

VIRTUAL RACING SCHOOL



Creating the Next Generation of

**MOTORSPORT
CHAMPIONS**

Abstract

There are thousands of young drivers racing go karts and in the lower formulas, all hoping to make careers as professional racers. At the other end of the spectrum, there are 22 drivers on the Formula One grid each year, and only one of them can become world champion.

Clearly, the odds are stacked against anyone becoming a professional driver in F1 or any of the other major racing series: IndyCar, NASCAR, DTM, etc. Learning the skills needed to compete at such a high level requires years of practice and the investment of hundreds of thousands of dollars. And even after all that, nothing is guaranteed.

This paper explores that difficult path to the top, both the traditional route from karting through the various formulas, and a new option: simulator-based training and racing, which is quickly proving to be a viable—if still rare—route for young drivers. Advanced simulator technology is making racing more accessible, but even with the new technology, drivers still need support to make the most of it.

Virtual Racing School (VRS) was created to provide that support to the next generation of motorsport champions. From analyzing and interpreting telemetry to tracking performance and trends to developing personalized training plans, VRS is being developed to assist drivers from the moment they take their first laps on a simulator all the way through a successful on-track racing career.

It is a long, difficult and expensive road...

While the technology of racing cars has advanced significantly over the past few decades, the methods for identifying driver talent have not. The drivers at the highest levels of motorsport are still coming up through the karting ranks and the lower formula cars, a very expensive route.

Lewis Hamilton, the 2008 Formula One world champion, had a family which struggled to support him in his early racing days, before he became a protégé of the McLaren team. Hamilton remembered his first go kart, a Christmas present from his father, telling the Daily Mail that it was, “a 10th-hand, rickety old thing when dad bought it, but he worked night and day to rebuild it like new.”¹ His father not only worked several jobs in order to fund his son’s racing, but also managed Hamilton’s career and found ways to be at the track for all his races as his career developed.

While F1 may be the most exclusive racing series, families of drivers aiming for other series do not necessarily have an easier journey. Four-time IndyCar champion Dario Franchitti’s father was an ice cream distributor and used the profits from his business to fund his son’s early racing career. Franchitti once told ESPN that, “it was money he didn’t have. There’s a lot of pressure on you when your family puts so much faith in your ability.”²

Tom Kristensen, the most successful driver in the history of the 24 Hours of Le Mans, grew up as the son of an amateur racer. His father owned a garage, “But money was tight, so he was always struggling with bad equipment. He’d work hard all day and work on his race car all night, and his enthusiasm came across to me”, Kristensen told Motor Sport Magazine.³ After a successful karting career, he had no budget and, at the urging of his mother, got a job at a bank. Eventually, though, Kristensen found his way into Formula 3 and built his career from there.

Stock car racing may not be as expensive as formula racing, but the father of six-time NASCAR champion Jimmie Johnson still felt the pinch while ensuring that his son could continue racing. “We never had a nice fancy home because we spent all our money on toys to go racing,” Gary Johnson told ESPN.⁴

1 <http://www.dailymail.co.uk/sport/formulaone/article-1292598/The-truth-Lewis-Hamilton-father-Anthony-McLaren-star-wanted-man-break-freedom.html>

2 <http://espn.go.com/premium/espninc/magazine/columns/vol3no6franchitti/415261.html>

3 <http://www.motorsportmagazine.com/halloffame/tom-kristensen/lunch-with-tom-kristensen/>

4 <http://sports.espn.go.com/rpm/news/story?id=1825011>



The path for most young drivers, unless they happen to have an F1 or NASCAR champion for a father—think Nico Rosberg or Dale Earnhardt, Jr.—is similar to all of these drivers: Family sacrifices for what is nothing more than a dream. Sometimes that dream is realized, but much more often, it goes unfulfilled.

Either way, a strong support network is necessary, usually consisting of family and, if the driver is lucky and/or exceptionally talented, sponsors. However, the racers and their family members generally do not have a background in racing, nor in engineering, and are learning as they go. They are driven to succeed, but they do not know what path to take and, without experienced guidance, they will be training inefficiently and their skills will stagnate.

But for every Hamilton, Johnson or Kristensen, there are hundreds or thousands of young drivers who spend a lot of time and money on their careers and never make it as professional drivers—in some cases, because they do not have the skill, and in some cases, because they have no one to help them develop it.

The passion for racing is not lacking in these drivers, but the support is. If their families are struggling to pay for tires, engines or chassis, they often do not have the money to pay for extras like racing school or specialized coaching. Instead, the young drivers learn by doing, by trial and error. And while that is not necessarily a bad method for learning new skills, it is certainly not the most efficient or cost-effective way.

To get to the professional level that these young racers aspire to requires a lot of work. If you believe Malcolm Gladwell, it takes 10,000 hours of practice to master a skill. But what if there was a tool that could make driving practice more efficient, possibly even reducing the number of hours needed to become an expert? Modern technology is providing more options for young drivers and, as the technology continues to develop, it is becoming better at meeting the specialized needs of racers.

Racing simulators offer a new road to the top...

