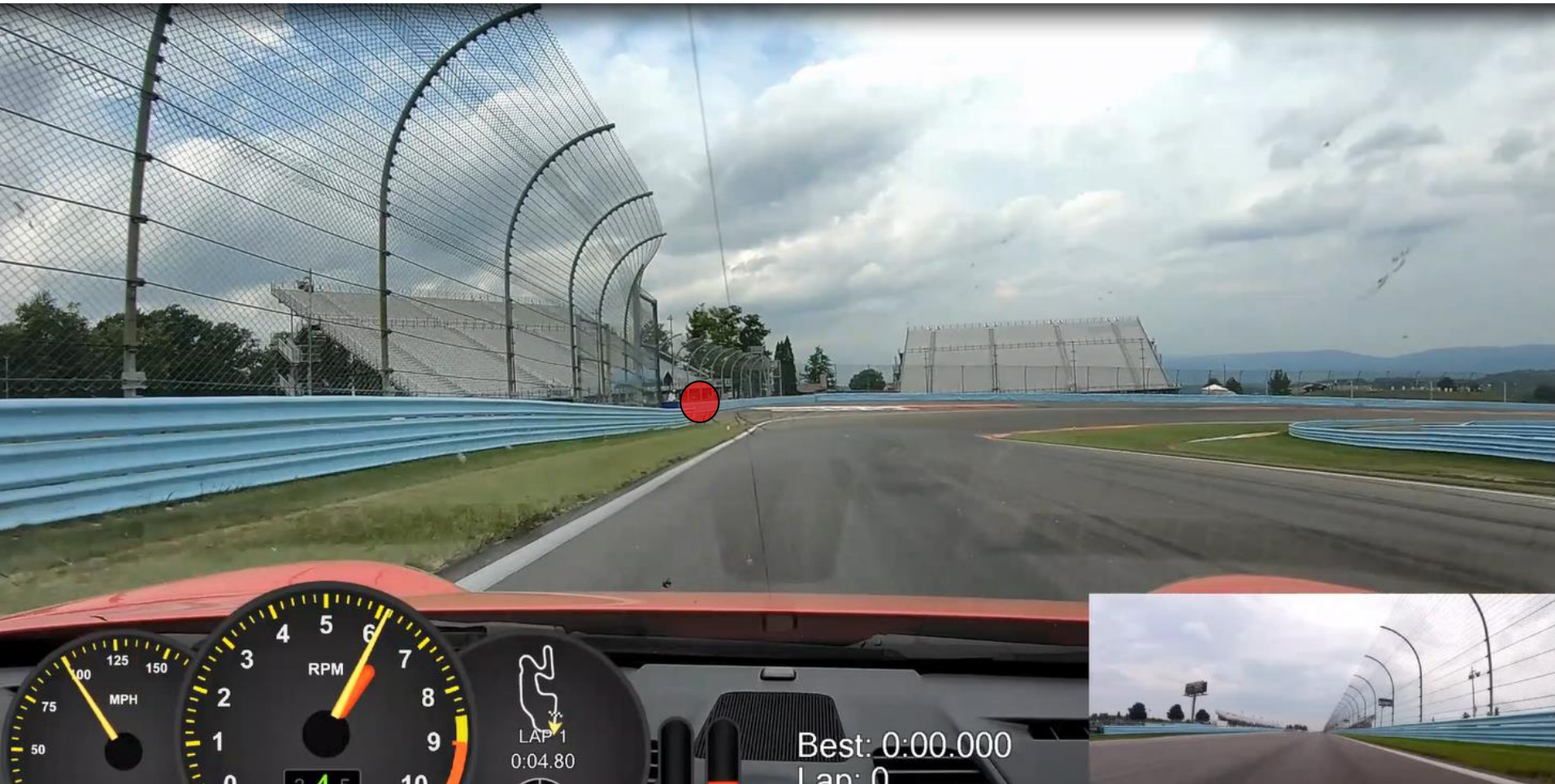


- At Flag stations?
- At Mirrors?

- Critical for your safety and others (*duh*)
- **No excuse** for missing any flag
  - Why do drivers miss flags?
- Inexperienced drivers
  - Not enough scanning (“glance”)
  - Incomplete “mental picture”
- Experienced drivers
  - Tunnel vision: e.g. chasing a car or a laptime
  - Incomplete “mental picture”
  - “In a rut” and forget the basics



