

# Triton Racing

Community Engagement



# Chance Meeting Helps Triton Racing Become Road-Ready

GKN Additive (Forecast 3D) sponsors UC San Diego's student-led racing team

Members of Triton Racing, the University of California San Diego's student-led auto-racing team, were facing a roadblock in early 2022: The 25-member team had no access to suitable vehicles for driver testing because their race cars needed some crucial replacement parts. This meant that its drivers would be unable to train and prepare for the team's annual Formula SAE design competition in May — a competition put on by SAE International (founded as the Society of Automobile Engineers). But their luck changed on a visit to nearby Lake Elsinore for a Sports Car Club of America autocross event, where they encountered a supplier that could help them access the parts they needed: GKN Additive (Forecast 3D), a digital manufacturer of advanced plastic and metal 3D-printed parts.

## Team Turns to Additive Manufacturing (AM)

Triton Racing allows students to gain hands-on knowledge and apply

classroom theory in a real-world setting. It is dedicated to the design, fabrication, and testing of an open-wheel race car for the annual Formula SAE competition in Michigan.

According to the team's electrical lead, Sam Green, two intake plenums on cars from previous years had developed cracks, leaving the team with no suitable vehicles for driver testing while they were assembling the current year's car. Without the plenums, the process of refurbishing these vehicles would be too costly to undertake.

"Our previous method of manufacturing intake plenums, in which the part was printed from ABS [acrylonitrile butadiene styrene] and then laid up with carbon, led to part failure within a year of manufacture," Green says. "We had no better options for printing in-house, and an alternative manufacturing method of resin printing was cost-prohibitive."

**"With the help of GKN Additive (Forecast 3D), UCSD Triton Racing has been able to easily expedite our manufacturing timeline and improve the quality and reliability of our Formula SAE car."**

— Sam Green, Triton Racing electrical lead

## GKN Additive (Forecast 3D)

- Founded in 1994
- Locations in Carlsbad, Calif. (headquarters); Michigan; New Jersey; Germany; Italy; China
- Provides the global network, tools, and expertise to bring additive manufacturing to life

## Triton Racing

- Founded in 1997
- Located at UC San Diego in La Jolla, Calif.
- Students gain experience applying classroom theory in a hands-on setting by designing and fabricating a race car. Although the team has guidance from faculty advisors, the project is largely student-led.

In addition to the intake plenums, the Triton Racing team needed a new restrictor. They also found that the pedal faces for the current-year car, slated to be machined from aluminum, would be difficult to manufacture in-house. The team opted for a 3D-printed part to save production time and to cut component weight.

According to Green, “The extent of our 3D-printing capabilities had been with an FDM printer, and printed parts would then be laid up with carbon. The manufacturing of these components was marred by the poor layer adhesion inherent in the printer and the difficulty in laying up parts with complex surface geometry, which often resulted in parts being damaged in manufacturing. Additionally, we had frequent failure of the parts after installation, leading to lost time for the team.”

## Partners Share Humble Beginnings

Luckily the team was able to secure the parts it needed from GKN Additive (Forecast 3D), which became a Triton Racing sponsor.

As it happens, the two organizations have similar roots. Triton Racing started in 1997 with a small group of dedicated students working in a garage at UC San Diego. GKN Additive (Forecast 3D) also traces its origins to a Southern California garage (but in 1994). Formerly known as Forecast 3D, Europe-based GKN Powder Metallurgy acquired the company in 2019.



Clutch, brake, and throttle pedals produced using Direct Metal Laser Sintering (DMLS)



Intake plenum produced using HP Multi Jet Fusion (MJF)



Restrictor produced using HP Multi Jet Fusion (MJF)

**“GKN Additive (Forecast 3D) has a broad team of knowledgeable employees who are willing to help us achieve our goals. They were very helpful in assisting our team with selecting the proper material and manufacturing process to produce our parts.”**

— Sam Green, Triton Racing electrical lead

## **Team Seeks Guidance on Materials, Processes**

Green’s role involved finishing and compiling the designs, ensuring the accuracy of the parts, and applying them to the car. He also acted as the main liaison between Triton Racing and GKN Additive (Forecast 3D).

The team had previously ordered a part from another manufacturer but found the process very hands-off. In addition, the manufacturer of the part was located overseas, which resulted in long lead times and expensive shipping. Team members had also considered using an online vendor and had previously used the 3D-printing machines available through UC San Diego.

“It was much nicer to have a relationship with [a local] manufacturer when working with GKN Additive (Forecast 3D) and to have access to knowledgeable staff to answer any questions,” Green says.

“GKN Additive (Forecast 3D) has a broad team of knowledgeable employees who [helped] us achieve our goals. They [assisted] our team with selecting the proper material and manufacturing process to produce our parts. Our team has had very little experience with additive manufacturing in the past, so they were able to guide us through the process.”

## **3D-Printed Parts Pave the Way for Victory**

With the help of GKN Additive (Forecast 3D), Triton Racing was able to compress its manufacturing timeline and improve the quality and reliability of the FSAE car. Beyond that, GKN Additive (Forecast 3D) offered a range of materials and manufacturing options not previously available to the team; the sponsorship also allowed parts to be made at a price far below other vendors. And unlike Triton Racing’s previous supplier of 3D-printed parts, GKN Additive

(Forecast 3D) is located only about 20 miles away from UC San Diego (in Carlsbad, Calif.).

GKN Additive (Forecast 3D) ended up providing several parts:

- Three pedals — clutch, brake, and throttle — produced using Direct Metal Laser Sintering (DMLS).
- Intake plenum (produced using HP Multi Jet Fusion, or MJF).
- Restrictor (produced using MJF).
- A plenum-restrictor combination (produced using MJF).

The result: The Triton Racing team came in eighth overall at the Formula SAE competition at the Michigan International Speedway in June 2022.

Green concludes, “With the help of GKN Additive (Forecast 3D), UCSD Triton Racing has been able to easily expedite our manufacturing timeline and improve the quality and reliability of our FSAE car.”

## About GKN Additive (Forecast 3D)

GKN Additive (Forecast 3D) is a digital manufacturer of advanced and metal additive manufacturing (AM) parts, backed by GKN Powder Metallurgy's 260+ years of engineering and production expertise. Equipped with one of the world's largest global networks of industrial 3D printers, GKN Additive (Forecast 3D) supports projects from one part to more than one million, offering innovative digital solutions for aerospace, automotive, industrial, healthcare, defense, electronics, consumer products, and more. Leading in prototyping to production with international manufacturing, advanced technologies, and raw materials, GKN Additive (Forecast 3D) gets products to market faster.

Find out how GKN Additive (Forecast 3D) can take your product from prototype to production. Visit [forecast3d.com](https://forecast3d.com) or contact us directly at **(877) 835-6170** or [hello@forecast3d.com](mailto:hello@forecast3d.com).

**Front Cover**

Sam Green, Triton Racing's electrical lead, behind the wheel of the TR-22 race car  
Photo: Francis Nguyen



**GKN Additive (Forecast 3D)**

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