



Palatov Motorsport revolutionizes engineering productivity with AMD Ryzen™ CPUs and Radeon™ Pro GPUs

Faster iteration of race car designs using AMD Ryzen processors and Radeon Pro graphics



PARTNER



INDUSTRY

Racing car design and manufacture

CHALLENGES

Improving productivity during design and CFD simulation

SOLUTION

Deploy AMD Ryzen™ 3950X processors and AMD Radeon™ Pro W5500 graphics

RESULTS

Shorter simulation times and the ability to run simulations in the background while continuing to design

AMD TECHNOLOGY AT A GLANCE

AMD Ryzen™ 3950X processors
AMD Radeon™ Pro WX 7100 graphics
AMD Radeon™ Pro W5500 graphics

PARTNER

Dassault Systèmes SOLIDWORKS®

Designing cars for motor racing is a precise business. High-speed vehicles will be pushed to their limits, putting their drivers' lives on the line, so the designs need to achieve the best performance and reliability possible. Palatov Motorsport has been at the forefront of creating original race car designs for over a decade. Its complex engineering models require the most powerful graphics and processors, which led Palatov to try AMD Radeon™ Pro GPUs and Ryzen™ CPUs, with revolutionary results.

"We design, build, and race cars from scratch," explains Dennis Palatov, Owner of Palatov Motorsport, LLC. "Cars are very complicated systems. There are literally thousands of pieces that all have to go together, and they all have to work. The top-level car design is an artistic endeavor. But beyond art, cars are held to a much higher standard because they have to perform at many different levels. They have to be safe; they have to be fast; the aerodynamics have to work; all the mechanical parts have to function correctly, so there is a lot to it."

"I found that I can run a CFD simulation and still have full usability of SOLIDWORKS® on the same computer."

*Dennis Palatov,
Owner of Palatov
Motorsport, LLC*

From design to simulation

Palatov's designs range from bespoke racers for track day driving to limited-run supercars, to one-off vehicles aimed at specific challenges. The company's 2019 electric collaboration with Cascadia placed second in its class at the Pike's Peak hill-climb competition. "At Bonneville, we did 197 miles an hour in the standing mile on slush," adds Palatov.

The company's automotive designs are at the forefront of their field. In order to obtain this high level of achievement, Palatov's work primarily employs SOLIDWORKS® software from Dassault Systèmes. "I've been using it since '95 when it first came out," explains Palatov. "We have the overall design software, and we have the CFD package." This is a key aspect of Palatov's workflow. The main SOLIDWORKS application is used to create components and fit them together into a car design, and then the Flow Simulation CFD software will be called upon to test the airflow, mechanical, and thermal performance. This will be fed back into further design updates.

"I have to work with every single aspect of the car," explains Palatov, "from industrial design, doing the surfacing, the bodywork, doing the mold for the bodywork, how that all fits together, designing the chassis, designing the chassis components, integrating the engine, and lately the electrical drive systems. You can't work on one component at a time. You

have to load the entire thing into the system, spin it around, look at it from multiple angles, and really get a feel for how things interact."

With a single car comprising 750 to 1,000 individual components, this places a huge load on processor and graphics subsystems. The CFD simulation will be an equally massive processing job. This means that every part of a workstation needs to provide the best possible performance.

Better productivity with AMD

Palatov was experiencing workflow interruptions at two points in the production cycle. "If I'm spending a lot of time just twiddling my thumbs waiting for the model to reorient itself or to zoom in and out, that slows down the process a lot," explains Palatov. The second interruption was when it came to testing the designs with Flow Simulation. "CFD is very incremental. You change one little thing and you rerun it. Normally it takes 12 hours. So I used to set it up last thing at night, let it run overnight, come in, get the results and then go on with the rest of the day."

The company had been using workstation technology based on the Intel Core i7 processor with AMD Radeon™ Pro WX 7100 graphics. This provided an adequate modelling experience, but when a simulation was running it was a different story. "CFD used to be an overnight project," says Palatov. "The key thing is to visualize and evolve the design in real time and see where everything fits. So the tools really have to move at the speed of my thought. If I have to wait, then it's very disruptive, and it really negatively impacts productivity."

This all changed when Palatov switched to all AMD technology, using the 16-core AMD Ryzen 3950X processor and AMD Radeon Pro W5500 graphics. Modelling was smoother than before. "When I was rotating the full model with the old system, it used to be about a half second per iteration before it would move. Now it's perfectly smooth," explains Palatov. But the revolutionary shift from the new AMD workstation technology was in the simulation workflow. "With this system, not only does it take a lot shorter time to finish the simulation—about eight hours,

but also I found that I can run CFD and still have full usability of SOLIDWORKS® on the same computer."