# NNJR Flag Station 1



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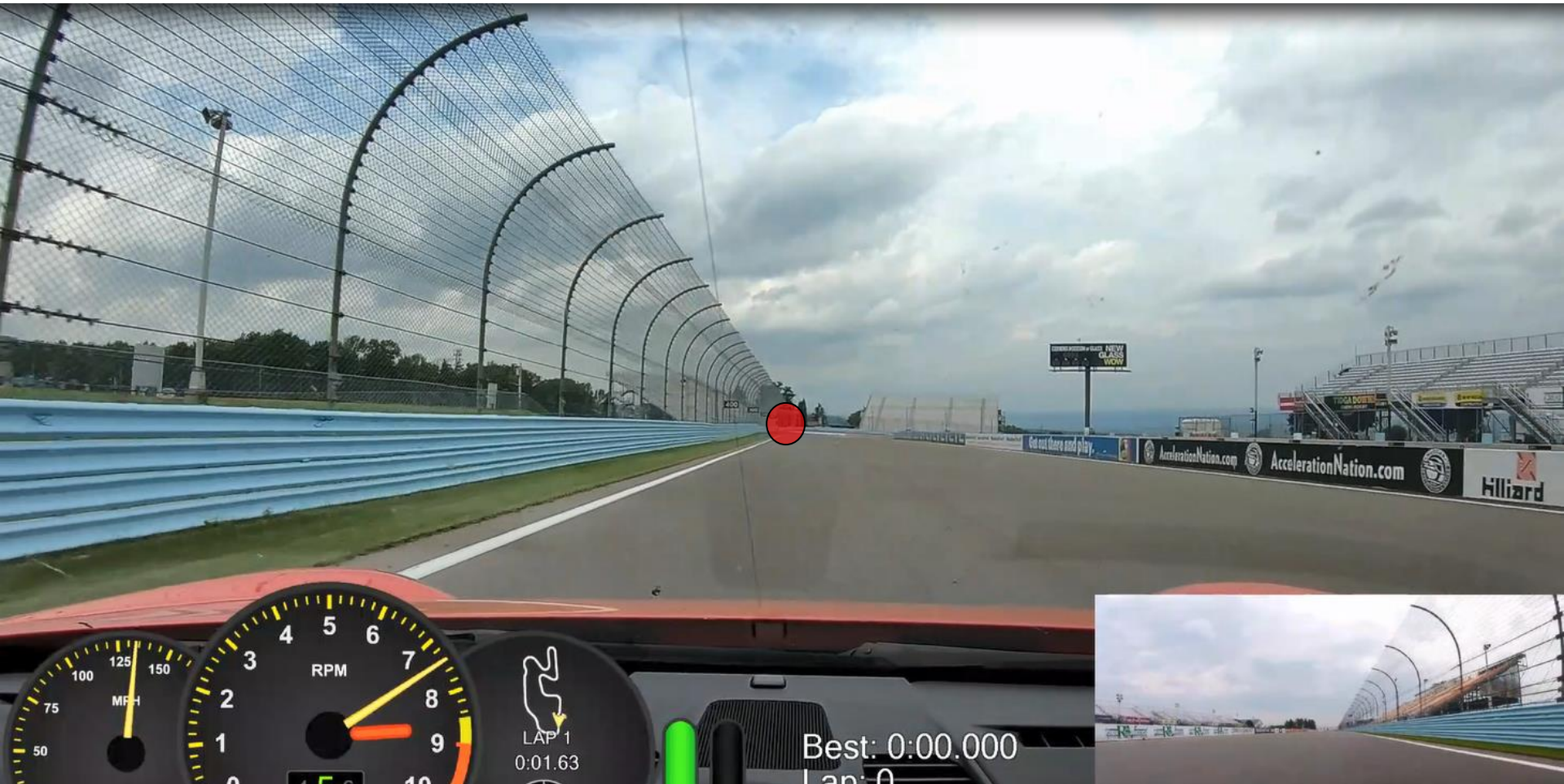
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# NNJR Flag Station 1



