

# PALATOV MOTORSPORT LLC

ADVANCING HIGH-PERFORMANCE AUTOMOBILE  
DEVELOPMENT WITH SOLIDWORKS SOLUTIONS



photo credit: Rockit West Media

Palatov Motorsport relies on SOLIDWORKS design and simulation tools to design and manufacture high-performance automobiles, which customers primarily utilize for recreational track-day use.



### **Challenge:**

Develop, test, and validate new automotive concepts and approaches while designing and building high-performance automobiles, all with a small team and a limited budget.

### **Solution:**

Implement SOLIDWORKS design and SOLIDWORKS Flow Simulation computational fluid dynamics (CFD) analysis software.

### **Benefits:**

- Realized 98 percent correlation between flow simulation and testing results
- Improved vehicle aerodynamics and performance
- Introduced innovative, patent-pending suspension design
- Designed and built over two dozen high-performance cars with team of four people

Palatov Motorsport designs and manufactures high-performance automobiles, parts, and accessories. Customers primarily utilize Palatov vehicles for recreational track-day use—when racetracks are available for use by amateur enthusiasts—but Palatov Motorsport also produces models that can be registered for road use. The specialty car manufacturer strives to create and build designs with outstanding performance that provide unmatched value. 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.

Prior to founding Palatov Motorsport in 2008, Managing Partner Dennis Palatov worked as a mechanical engineer, designing computer enclosures. In that capacity, he needed a 3D design platform. So, in 1995, after evaluating available design solutions, Palatov chose SOLIDWORKS® 3D design software and has continued using it as his preferred design tool.

“I looked at Pro/ENGINEER®, but it required an expensive workstation and was cumbersome,” Palatov recalls. “I wanted a PC-based solution and decided to evaluate SOLIDWORKS. I sat down without opening the user’s manual and found that I could immediately start using SOLIDWORKS. The software is very intuitive—it behaves the way my brain works—and allows me to productively transfer the ideas in my head into reality.”

Given his experience, selecting SOLIDWORKS at Palatov Motorsport was an easy decision. “I design complete cars, featuring tight tolerances, from scratch by myself, and we assemble the cars with a team of four,” Palatov says. “Most specialty cars are developed by teams of 20 to 30 people or more. We would not be able to do what we do at Palatov Motorsport without SOLIDWORKS. The software continues to evolve and improve, and has proven to be an awesome tool.”

The specialty car manufacturer added integrated SOLIDWORKS Flow Simulation computational fluid dynamics (CFD) analysis software in 2012 to optimize aerodynamic performance. Like its decision to standardize on SOLIDWORKS, Palatov Motorsport chose SOLIDWORKS Flow Simulation because the software is intuitive, operates inside the SOLIDWORKS design environment, and generates accurate results.

### **IMPROVING AERODYNAMICS WITH FLOW SIMULATION**

Using SOLIDWORKS Flow Simulation software, Palatov Motorsport gained important insights into how airflow, drag, and downforce affect car performance, enabling the company to not only improve the aerodynamics of its cars but also provide the flexibility to adjust aerodynamic elements to match driver preferences. For example, the firm used SOLIDWORKS Flow Simulation during development of the D1PPS (Pike’s Peak Special), which was specifically designed to compete in the Pike’s Peak International Hill Climb (IHC), a 12.42-mile race up 14,110-foot Pike’s Peak in Colorado which features 156 turns.

“We ran flow analysis on the D1PPS using SOLIDWORKS Flow Simulation software and then compared the results to real-life data obtained through physical tests,” Palatov explains. “We found a 98 percent correlation between SOLIDWORKS Flow Simulation results and what actually happens, which gave us the confidence to rely on the software to improve aerodynamic performance. We still maintain 400 pounds of downforce on that car at 100 mph, but used the results to optimize front/rear distribution of force and allow for aerodynamic adjustments.”



**“With SOLIDWORKS solutions, our small team can develop new concepts quickly and prove them on the steep, bendy slope of Pike’s Peak, allowing us to redefine what a high-performance automobile can be.”**

— Dennis Palatov , Founder and Managing Partner

### **INTRODUCING INNOVATIVE, PATENT-PENDING SUSPENSION**

Palatov also used SOLIDWORKS solutions to optimize the performance of the company’s innovative, patent-pending suspension design, which eliminates the need for antiroll bars and aero-assist third springs while improving handling. “I came up with a clean, simple solution that makes use of geometry to achieve a wheel-rate progression ratio of five to one,” Palatov notes.

"I defined relationships and equations in a sketch, and used SOLIDWORKS 3D sketching in combination with SOLIDWORKS parametric capabilities as analysis tools," he continues. "By changing key dimensions in a series of progressive iterations, I was able to quickly optimize the design to achieve the desired performance."

### WINNING AT PIKE'S PEAK INTERNATIONAL HILL CLIMB

Since 2012, Palatov Motorsport has participated in the Pike's Peak IHC—an event that demands automotive power, handling, and performance—to showcase the company's cars. Palatov Motorsport cars won the 2012 Unlimited Class race, where the only technical rules restriction is passing a safety inspection, and the 2015 Open Class race, for cars with stock/street vehicle bodies.

"The Pike's Peak International Hill Climb is something that I've always wanted to do," Palatov stresses. "It's the only place where we can showcase how our unconventional ideas stack up against top-level international competition and validate their performance. With SOLIDWORKS solutions, our small team can develop new concepts quickly and prove them on the steep, bendy slope of Pike's Peak, allowing us to redefine what a high-performance automobile can be."

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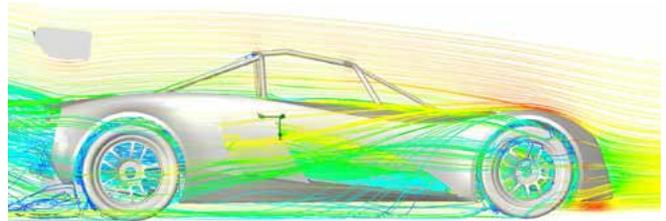


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Using SOLIDWORKS Flow Simulation CFD analysis software, Palatov Motorsport has improved the aerodynamic performance of its cars, including the D1PPS (Pike's Peak Special), which was specifically designed to compete in the Pike's Peak International Hill Climb (IHC), a 12.42-mile race up 14,110-foot Pike's Peak in Colorado which features 156 turns.

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