The proliferation of realistic racing games, such as Gran Turismo and Forza Motorsport, as well as online racing simulators, like iRacing and Live for Speed, is providing drivers with the opportunity to develop their skills at a level only dreamed of twenty years ago. As racing simulation technology has advanced dramatically, the use of simulators to develop real-life driving skills is becoming more and more viable. With laser-scanned race tracks, these simulators are already a great tool for learning new track layouts. In fact, professional racing drivers use them all the time for just that purpose. Realistic physics engines combined with n-DOF motion platforms give sim racers as close to an on-track experience as possible.

These games and simulators offer convenience for young drivers, who can practice their skills from the comfort of their own homes. They also require a much smaller financial investment than on track racing. But more convenience at a lower cost does not necessarily mean more efficient. Drivers practicing on their own can just make the same mistakes over and over, if no one is correcting them.

Both in simulators and on track, the technology already exists to provide a significant amount of data to the racers. For example, iRacing integrates with Atlas Express telemetry software developed and used by the McLaren F1 team.⁵ However, this software was developed by engineers, for engineers. The telemetry data, as presented by currently available software, is not intuitive. The data outputs are designed to be read by people who are specially trained to do so, not by the average 17-year-old racing at night on his simulator. Even professional drivers have race engineers to help them make sense of all the data available to them.

Racing schools or advanced driving schools are another option for driver development. There, experienced drivers will train young racers and help them develop their driving skills and race craft. Of course, these schools are very expensive. For drivers struggling through a karting season or racing exclusively online, racing schools are not a viable option.

5 <http://www.iracing.com/iracingnews/iracing-news/iracing-mclaren-electronic-systems-partner-in-online-racing-data-analysis>



So, simulator training is certainly the most cost-effective way to practice. However, there are still not many opportunities for virtual racing drivers to make the cross-over from online to on-track racing. But Jann Mardenborough has already proven that the skills learned and developed on a virtual racing simulator are transferable to a real racing car. Mardenborough, a 22-year old British driver, was discovered after he won a Gran Turismo video game competition in 2011. He had never raced cars before, although he did have a bit of karting experience. “I stopped when I was 11,” he told *The Guardian*, “because it got too expensive.”⁶ Nonetheless, his rise has been spectacular—in three years, he has gone from video games to the 24 Hours of Le Mans to GP3, two steps below F1. Describing the transition from video games to the race track, Mardenborough said, “It felt completely normal.”

The key question now is: How can the next Jann Mardenborough be identified and, more importantly, how can he (or she) get the support they need to become the next Lewis Hamilton, Dario Franchitti or Jimmie Johnson?

⁶ <http://www.theguardian.com/sport/2012/apr/29/jann-ardenborough-racing-car-games>



Virtual Racing School will provide that technology...

WHY?

Because our mission at Virtual Racing School (VRS) is to create the next generation of motorsport champions.

HOW?

We are going to achieve this by providing drivers with the tools to develop their skills more efficiently and more cost effectively. Whether a driver's goal is as modest as beating their friends on a simulator, or as ambitious as becoming an F1 world champion, VRS is committed to help them do it. Starting with learning tools for simulator racers, we have plans to extend the power and reach of our technology to on-track drivers.

The best way to steadily improve is to learn to consistently replicate laps, hitting the correct line and braking points lap after lap. This is one of the most important—yet most difficult—skills for young drivers to master and is a big difference between professional racers and amateurs. Sometimes a driver will intuitively or instinctively take a better line through a corner, but will not be aware of it and hence will not be able to replicate it. VRS will make racers aware of what they have already done well, and help them learn to consistently repeat their best.

No longer will drivers have to guess at how they can improve. VRS is designed to show them.



WHAT?

VRS is developing the technology to take complex telemetry data and present it in a format that makes sense to drivers who just need to know what they should do to get faster, in the simulator or on the track.

The software is designed to integrate with popular racing simulators, and even with on-track data acquisition systems. Once the racer's telemetry is uploaded, VRS will show them what they did well, where they can improve, and—most importantly—how they can improve.

VRS has several distinct features to assist drivers in their development. The software has the capability to:

- **Record** and store **racing telemetry**;
- Keep track of **racing statistics** (e.g. hours of daily practice) and **performance trends** (e.g. how your lap times are improving);
- Provide powerful, but easy-to-use **telemetry analysis tools** (e.g. lap-to-lap comparison, session comparison);
- Act as a **race engineer**, analyzing drivers' performance and showing them how they can produce faster lap times;
- Act as a **racing coach**, developing an individual and customized training programs to foster long-term improvement.



No longer will the benefits of training with advanced telemetry be the exclusive purview of those with big budgets and engineering backgrounds. Instead, VRS will level the playing field, giving all young drivers—using racing sims or on the track—access to personalized feedback from a virtual racing coach and race engineer.

With that kind of support, anyone will be able to improve their racing skills and, if they have the ambition and talent, work toward the ultimate goal of becoming a world champion.

WHAT'S NEXT?

If this technology sounds like exactly what you need to take your racing to the next level, VRS will soon be available to iRacing drivers in a closed beta program. In the future VRS will expand to integrate with any online racing simulator and will be available to all users on a subscription basis.

Find out more at <http://virtualracingschool.com>.