

Perfecting Cooling: Delta PAG Breaks Down the Science Behind High-Performance Thermal Management on EPARTRADE Race Industry Now

The science of cooling in motorsports goes far beyond simply mounting a radiator and hoping airflow solves the problem.

That was one of the major takeaways from a recent episode of EPARTRADE's Race Industry Now webinar series, titled "Perfecting Cooling with Delta PAG," featuring John Pairaktaridis, President of Delta PAG, and hosted by Brad Gillie from SiriusXM, Ch. 90, Late Shift.

The technical discussion focused on the engineering realities behind modern thermal management systems for racing and high-performance applications, covering everything from airflow efficiency and oil cooling to brushless fan technology, water pump design, packaging constraints, and the importance of approaching cooling systems as fully integrated engineered solutions.

Cooling Is an Engineered System — Not an Afterthought

Early in the webinar, Pairaktaridis emphasized one of the most common mistakes made in both motorsports and high-performance street applications: treating the cooling system as a secondary consideration.

According to Pairaktaridis, many builders dramatically increase horsepower output while continuing to rely on cooling systems originally designed for far lower thermal loads.

"What we encounter a lot of times is someone building a hot rod that suddenly makes 800 horsepower, but the cooling system is still essentially stock," said Pairaktaridis during the webinar. "Then the vehicle overheats immediately once it sees real-world conditions."

Rather than relying on generic solutions, Delta PAG approaches cooling from a first-principles engineering perspective.

"We ignore what everybody else is doing and start from the ground up," Pairaktaridis explained. "We use CFD software, CAD software, and a full engineering process to maximize cooling efficiency while minimizing restriction and wasted energy."

The discussion highlighted how thermal management becomes increasingly critical as engine power density rises, particularly in modern race engines where tighter packaging, aerodynamic constraints, and elevated operating temperatures create significantly greater demands on cooling components.

Oil Cooling Without Restriction

One of the most technically detailed segments of the webinar focused on oil cooling.

Pairaktaridis explained that many traditional plate-style oil coolers create excessive restriction within the lubrication system, particularly when working with the high-viscosity oils commonly used in racing applications.

“Oil restriction is an engine killer,” he said.

To combat this issue, Delta PAG developed a proprietary oil cooler utilizing wide turbulator tubes designed to increase heat transfer efficiency while dramatically reducing pressure drop through the system.

The turbulator design agitates the oil internally to improve thermal transfer while maintaining substantially greater flow capacity than conventional restrictive designs.

“We wanted something that dissipates the maximum amount of heat but is almost invisible to the oil circuit,” Pairaktaridis said.

The company’s oil coolers also integrate practical race-focused features including ORB fittings, pressure sensor provisions, and bleed ports intended to simplify installation and improve serviceability.

Brushless Fan Technology and Efficiency Gains

Another major focus of the webinar centered around Delta PAG’s brushless fan technology.

Pairaktaridis provided a detailed explanation of the differences between conventional brushed electric motors and modern brushless systems.

Traditional brushed motors rely on physical electrical contact between brushes and the rotor, generating friction, heat, electrical losses, and long-term wear.

“Most people have seen the sparking coming out of the back of an old drill motor,” Pairaktaridis explained. “That energy loss becomes heat and inefficiency.”

Delta PAG’s brushless architecture eliminates these mechanical losses while improving durability and efficiency.

One unique aspect of the company’s system is its modular external electronics design.

Unlike many brushless fan systems that integrate the electronics directly into the motor housing, Delta PAG separates the electronic controller from the motor itself.

According to Pairaktaridis, this provides several major advantages for motorsports applications:

- Improved heat management

- Faster field serviceability
- Reduced replacement costs
- Increased reliability in harsh environments
- Easier troubleshooting during race conditions

“In racing, if electronics fail, you need to get back on track quickly,” said Pairaktaridis. “With our design, the electronics can be replaced in seconds without removing the fan or using specialized tools.”

The company also places significant emphasis on aerodynamic blade efficiency.

Pairaktaridis noted that fan blade geometry is engineered specifically to minimize cavitation, vortices, turbulence, and wasted acoustic energy.

“We want all the energy going into spinning the fan to move air — not create noise,” he explained.

The result is improved airflow efficiency while reducing unnecessary electrical load and thermal waste.

Packaging Constraints and Airflow Management

A recurring theme throughout the webinar was the importance of packaging efficiency.

Modern race cars and high-performance vehicles often have extremely limited space between the radiator and engine, making cooling system optimization even more critical.

Pairaktaridis explained that thinner, more efficient brushless fan systems can create valuable clearance while simultaneously increasing airflow capacity.

“Space is one of the biggest challenges people face,” he said. “A thinner system gives builders more room while improving cooling performance at the same time.”

The conversation also explored how many overheating problems are actually airflow management issues rather than simply insufficient radiator capacity.

Factors such as shroud design, fan placement, pressure zones, ducting efficiency, and heat extraction all play critical roles in determining total system performance.

Engineering Services Beyond Off-the-Shelf Components

Beyond product manufacturing, Delta PAG also offers engineering and system design services tailored to custom applications.

Pairaktaridis explained that many projects benefit from a complete thermal management strategy rather than isolated component upgrades.

Instead of simply selling a fan or radiator, Delta PAG frequently works directly with builders and race teams to optimize entire cooling systems around the vehicle's specific operating environment.

The company's engineering-driven approach includes:

- Custom cooling package development
- Fan and shroud optimization
- Water pump integration
- Airflow analysis
- Heat exchanger design
- Packaging optimization
- Thermal efficiency improvements

According to Pairaktaridis, proper thermal management must account for the entire system working together rather than treating each component independently.

The Growing Importance of Cooling Technology in Motorsports

As race engines continue producing more power within increasingly compact packages, cooling technology has become a major performance differentiator.

Throughout the webinar, Pairaktaridis repeatedly emphasized that thermal management directly affects reliability, consistency, and overall vehicle performance.

Excessive temperatures can impact:

- Engine durability
- Oil viscosity stability
- ECU performance strategies
- Power consistency
- Driver confidence
- Aerodynamic efficiency
- Overall race reliability

The webinar demonstrated how advanced cooling technologies are evolving from simple support systems into highly engineered performance-critical components.

For racers, builders, and performance engineers, the discussion provided an in-depth technical look into the modern science of thermal management and why cooling system engineering is becoming increasingly essential in today's motorsports environment.

EPARTRADE's Race Industry Now webinar series continues to showcase technical discussions with leading manufacturers, engineers, and innovators from across the global racing industry.

For more information, [watch the full webinar here.](#)