

LOCAL MOTORS: THE NEXT GENERATION CAR COMPANY

HP Z Workstations provide stability, speed for design and engineering



"The HP Workstations I've used are powerful and stable, which is critically important when you're trying to develop a vehicle cost-effectively and from scratch in 18 months."

—Mike Pisani, vehicle engineer and lead builder/trainer,
Local Motors, Wareham, Mass.

HP CUSTOMER CASE STUDY:

HP Workstations
drive new approach
to automotive
engineering

INDUSTRY:
Automobile

HP recommends Windows® 7.

OBJECTIVE:

Provide processing capability for end-to-end automotive design engineering

APPROACH:

Local Motors has adopted HP Z Workstations to support 3D CAD, solid modeling and analysis

IT IMPROVEMENTS:

- Improved stability, with no crashes
- Expandability to accommodate more RAM, storage, peripherals

BUSINESS BENEFITS:

- Design in less time than previous models
- Reliability in processing large, complex models and analyses
- Elimination of delays due to hardware crashes
- Accurate designs developed efficiently contribute to product quality and manufacturing viability



Local Motors is the next generation American car company, with a game-changing approach. Rather than developing a car for the masses that might be sold worldwide, Local Motors designs vehicles to fit the needs of a niche market and auto enthusiasts.

"Our community rules the roost—it's about making a car that people WANT to drive," says Jay Rogers, Local Motors' founder.

The company runs design competitions and depends on an online community of designers—now 20,000 strong and growing—to develop innovative solutions to each competition's challenges.

To translate designs for manufacture, Local Motors turns to HP Workstations. "Working with HP has been a very positive experience," says Mike Pisani, vehicle engineer and leader builder/trainer with Local Motors. "The HP Workstations I've used are powerful and stable, which is critically important when you're trying to develop a vehicle cost-effectively and from scratch in 18 months."

HP recommends Windows® 7.

FOCUSING ON UNIQUE VEHICLES

Local Motors is a new breed of auto developer/manufacturer that is offering customers an entirely novel approach. It's not out to develop the uber-car. Instead, it endeavors to create a distinct design appropriate to the needs and desires of local car buyers, and to produce the design in relatively small quantities in small, local micro-factories.

"Our cars will never directly compete with most mass market models. Our cars will be more distinctive and unique," says Pisani.

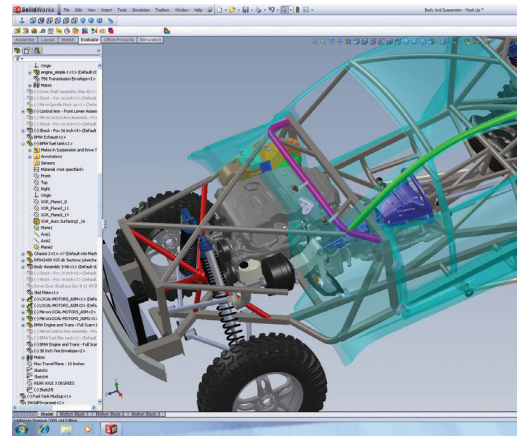
"The ability to assemble files right on the computer, and to run detailed analysis in SolidWorks, is critical to meeting the turnaround targets we have here. We couldn't do it without the power of our HP Workstations."

—Mike Pisani, vehicle engineer and lead builder/trainer, Local Motors

The first vehicle developed for production by Local Motors was its Rally Fighter, for which the company has held design competitions not just for the concept car overall, but also for individual components. The company has built 25 Rally Fighters, literally by hand, at its first micro-factory in Chandler, Ariz.

A recent project involves designing a vehicle for the Defense Advanced Research Projects Agency (DARPA), with unique requirements for combat reconnaissance, delivery and evacuation. DARPA's hope in working with Local Motors and its "crowd-derived" design process is to reduce the time and development costs associated with creating a niche military vehicle.

