

Case study

Morgan Motor Company

HP Z Workstations marry technology with classic sports car design



Industry

Automotive

Objective

Enable sophisticated automobile design, visualization, and testing using an integrated CAD package

Approach

Morgan Motor Company standardizes on HP Z Workstations running the Autodesk Product Design Suite

IT matters

- HP Z Workstations with NVIDIA graphics can multitask to render in realtime, without impacting design workflow
- Autodesk/HP certification assures Morgan that the integrated Product Design Suite will run seamlessly on HP Workstations

Business matters

- 3D model enables design review, virtual testing, and automated transfer to manufacturing
- Integrated design, visualization, and testing capability enables rapid new vehicle development: the Morgan 3-wheeler went from initial sketch to road-worthy vehicles in 18 months



“We chose HP Z workstations for many reasons. They are well-built and easy to work on, they are powerful, and they are reliable. Working with HP Workstations for about six years, we’ve experienced ongoing reliable performance.”

– Graham Chapman, director of engineering, Morgan Motor Company



Morgan Motor Company is an iconic British sports car company. Its current cars evoke the romance of the company’s earliest designs from a century before, but the technology under the hood is strictly 21st century. And to design and produce those cars, Morgan turns to HP Z Workstations. Customers recognize that the creation of every Morgan results from innovative technology and skilled craftsmanship.

HP recommends Windows.

An automobile icon

What makes Morgan Motor Company iconic? A rich heritage, loyal ownership that keeps its cars on the road for decades, and a reputation for creating cars that are fun to drive.

Morgan started building cars more than a century ago with the production of its three-wheeler, a ground-breaking design. To this day, every Morgan is completely customized based on consultation with each buyer, then assembled by hand (often with the buyer visiting the factory to look on).

“There is literally an infinite selection of paints, hundreds of different leather samples, wheels and different hoods. Your car is crafted and tailored just for you,” explains Jon Wells, senior designer at Morgan. “It’s more like a fine suit would be made on Savile Row in London than you expect a car would be.”

Morgans are a marriage of technology and skilled craftsmanship. They are still built with steel, a frame of ash wood, and leather — all by hand. A century ago, the engineering was rudimentary by today’s standards. The craftsmanship by Morgan’s car builders involved working meticulously to shape hand-cut materials, potentially with large variation from one piece to the next, into a flowing, artistic masterpiece of automotive design.

Using HP Z Workstations to drive design, engineering, approval and manufacturing

Today, Morgan’s design engineering matches that of the largest, most advanced automotive companies, thanks to the company’s technology solutions. The largest manufacturers produce and sell hundreds of thousands of cars each year; Morgan produces fewer than 1,500. But Morgan’s design technology is second to none.

Designers may start with a hunk of clay or blank sketchpad. For clay the company uses a 3D scanner driven by an HP ZBook Mobile Workstation to create a 3D point cloud. For a 2D sketch, a flatbed scanner captures the design. Whether a 3D point cloud or 2D drawing, that data soon becomes a computer model manipulated in Autodesk Alias by designers using HP Z420 Workstations. There, Morgan’s design staff refines rough design ideas, explores multiple options in minimal time, and finalizes the design in the virtual world.

“We start creating loose forms and using them as a design tool to evolve the surfaces,” explains Jon Wells, senior designer at Morgan. “We can apply textures and materials onto the surfaces quickly and review in real-time what those surfaces will look like.”

To gain approval on the design by the company’s board, the staff develops a 3D presentation for the company’s directors, on HP Z1 Workstations. “We’re able to show our designs quickly and accurately in Autodesk Showcase and spin around the 3D models in high definition so that everyone can surround the monitors and immerse themselves in the designs we’re proposing,” says Wells.

When the board gives a thumbs up to the proposed design, “Everyone leaves with a good understanding of what the final car will look like, even though we haven’t spent a penny yet on actual production,” Wells explains.

