

Let's go to the video

This is the first part of a two-part series on using digital technology to help improve your driving and coaching options. Our first installment is on using video for review and coaching. All levels of driver from beginner to professional, can and should use video technology to improve their driving. Video helps in learning a track and “the line” but it can also highlight steering inputs, driving techniques and vehicle dynamics.

Many of our students today will come to a track event with an action camera or smartphone mounted on their windscreen running lap timing applications such as: Harry's LapTimer, TrackAddict or RaceChrono. Many new action cams capture GPS data along with the video data that can overlay speed, G force and track maps. Stand alone “dash cam” system like Waylens Horizon record video and overlay GPS generated data and provide a summary of lap statistics. Most systems allow for wireless transfer of video and data for analysis without ever needing to remove the camera or phone from the car. Amazing!

BMW's M Dashboard Laptimer

Here come the OEMs. Car manufactures are also entering the track video - performance data market. The applications provided by car manufactures support external and internal with HD cameras, GPS, IMU(CPU) on-vehicle processing units, software with iOS & Android applications.

BMW's M Dashboard Laptimer



BMW's M Laptimer App is being co-developed with Harmam, a SAMSUNG Company.

Porsche, Chevrolet and McLaren allow you to download lap and car data into Cosworth's Toolbox analysis software today for details analysis on a tablet, laptop or home computer.

Data from these OEM systems can be copied to a SD card and reviewed on a Laptop with the appropriate manufactures software.

These are just some of the options available to our next generation of students BEFORE they venture into actual track data acquisitions such as AiM Sports, VBox, Motech, or Traqmate. I suspect most Green and Yellow students will have video and data installed before our NNJR instructors do! Clearly this is something as instructors, we need to address. The good news is it is actually very straight forward, easy to learn and you can apply almost all of your right seat experience when reviewing video. Just be aware, instructional video analysis and review takes time. It is easy to spend 10 minutes reviewing a single lap. It can be done “in car” after a run group **if both the student and the instructor are fluent with the playback application**. If not, don't set the expectation of reviewing a video like you might review a run session before jumping out the students car. A better suggestion is to ask the student to set aside 15 minutes before their next run group or later in the day for a data review. Make it the students responsibility to make sure everything is set up and ready to go, so you spend you time reviewing the video, not troubleshooting the students video application.

Avoid the time sink of helping your student set their camera's settings and placement. Your student's camera should be set up and turned on before you leave pit lane and you should not touch it again until the car is parked. If the camera fails to start, slips in the mount or the beeps while driving, ignore it until you are parked in the paddock. If the camera falls in the footwell, make your way back to pit lane, park the car and deal with it. The last thing you want to be thinking about while driving at speed is a camera or smartphone flopping around on the floor.

Just like on track instructing, use the video at first to focus on the students line just as you would from the passenger seat. The benefit of recorded video today is that it is easy to stop, rewind, and play. Most of the time you will be doing this on the students smartphone, tablet or laptop at the track. An added benefit of the laptops larger screen is you can view lap video side by side, each in its own window. It takes a bit of practice to sync the side by side video, but it's not hard to do. Move one video ahead, go back to the original, start it, and then start the second video as the lap time counts down. With newer integrated Analysis systems such as AIM Sports Race Analysis 3 and VBOX's data analysis, the software will allow you to select and compare two or more lap video side by side perfectly synchronized.

Try to limit your reviews to one or two per day, video analysis can be very time consuming. You will be able to highlight the key areas with the video, and help the student visualize what you are asking them to do which will pay dividends the next time you go out “in the right seat”. By the 2nd day, you will be able to show and reinforce the improvements in your next video review. I have found this to be a very powerful reinforcement, and it gives the student a real sense of accomplishment that they can see and take home with them.

For a review, I watch a few laps in a row before making any comments from the video. I am looking for overall consistency of the students line, braking and turn in points. If the system has data overlays (most do) I will look for consistent timing and track location of when and where the student goes to the brake or throttle and establish reference points in the video that they can use on track. You can always “stop” the video when you see the brake icon come on, and then look for a reference point from the video screen. This is where the pause, return and replay video function becomes a very insightful observation and reinforcement tool for the student.

Your instructions should be the same as if you were in the right seat. It is easy to spend 15 minutes with a student reviewing a two minute lap. Play a full lap or two before commenting or stopping and starting the video. Try to focus on only one or two coaching points that you may have picked up on while on track or in the video review. Use the video to reinforce your instruction. Say the same thing. "Turn in, brake, brake release, look ahead." After the event is over, students can save their videos on their phones or upload them to Youtube, iCloud or another video service. This gives students and instructors a terrific starting point for their next time on the track. Students can show their next instructor the video from their last track event. If a student was using an inside mount for a product like Harry's or RaceChrono, the smartphone microphone will record the instructor's verbal instructions and commands.