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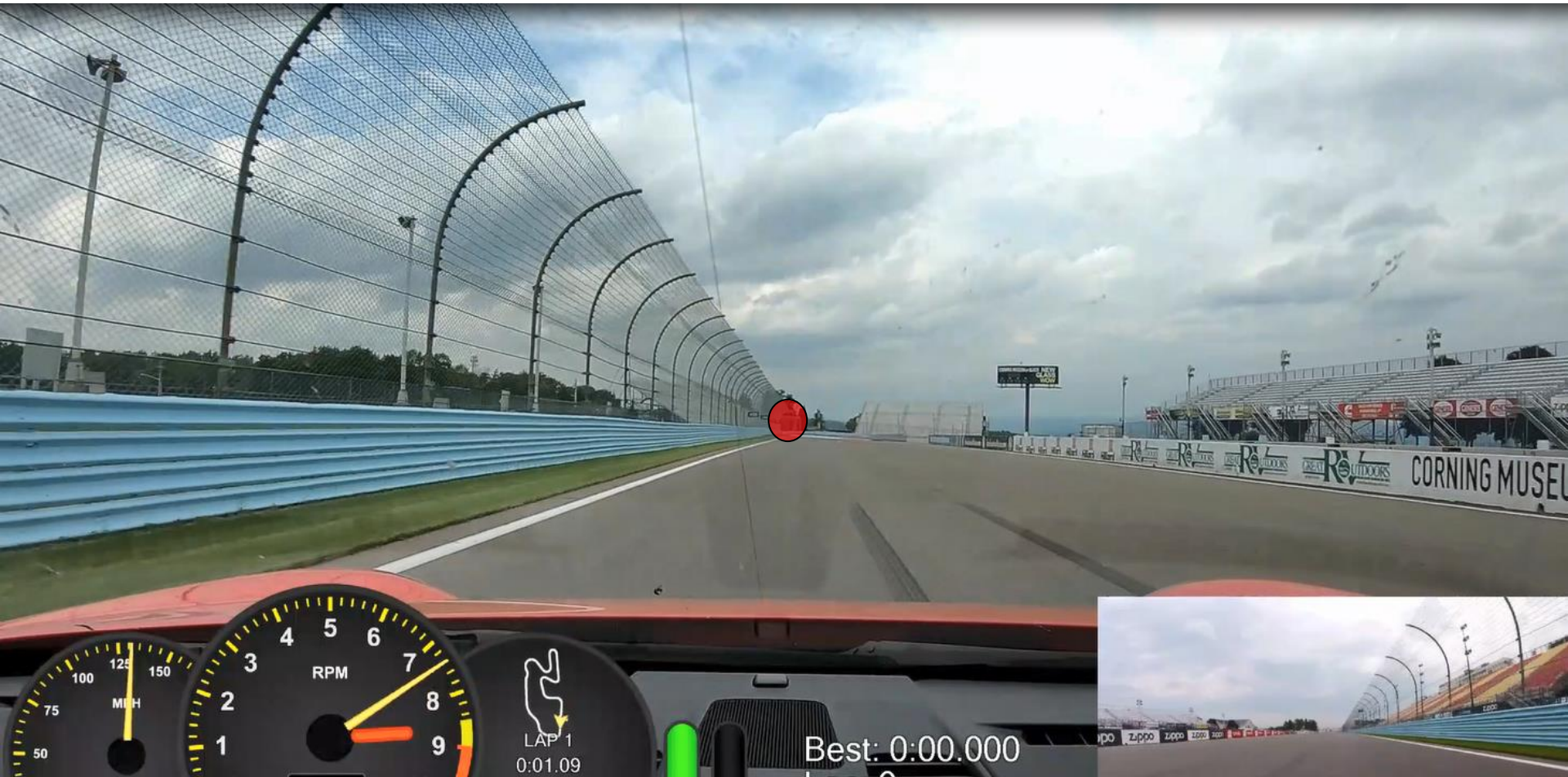
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# NNJR Flag Station 1



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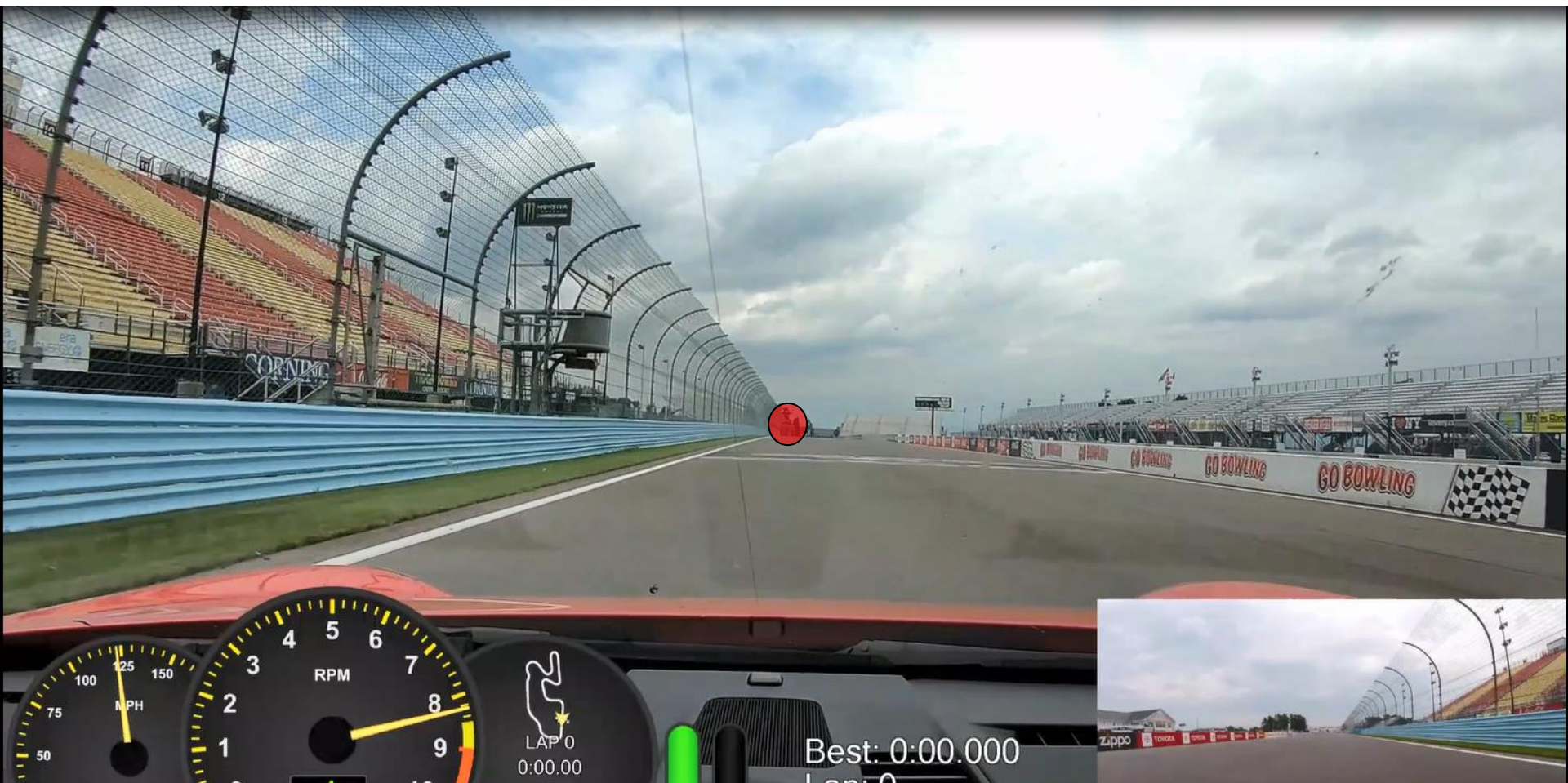
Slide 24