Local Motors operates with a skeleton staff. So translating a design concept into a manufacturable car is left to a team of less than 10 engineers and fabricators. It isn't easy. The designers who submit ideas to Local Motors often submit nothing more than rough, 2D sketches.



"Early in the life of Local Motors, there was a time when I was running on a consumer-grade computer, and when it came time to compile the designs and do motion studies, they would often crash," Pisani notes. He knew that without a more powerful and stable computer, he would never be able to meet the company's goal of developing a vehicle in just 18 months.

HP WORKSTATIONS DELIVER POWER, STABILITY

So he turned to the HP Workstation team to ask for a recommendation. Soon he had a one-to-one relationship with a product engineer who put together exactly the workstation Pisani needed. "Since I started working with HP Workstations, previous problems have essentially gone away," he says. "They're incredibly stable. Crashes are a thing of the past."

Local Motors started with a single HP Z600 Workstation for Pisani's use in engineering. It proved so valuable the company has now added the Z800 and Z200 Series Workstations, as well as a few HP EliteBook 8540w Mobile Workstations. One of the mobile workstations is used for CAD design and surface modeling in CATIA; the others drive a Z Corporation Spectrum Z510 Full Color System 3D printer/rapid prototyper, and a Z Corporation ZScanner 800 3D scanner.

Pisani takes raw designs and recreates them in SolidWorks 3D CAD software using the HP Z600 and Z800 Workstations. He develops assemblies, runs finite element analysis, thermal analysis and aerodynamic analysis, all in SolidWorks.

CUSTOMER SOLUTION AT A GLANCE

PRIMARY APPLICATIONS

Automotive engineering

PRIMARY HARDWARE

- HP Z200, Z600, Z800 Series Workstations
- HP EliteBook 8540w Mobile Workstation

PRIMARY SOFTWARE

- Genuine Windows® 7 Ultimate
- SolidWorks 3D CAD software
- CATIA
- Pro/ENGINEER



HP recommends Windows® 7.

"We use the Z800 Workstation to do a lot of analysis on our chassis designs. It allows us to run more simulations and build bigger assemblies faster than we could with our old computers, so we're more efficient," he explains. It also enables Pisani to multi-task, running analyses in the background while moving forward with other design challenges.

The HP Z800 Workstation runs genuine Windows® 7 Ultimate,¹ which enables Pisani to make use of all of the RAM and multi-threading capabilities in his software. It is configured with a six-core Intel® Xeon® processor X5675, 12 GB of RAM,^{2,3,4} and an ATI Firepro V5800 video card that drives an HP ZR30W 30-inch monitor.

The workstation's processing power can make a significant difference in the way Pisani works. Today, for example, "we can model essentially an entire vehicle in SolidWorks and run simulations, whereas in the past, we had to work with smaller subassemblies. The computer simply didn't have the horsepower."

Local Motors also uses HP Z Workstations on the production floor to access drawings on the internal network, and to maintain a Wiki build manual. The Wiki is used to train employees and customers working together in the building process. "That lets us centralize our knowledge and avoid having 'tribal' knowledge that's isolated in one or two individuals," Pisani explains. Customers can also refer back to the Wiki if they choose to modify their cars later, and upload information on their modifications for other customers to see.

Another Z Workstation runs the video cameras that capture the building process from start to finish and display it online for fans (and owners) to watch.

Parts developed in SolidWorks can be output to the Spectrum Z510 3D printer/rapid prototyper to produce scale models. It will output objects up to 14 x 10 x 8 inches in size.

For other components, Pisani works with the Specialty Equipment Marketing Association's (SEMA) Techtransfer group to bring in schematics for existing parts, which are typically developed in other CAD packages such as Pro/ENGINEER. The Rally Fighter, for example, uses the Chevrolet Corvette engine. Pisani can simply import the data for the engine, and then use a few reference points to define the engine in his overall vehicle model.

