

Driving With Voices in My Head

By Jim Regan

If you are familiar with a racecar setup using analog gauges you are likely well aware the world has changed. What was once analog-only gauges transformed into digital displays which transformed into on-board lap timers and data recorders. Fast forward to where we are today and you will see many cars with electronic dashboards which use software to personalize the dashboard layout. More importantly, these devices are recording on track information from the vehicle and/or sensors to measure things such as RPM, oil pressure, water temp, MPH, lateral and linear g's, etc.

The result is the ability to download this information for analysis to demonstrate what the car is doing on track. Software is then used to display these measures in a graphical presentation which are displayed as a bunch of squiggly lines. Learning how to decipher these results is usually the disconnection point for most drivers as interpreting this information requires education.

To paint some background on my own data path, in 2015 I made the jump from regional club racing, with the SCCA, into racing at the SCCA Majors level. It was also the year when I added an electronic dashboard and data logger to my racecar. Having been an analog driver, an electronic dashboard was a new-fangled gadget with flashing lights, MPH readouts, predictive times, and a myriad of other functionality that was visually exciting. It was also something I deemed was necessary to compete against many of the best drivers in the country in the highly competitive SRF3 class. Under the covers, my on-track performance was being recorded as measures which could be graphically displayed (the squiggly lines) for any track session. Yet none of this made much sense to me initially. I then signed up for a seminar to learn what the squiggly lines actually mean and how to evaluate my on-track performance.

The course was great as I learned the difference between a jagged line under braking or acceleration compared to a V shape and flat line 100% throttle TPS measure. But I still didn't fully understand the significance of this until an engineer pulled my data for comparison to his own at a track where I am consistently fast. The next thing I knew, he had an audience around him reviewing my entry, minimum and exit speeds in some of the most demanding turns on the track.

Then at the next event, I noticed fellow driver Steve Spano fiddling with a black box in his racecar. Knowing Steve is an electrical engineer, I asked him what it did. His response was, "Oh, this is a device I built and have been playing with which translates my dashboard information into speech and tells me that information while I'm driving." My immediate reaction was, I want one! Following that conversation, Steve and I set out to refine what his device could do and The Era of Audible Reporting for the everyday racer had begun.

Make no mistake – data capture is a fantastic tool for post session analysis. Add in video and the results are both entertaining and useful in seeing how well a driver is doing on track. Yet even together neither of these options can match what is possible with performance measures being reported in real time. If data analysis and video were the gateway to driver analysis, adding audible feedback to the equation is a game changer. Not only does the driver hear performance measures, but they also get critical engine warnings such as low oil pressure, lack of charging or overheating.

Having used audible feedback while driving for the last two years, I can tell you it works! In my own usage, I have my in-car audio tied in as an external mic to my camera system. This allows me to replay my video session with the same audible information I hear in the car rather than having to hash through those squiggly lines. But enough of the high-level overview. Let's break this down into some examples of how I apply this information while driving.

To begin with, track knowledge is important. You can't expect any device to help you until you know the relative layout and flow of the track. This is where the notes that Ross Bentley has talked about many times serve as a starting point. Get a track map, make the notes and visualize the track or watch video of what you did on track. Next, decide what audible measures you want reported from your dashboard. I always keep upshift enabled as well as rolling MPH when I am learning a new track.

As I gain confidence, I begin to ratchet up the entry speed for each corner to hit a repeatable target of +/- 1 MPH. With that in hand, I then work on increasing my v/minimum speed through the turns leading onto the longest straights with the goal being to tick my v/mins upward by making adjustments in car position or throttle stick. Using these two announcements, it doesn't take long to define a repeatable variance for both measures. This is also where it gets interesting as you can begin to apply advanced measures such as lateral or linear g force announcements.

Knowing these values also helps with assessing the speed of the local hot shoe. A great example of this is T17 at Sebring which I have experienced in my Spec Racer Ford. You think you are doing just dandy at 120+ MPH entry speed when a local driver whizzes past you at your braking point then brakes much harder than you, makes the turn and drives away. Suddenly you determine perhaps an entry speed of 120 MPH can be faster. But that doesn't mean you should go all in on the next lap. That is how people crash. Instead, use the entry speed announcement to step up your entry speed before braking and build your confidence to do it on every lap. In doing this, you will find the added speed.

Entry speeds can also be used to establish a passing zone. In one instance, my entry speed was repeatable at 112 MPH at my beginning of braking in a turn before the longest straight. Yet the car I was following was braking at 108 MPH based on my audible MPH reporting. Otherwise we were very equal on the remainder of the track. After repeating this for two laps, I was easily able to pass him under braking when he jumped on the brakes at 108 MPH and I carried my 112 MPH entry speed into the turn to out brake him and pass him. While one could argue this was simply racecraft, I clearly knew the odds were stacked in my favor to make the pass premised on knowing my entry speed.

Finally, we end with the audible upshift notification which is triggered by a user-defined RPM threshold. On race starts, knowing you will get an audible upshift alert allows you to be eyes up to find the opening rather than having to look at your dashboard or worse hit the rev limiter. Plus the upshift notification can be paired with rolling MPH to provide upshift timing. Using these two measures you might hear an oscillation in MPH i.e.: 116, 117, 116. This would be indicative of either having a headwind or the MPH hanging from compression which can occur in speedway banking such as at Daytona or Homestead. In either case, if you shift too early solely based on RPM or shift lights your lap time suffers. Plus pairing the upshift alert with rolling MPH can be used to breathe the throttle rather than upshifting in some track segments.

Moreover, data usage in the form of data capture, video and now voice are raising the bar on going faster. When these tools are joined together, drivers who use them have competitive advantage and that is what we all want.

About Jim Regan

Jim Regan has been an active New England Region SCCA driver for the last 40 years. He spent 30 years racing in the Formula Vee class and transitioned to Spec Racer Ford 10 years ago. He was also an early adopter in updating to the Spec Racer Ford Gen3 platform and has raced in that class at the SCCA Majors level for the last 4 years. He has multiple FV and SRF New England Regional Championships among his accomplishments.