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# NNJR Flag Station 1



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- When should I look in my mirrors?
  - Entering a corner
  - Middle of a corner
  - Exiting a corner
  - Middle of straightaway
  - Entering a braking zone

- When should I look in my mirrors?
  - ~~Entering a corner~~
  - ~~Middle of a corner~~
  - Exiting a corner
  - Middle of straightaway
  - **Entering a braking zone**



1. On the street
  - 5 seconds, 20 seconds
  - Focus vs. glance vs. peripheral
  - Adjust mirrors!
2. Visualization / Mental Imagery
  - Develop the mental picture!
3. Deliberate Practice
  - Sensory Input Sessions
4. Be Aware of Alarm Bells



- In a rut / lose focus
- Pressure
- Tired
- Distracted



- Follow classic advice
  - Look far ahead
  - Look where you want to go
  - Adjust mirrors
  - Use Reference Points
- Adapt to Track Driving
  - Reprogram for faster speeds
  - Use Focus, Glance, Peripheral and Mental Vision
- See flags early
- Check mirrors at the right time
- Pressure, distractions, etc. reduce vision...a lot

## From the Advanced Class: Vision and Situational Awareness

- Following slides show how to improve on-track vision









1. On the street
  - 5 seconds, 20 seconds
  - Focus vs. glance vs. peripheral
  - Adjust mirrors!
2. Visualization / Mental Imagery
  - Develop the mental picture!
3. Deliberate Practice
  - Sensory Input Sessions
4. Be Aware of Negative Factors





