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PERSPECTIVE ON AUTONOMOUS TRUCKING

A DAY AT THE (ROBOT) RACES

The Indy Autonomous Challenge was a fascinating look at the state of self-driving vehicle technology — but also a reminder about how far there still is to go before autonomous vehicles go to work for the trucking industry.

Racing always has been the automotive industry's field laboratory for new technology. Over a century ago, the industry's first OEMs and now-legendary drivers were pushing rudimentary automobiles to make them go farther at faster speeds. It was a thrilling spectacle for the crowds in the stands to see cars rushing around the track. But on the practical side, racing also helped OEMs build better products that eventually led to safer, more dependable cars and trucks.

And racing still is a vital proving ground for new technology. So, it wasn't really all that surprising to see the vaunted Indianapolis Motor Speedway host the inaugural Indy Autonomous Challenge on October 23, 2021. This was the very first competition of its kind, with various universities and OEMs from all over the world, partnering together in nine different teams staffed primarily by engineering students from 21 universities. These included teams from South Korea, Japan, Italy, Germany, Austria, India and the United States, as well as familiar schools such as Auburn, Clemson, Perdue, Michigan, Florida, Hawaii and Berkeley — all of whom were competing for $1 million in prize money.

Naturally, NACFE was on hand both for the race, as well as the day before, hosting a wide array of trucking industry members from fleets to suppliers to OEMs to autonomous vehicle tech start-ups for a day-long series of panel discussions on the current state, and future of autonomous truck technology. The roster of participants contains some very heavy-hitters in the rapidly evolving world of autonomous freight — with representatives on hand from companies such as TuSimple, Einride, Locomation, Volvo, Navistar and UPS — to name a few.

Attendees at the NACFE Autonomous Summit learned quite a bit during the day — and I'll be discussing some of those lessons in future NACFE Autonomous Blogs. But for now, I'd like to focus on the race itself and the major takeaways we gleaned watching these autonomous Indy cars on race day.

If you were looking for head-to-head, competition racing, you were in for a disappointment. Early on, the organizers and the race teams agreed that currently, autonomous control systems aren't ready to handle packs of race cars roaring around a track at 180 mph or so. Instead, it was decided that the cars would make solo runs around the track under autonomous control with the highest average two-lap speed being named the winner. As a sort of add-on demonstration of the technology, on each car's last qualifying lap, two, large, inflatable obstacles were randomly placed on the track in front of pit row, to see if the cars could successfully identify the barriers and maneuver around them.

> "Teams of university students and OEMs tested autonomous race cars at the storied Indianapolis Motor Speedway. We can learn some things from their effort to help move AVs from the track to the highways.

Of the nine teams in the garages, only seven were able to field cars on race day. There were three mishaps; one car got confused trying to decide if it needed to stay on the main track or enter the pits and ended up spinning out in the grass. Two more cars went into the wall at speed and crashed — although in both cases the damage was minor. Interestingly, in all three crashes,

Photo by Dave Schaller

and in the case of at least one team that didn't run, the issue was the same: Faulty GPS sensors.

Most of the cars that did run, did quite well. Speeds ranged from around 100 mph to nearly 160 mph on qualifying runs. And all of the cars that made it to the "obstacle lap" weaved around the barriers without any noticeable problems (although one or two cars cut things a bit too close for comfort!).

Perhaps the most interesting development in the race was seeing almost-certain victory slip from the grasp of the team from Graz University in Austria. On its first final lap, the car ran an impressive 159 mph. It only needed another lap at that pace to secure victory over the TUM Autonomous Motorsports Team from Munich, Germany with a two-lap average of 135.944 mph. But instead, the team looked on in horror as the race car suddenly decelerated to a safe 60 mph for its final lap. It turned out the team had neglected to enter into the computer in the correct number of laps for the car to complete. The car was programmed to slow to a safe speed on its last lap to enter the pits. And that's exactly what it did.

The Indy Autonomous Challenge was a showcase for autonomous technology. But it also showed that there's still a way to go before self-driving trucks, in particular, are ready to hit the road. And both the organizers of the race, and the team members understand this. "Participating in the Indy Autonomous Challenge allowed our team to advance autonomous driving technologies and being able to take first place after two years of hard work acknowledges that we had an outstanding team," said Alex Wischnewski, team leader of TUM Autonomous Motorsport. "Our next goal is to win a high-speed autonomous head-to-head race." Beyond that, Wischnewski added, he envisioned a day in the near future when an autonomous race car will face off against a human-driven car at Indianapolis.

So, should we expect a modern-day version of John Henry competing against a steam-driven hammer? Will a robot-driven race car be pitted everything against a top human Formula One driver in our collective future? At the rate autonomous technology is advancing, it seems like such a race is only a matter of time — and could well be the ultimate validation that autonomous technology is ready to move off the racetrack and onto the highway.

About the Author: *Jack Roberts is a transportation journalist who has been covering North American commercial vehicles for 25 years and has developed a reputation as a leading authority/futurist concentrating on new trucking technology, including autonomous vehicles, battery-electric trucks and emerging blockchain technology.*