Once approved, the design is translated into the language of manufacturing and shared with Morgan’s shop floor staff, who use ZBook Mobile Workstations to drive the manufacturing process. Renderings from Autodesk 3ds Max Design are also used to create marketing materials and to create demand for the new car, long before the first parts are ever produced.

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HP ZBook Workstations are also used in one-on-one meetings with potential customers to present the vehicle design and work through customer selections for vehicle color, leather appointments and more. “We can show customers exactly what their car will look like with a photo-realistic rendering showing all their design choices,” Wells says. “It begins their journey into Morgan ownership.”



Workstations enable multitasking to accelerate design processes

By using an NVIDIA Quadro K4000 graphics card in their HP Z Workstations, Morgan is able to accelerate graphics-intensive design and visualization workflows without impacting their design process. In essence, they are able to design and render in realtime, without impacting workflow.

Which leads Chapman to a major reason for Morgan's technology selections: vendor certification. "All the Autodesk products have been certified to run on HP Workstations and with NVIDIA graphics cards," he says. "That assures us that we will be able to manipulate and manage our datasets, and be sure they will be accurately represented on screen no matter how big the assemblies become."

Autodesk recommends dual-core Intel processors as a minimum configuration for several of its Product Design Suite applications; HP Z Workstations at Morgan come with 4-6 Intel Xeon processing cores. HP Performance Advisor¹, which is included with all HP Z Workstations, helps Chapman to optimize workstation performance for the Autodesk Product Design Suite.

Before proceeding to production, the company also tests the design. Aerodynamic studies of the virtual model simulate how air will flow over, under and around the car. Structural analysis ensures the frame and body will meet the stresses of driving.

From design to production in record time

As a result, Morgan can move from design into production in record time. A good example is the rebirth of the Morgan 3-wheeler. A few years ago, the company chose to resurrect the century-old design in modern, high-tech form for Morgan's 100th anniversary. The design has taken the market by storm, reminding automotive enthusiasts that sometimes old ideas are still great ideas.

With the 3-wheeler, Morgan took inspiration from the past and turned it into something entirely modern and unique to Morgan.

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The original 3-wheelers were raced competitively throughout Europe in the early

Customer at a glance

Application

Automobile design/engineering

Hardware

- HP Z420 Workstation
- HP Z1 Workstation
- HP ZBook Mobile Workstation
- Autodesk Product Design Suite
- NVIDIA Quadro K4000 video cards

HP recommends Windows.

20th century, and eventually venerated through passionate clubs of 3-wheeler enthusiasts. The modern incarnation is far more advanced, with a tubular space-frame chassis, dual wish-bone suspension, and modern drivetrains imported from U.S. car builders. Today, it has become Morgan's best-selling model with a 12-month waiting list.

Century-old car modernized in months

What few people appreciate about the modern Morgan 3-wheeler, though, is that while it followed its production predecessor by a century, it was mere months in the making.

"With the 3-wheeler, we were able to go from an initial sketch to vehicles on the road in a matter of 18 months," says Wells. "When you consider that most companies will spend five or six years developing a new car, you see that the 3-wheeler is testament not only to how well our team works together, but also to how HP and Autodesk technology gives us the ability to visualize, test, evaluate and produce a vehicle quickly."

Of course, the modern Morgan 3-wheeler isn't just younger. It's also lighter, faster and safer. Everywhere it's driven, the modern 3-wheeler turns heads.

It is also, true to Morgan's roots, extraordinarily fun to drive.

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"People smile when they see you on the street," explains Wells. "Driving the 3-wheeler is like flying an older fighter plane or driving a motor bike. You're very exposed. The driving experience is very visceral. As you drive the car, you hear the throaty engine, feel its responsiveness and the wind flowing around you. It's a really fantastic toy that lets you experience motoring in such a different way than any modern vehicle."

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¹HP Performance Advisor requires Windows and an internet connection.

4AA4-9868ENW, November 2013