VISION IN DRIVING - Part 1 - Visual Field / Focus

Watch later Share

MORE VIDEOS

0:25 / 7:08

YouTube

Yes 89635.png

Show all

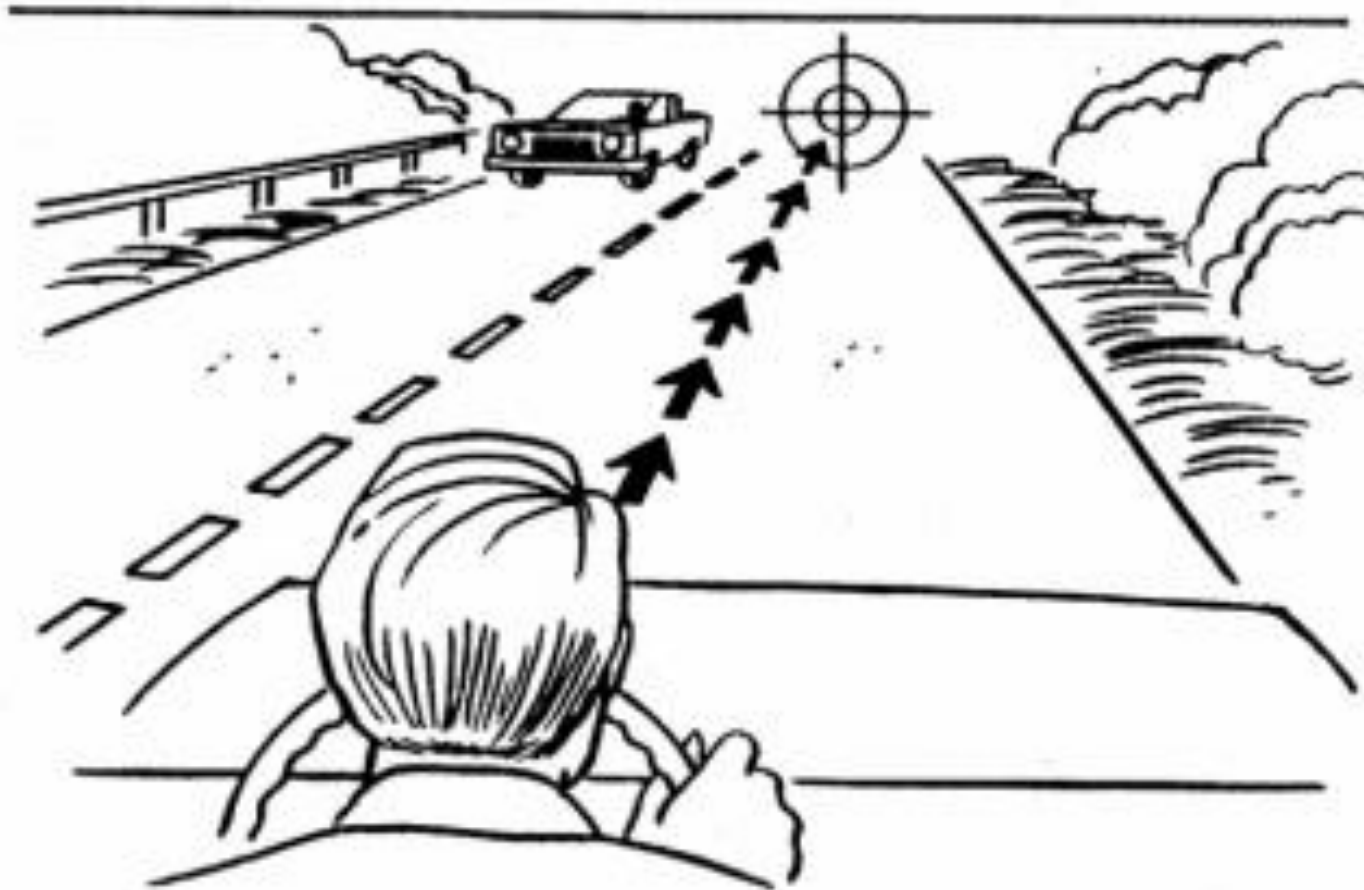


**CITY DRIVING**



**OPEN HIGHWAY**

12-15 Seconds is About One Block    12-15 Seconds is About A Quarter-Mile





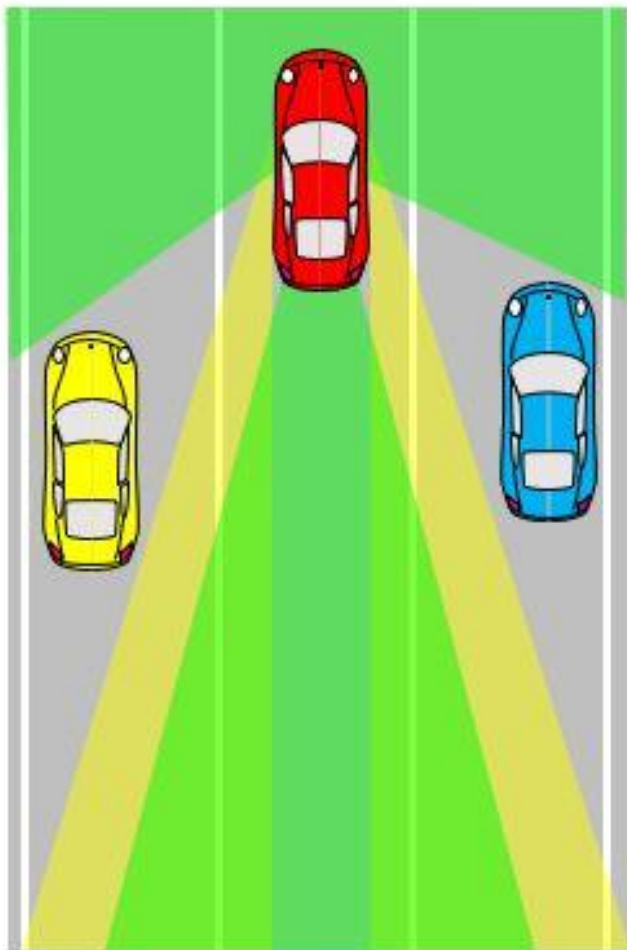
# NNJR Adjust Mirrors!