Alternatively, Pisani can use the ZScanner 800 3D scanner. He scans the outside supplier's part or subassembly to create a "point cloud"—a hollow surface model—that gives him the outer geometry of the subassembly. "Rather than reverse engineer an assembly, we scan in the design, create an STL file, and then drop that object into the chassis design."

HP WORKSTATIONS PROVIDE EXPANDABILITY

"Memory is critical because of the file sizes I work with," Pisani notes. He upgraded the memory in his initial Z600 Workstation once, to 9 GB, before getting the Z800 to handle the most demanding tasks on complex 3D models.

HP recommends Windows® 7.

The Z600 can be configured with up to 48 GB of RAM; the Z800 will accommodate up to 192 GB. The Z Series Workstations continue to advance rapidly with additional performance capabilities, he adds.

"The ability to assemble files right on the computer, and to run detailed analysis in SolidWorks, is critical to meeting the turnaround targets we have here. We couldn't do it without the power of our HP Workstations."

"We use the Z800 Workstation to do a lot of analysis on our chassis designs. It allows us to run more simulations and build bigger assemblies faster than we could with our old computers, so we're more efficient."

—Mike Pisani, vehicle engineer and lead builder/trainer, Local Motors

Though he hasn't done comparative studies, Pisani notes, "When moving to the Z600 Workstation, the experience seemed several times faster than what I was used to. The Z800 is faster yet."

Designers provide Pisani with JPEGs, Adobe® Illustrator® files, or even raw scans of hand sketches. Parts suppliers might work in Pro/ENGINEER or CATIA. Regardless of the native format, Pisani must find a way to open and interpret the files, to capture them effectively in SolidWorks, and ensure the interaction among parts is portrayed accurately in his computer models.

Seeing the models is critical to his ability to envision a design. He's currently using a single HP ZR30w 30-inch S-IPS LCD monitor supported by the ATI Firepro V5800 graphics card.

ON SCHEDULE, ON BUDGET, NO COMPROMISES

"By keeping a project on my HP Workstation from start to finish, I can be both more efficient and more accurate. I'm not fixing problems down the line that creep in because something was manually drawn without specifications," Pisani says.

Having total control over a project gives Pisani a distinct advantage over vehicle engineers elsewhere. The typical vehicle-engineering paradigm is to divide the engineering work into many distinct, smaller tasks delegated to a far-flung engineering team. But that can lead to miscommunication and ultimately to compromise.

"It's very common in the auto industry for a design to come up short of its original goals because of communication breakdowns," he says. Worse still, he notes, is when prototypes prove un-manufacturable. That wastes time and money, both of which are in precious short supply.

"We're reducing that effect at Local Motors," Pisani says. "Our designs are meant to be built. We're using our HP technology to keep the design intent intact, stay on schedule, stay on budget, and avoid compromises."

Looking back, Pisani says his experience with HP engineering products and support has been excellent. "Everyone that I've worked with at the company is top-notch. They have a good understanding of what I need as a user. The people are great; the technology is easy to use and cutting edge."

With the challenges involved in automotive engineering, he notes, finding the right computer and support is a prerequisite to success. "With HP Workstations, our work is enhanced rather than compromised by the technology. I know the tools are good. The rest is up to us."

To learn more, visit www.hp.com

Contact the HP Reference2Win Program, 866-REF-3734 for more information.

© 2009, 2011 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Windows is a trademark of the Microsoft group of companies.

Adobe and Illustrator are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Intel and Xeon are trademarks of Intel Corporation in the U.S. and other countries.

¹ Not all features are in all editions of Windows 7. Systems may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://www.microsoft.com/windows/windows-7/> for details.

² Multi-core are new technologies designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefit. Not all customers or software applications will necessarily benefit from use of this technology.

³ 64-bit computing on Intel architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See www.intel.com/info/em64t for more information.

⁴ Intel's numbering is not a measurement of higher performance.

4AA29417ENW, October 2011