Of course, most students will rush to first look at the "lap time". That's a potential downside of lap timing video tools, it is up to you to reinforce it's not about top speed or lap time. It is important for the instructor to stress that the student needs to use video to gain and overall understanding of consistency in their driving and that their speed will come with an improved line and overall consistency, not trying to beat their best lap time.

The GPS breakthrough

Whether it is Smartphone App or a GoPro action camera, GPS is a game changer for both ease of use and sophisticated track mapping and data capture. Today's GPS is so accurate it will draw you an actual track map where you can trace your driven line through a corner within a foot. You can even render your lines on a satellite image of the track, which is cool, but not necessary.

All the current action sports camera manufactures offer cameras that can turn themselves on and off based on location or activity. Many support Bluetooth and WiFi so after the session, you can wirelessly transfer video directly to your laptop or tablet. Of course you can always just sit in the car and review on the car's display or smartphone for a quick review.



Harry's, TrackAddict and RaceChrono

I'm a big fan of SmartPhone applications like Harry's LapTimer, TrackAddict and RaceChrono because they ridiculously affordable and just so easy to use.

Harry's PetrolHead IOS app costs \$19.95, RaceChrono's App is \$17.99 and TrackAddict is free! You will spend more on a good mount than the smartphone software, each represent a ridiculously good bargain. Do invest in a good mount with a short "arm" to improve stabilization and use a phone case that you cut a hole in to secure a tether to the phone and the mount. You will spend more on a good mount than the smartphone software. Both are ridiculously good bargains. Look for a mount with a short "arm" to improve stabilization and use a phone case that you cut a hole in to secure a tether to the phone and the mount.

RaceChrono and Harry's will run on either an IOS (apple) or Android phone (Google) and leverage the phone's camera, GPS and accelerometer to capture video, speed and G-Force data. All the applications mentioned above provide ongoing software updates at no charge. A GPS function selects the track from your location and then loads the coordinates or you can "create a new track" by allowing the GPS to figure it all out. Presto!

When you select the video option, the application "starts up" the video camera when you cross the start-finish line. After a session is over, you can review your video right from your phone, "Airdrop" it to a tablet, laptop or with a couple of clicks, upload the video from the phone to a cloud service such as YouTube.

These applications can also integrate input from additional wireless cameras and OBDII dongles. You can add additional measures such as break pressure, RPM, gear, etc. You can have picture in picture video when using an editing software such as RaceRender.

Having a camera placement behind the driver's right shoulder shows the driver's inputs provides with valuable additional information for your instructing. Look for smooth inputs and see if the driver is experiencing understeer or oversteer. If the dash is in view from a camera you may also be able to notice if the traction control indicator comes on in the dash. If you have an over aggressive student cranking in steering angle in the middle of turn with the traction control light blinking, it makes it very easy to explain the concepts of understeer and "over driving" the car sitting in the paddock. Next time out, set goal to have the student control the car, instead of the car controlling the student.

Video editing and data review tools

Most smart phones and in car systems can produce a video and data file that can be imported into programs like RaceRender. RaceRender is a track day video editing software that allows you import and sync video and data files to create terrific looking track videos. The synchronizing tool is very well executed and intuitive to use if you are taking video from a camera and data from another tool such as a Solo.

The RaceRender software creates data overlays onto your video with graphical widgets for Speedometer, Tachometer, Gear, Brake, Throttle, G-Force, Lap Number, Best Lap, Best Time, Track map, Shift lights.

RaceRender also supports multiple camera views to produce that professional “window in a window” look. Of course you add your own Titles, headings, and insert text any where in the video playback.

RaceRender is a very slick piece of a track focused video editing software and works seamlessly with their TrackAddict phone application. If you purchase the Apple or Windows application, you can load a data file and a video file(s) to create works of art from just about any data logging and video system. Create your own YouTube Channel, and you are ready to take on Chris Harris.



Vbox CircuitTools is another terrific piece of software that combines Video with “squiggly line” data analysis in a single integrated view. So far it only works with their own Vbox video loggers but it can read just about any data logger’s lap data. CircuitTools has well-executed user experience combining synchronized video with lap segments, split times, color coded track map and “squiggly line” G-Force data graphics all on a single four quadrant screen.



A word of caution is needed here. Discourage your students from looking at the real-time LapTimer to check their position in an ongoing lap. Set the lap timers to display a lap time after start finish, not a predictive lap time.

If you want to learn more about Harry’s LapTimer, TrackAddict or RaceChrono visit their website and follow the Online Forum or search YouTube for “how to” videos.

- <http://www.gps-laptimer.de/> Harry’s
- <https://racechrono.com/> RaceChrono
- <https://www.hptuners.com/> TrackAddict