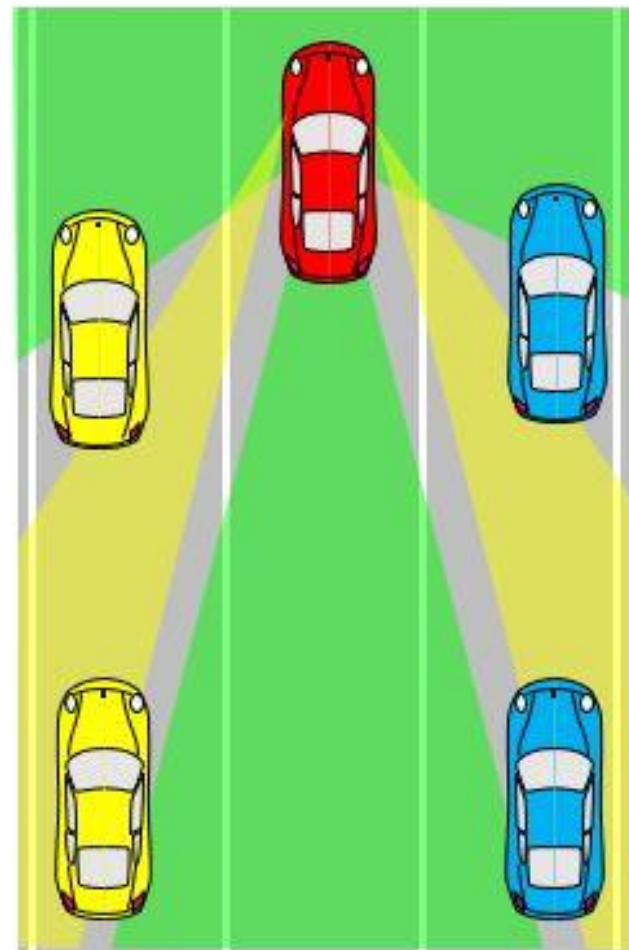
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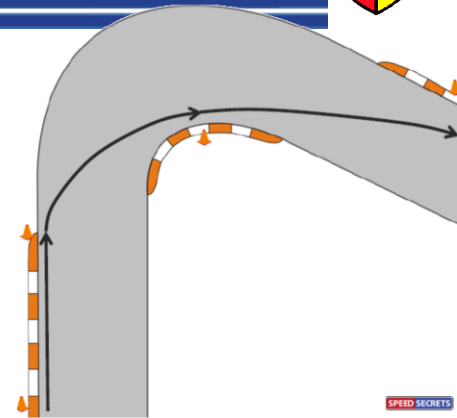
Common



Better



G. Plazer, "The Geometry of Automotive Rearview Mirrors—Why Blind Zones Exist and Strategies to Overcome Them," SAE Tech. Paper 950601 (1995).



- Develop “mental vision”\*
  - A picture in your mind of entire corner
  - Start with in-car video of corner (over & over)
  - Key: Turn video off and visualize full corner including exactly how you want to drive it. Repeat.
    - Turn your head!
    - Move your hands and feet!
    - Imagine the sound the car will be making, how it will feel, physical movements you'll be making and how you will feel

**SPEED SECRET**

**Using all your senses while doing mental imagery is powerful - and will make you a better driver.**

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\*Ross Bentley Speed Secrets 212

[See Mental Imagery Guide for Drivers](#)

# NNJR 3. Deliberate Practice: Vision and Situational Awareness



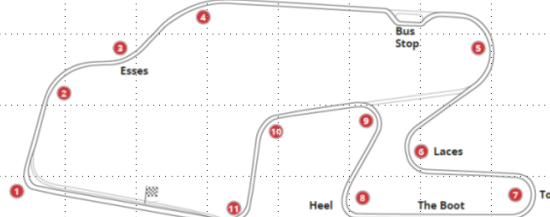
## General

- Everything you see on and off the track surface
- Something new each lap
  - e.g. Horizon change during a corner
- How far ahead can you see?
- Turning your head?
- Looking around corners?

### DELIBERATE PRACTICE WORKSHEET: VISION 1

#### General

- Everything you see on and off the track surface
  - Something new each lap
    - e.g. Horizon change during a corner
  - How far ahead can you see?
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  - Looking around corners?
  - Etc.



Write Vision notes on map immediately after session.



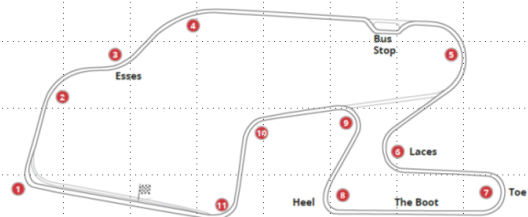
### DELIBERATE PRACTICE WORKSHEET: VISION 2

#### Mirrors

- Adjusted properly? (no blind spots)
- How many cars behind?
  - Entering bus stop? Entering Turn 1?
- Closing speed: is car in mirror closer or further away?
- What color(s) is/are the cars behind?
- Etc.

#### Safety

- How soon/far ahead can I see flag stations?
- Bail out areas for each corner



Write Vision notes on map immediately after session.



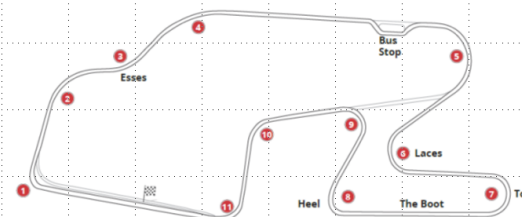
### DELIBERATE PRACTICE WORKSHEET: VISION 3

#### Reference Points

- Not cones!
- Cracks, posts, seams, curbs, etc.
- BOB, TI, EOB, Apex, Track out, more

#### Track Surface

- Sealer, color changes, etc.
- Elevation
- One new feature per lap



Write Vision notes on map immediately after session.