Faster designs for faster cars

Using the new AMD workstation technology, Palatov Motorsport could carry on developing its designs while running the CFD simulations in the background. This multitasking prowess is a key benefit of AMD graphics combined with an AMD Ryzen processor. Benchmarks with SPECviewperf's SOLIDWORKS viewset running at the same time as a CPU workload have shown that the AMD Radeon Pro W5500 provides ten times the modelling frame rate of NVIDIA's Quadro P2200 in this scenario. That's the difference between usable and unusable.

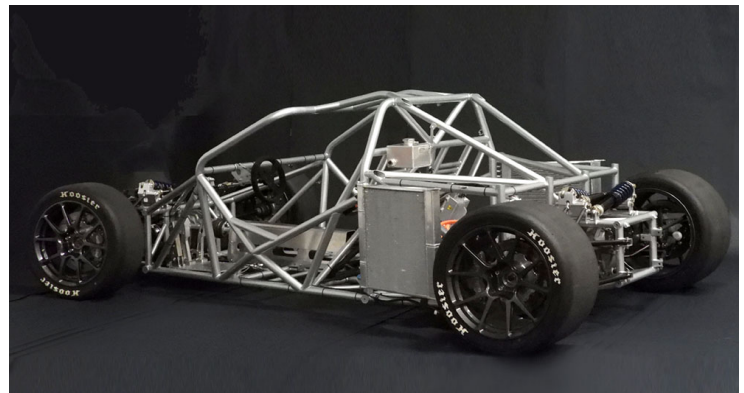
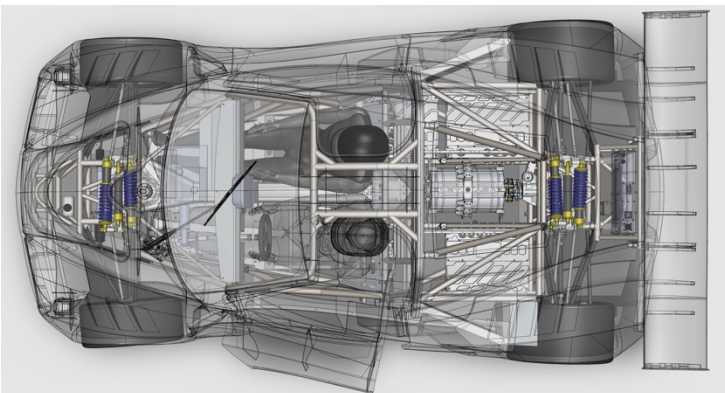
But the 16 cores of the AMD Ryzen™ 3950X also meant that it could use 8-10 of these for Flow Simulation and still have some leftover for modelling. Palatov Motorsport has a specific example with one of its car design simulations. "The old system took seven hours and 24 minutes to finish it," says Palatov. "The new system took six hours and 22

minutes, but I was also using SOLIDWORKS in the foreground simultaneously. The old system was basically running only CFD and was completely useless for anything else at the same time."

"The productivity is the payoff. The value proposition is very easy. You save a significant amount of time and do a lot more with every day, so you look at your personnel costs and opportunity costs versus equipment costs, and it becomes very compelling. It makes me enjoy the work a lot more, and it makes me more excited and motivated. It's not just work; it's actually fun when the tools get out of your way and just let you be creative."

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About Palatov Motorsport, LLC

Palatov Motorsport, LLC, was founded in October of 2008 to design and manufacture high-performance vehicles, parts, and accessories, primarily targeted at recreational track day use. The company's mission is to create and build designs with outstanding performance that provide unmatched value in the dedicated track day car market. Palatov Motorsport has also been successful in designing and supplying components such as suspension parts for custom car applications ranging from individual builds to low- and medium-volume specialty vehicles. For more information, visit palatov.com.

About AMD

For 50 years AMD has driven innovation in high-performance computing, graphics, and visualization technologies—the building blocks for gaming, immersive platforms, and the data center. Hundreds of millions of consumers, leading Fortune 500 businesses, and cutting-edge scientific research facilities around the world rely on AMD technology daily to improve how they live, work, and play. AMD employees around the world are focused on building great products that push the boundaries of what is possible. For more information about how AMD is enabling today and inspiring tomorrow, visit amd.com/ryzen.