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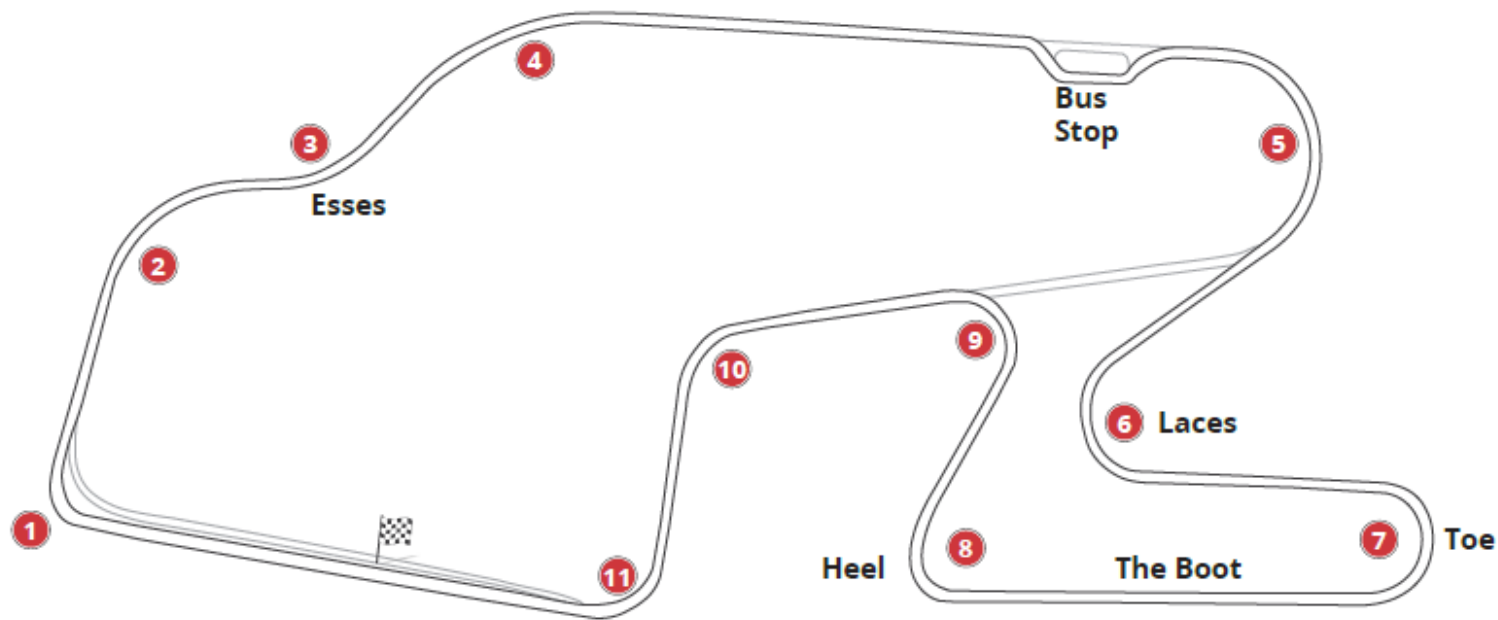


# DELIBERATE PRACTICE WORKSHEET: VISION 1



## General

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  - e.g. Horizon change during a corner
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- Etc.



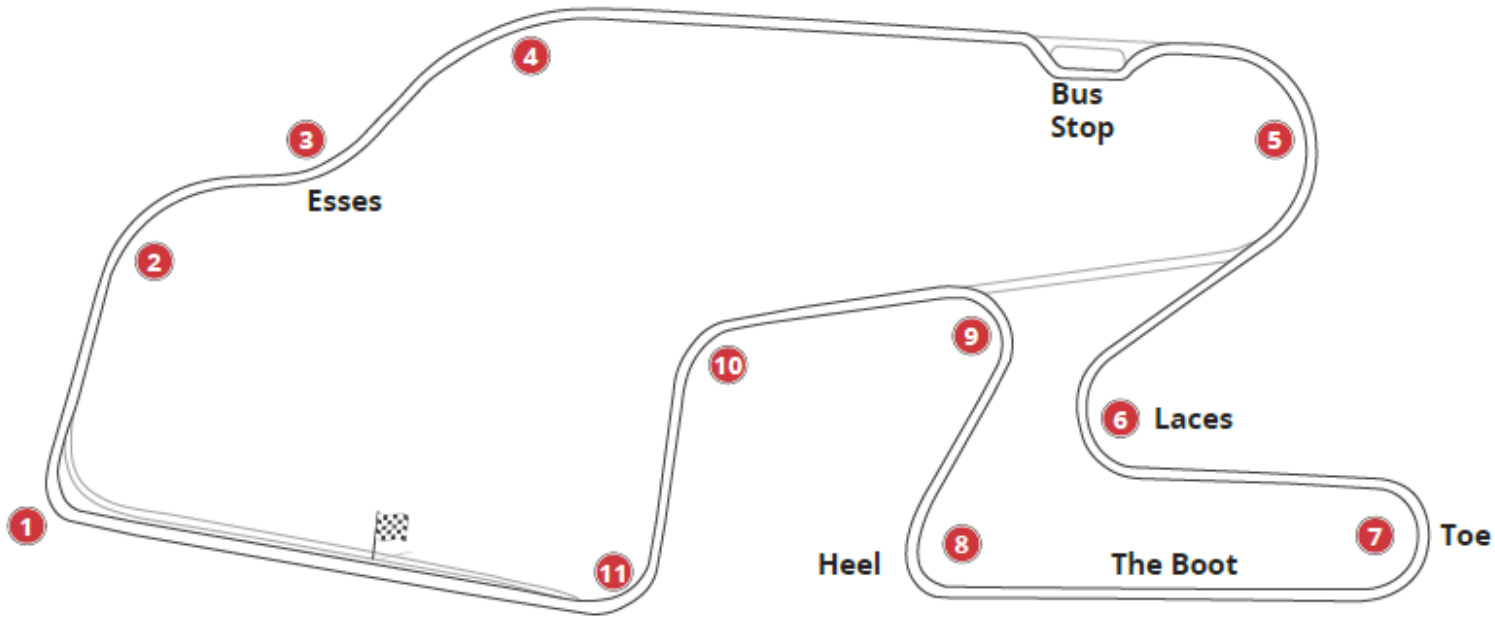


Mirrors

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# DELIBERATE PRACTICE WORKSHEET: VISION 3

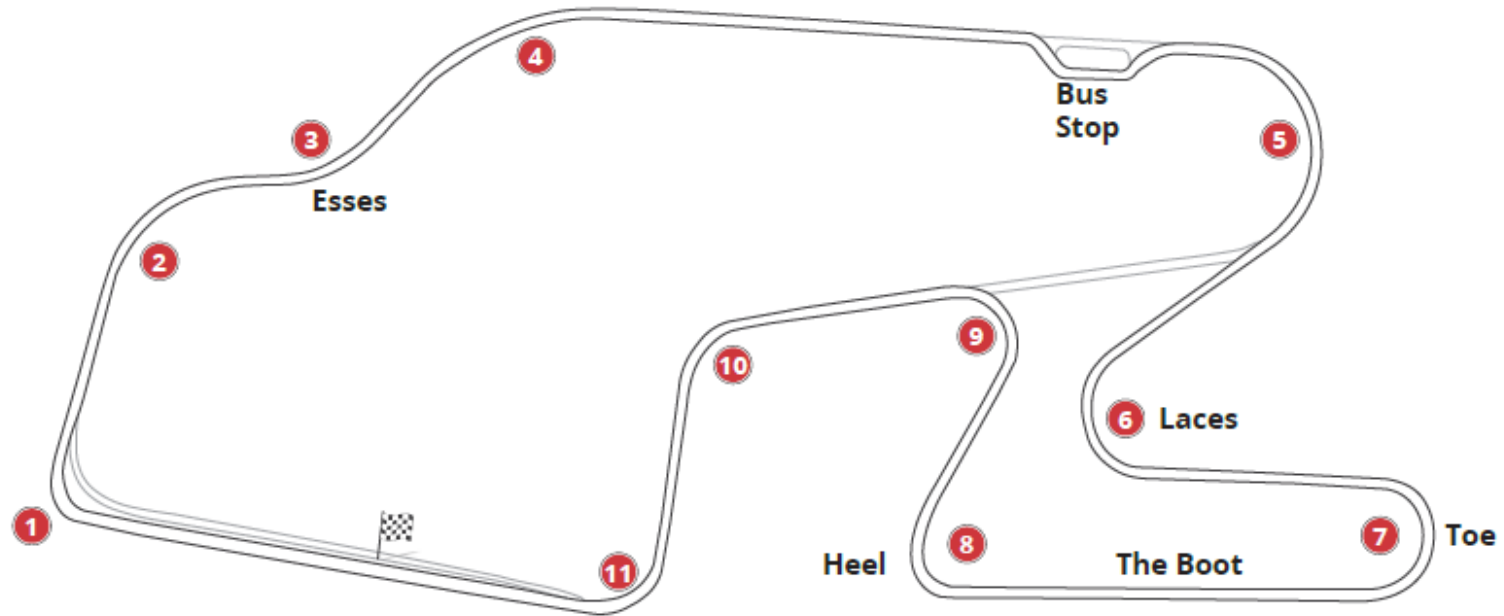


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## Track Surface

- Sealer, color changes, etc.
- Elevation
- One new feature per lap





- <https://nnjr-pca.com/wp-content/uploads/2022/08/Sensory-Input-Worksheets-for-Vision-Watkins-Glen.pdf>



- In a rut / lose focus
- Pressure
- Tired
- Distracted





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