NVIDIA AUTOMOTIVE

Driving Innovation

Today, NVIDIA processors are found in more than

6,200,000

cars—and the number is growing rapidly.

Realistic computer-generated 3D models and virtual simulations create award-winning designs. Rich graphics, natural language processing, and gesture control lead to sophisticated 3D navigation systems. Powerful computer vision and machine learning systems result in safer driving experiences.

The car is now an extension of the driver—performing, seeing, hearing, and communicating with amazing precision and clarity. Self driving cars are already on the road today, and the graphics processing unit (GPU) is fueling this revolution.

But the technology doesn't stop there. NVIDIA visualization technology in the cloud is transforming everything from how cars are designed, to the car buying experience in dealer showrooms and at home.

NVIDIA is driving this innovation throughout the automotive industry.

Audi · CITROËN · LAMBORGHINI · ASTON MARTIN · SEAT

TESLA · BMW · BYD · PEUGEOT · PORSCHE

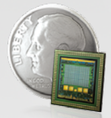
LANCIA · MINI · ROLLS ROYCE · HYUNDAI · FIAT · MASERATI · ŠKODA

Driving Innovation Together

NVIDIA partners with some of today's most forward-looking automakers to integrate GPU technology into infotainment, navigation, digital instrument clusters, and advanced driver-assistance systems (ADAS).

Small, energy-efficient Tegra processors enable rich infotainment displays, customizable digital instrument clusters, and computer vision-based advanced driver-assistance systems.

NVIDIA® TEGRA®
The innovation inside

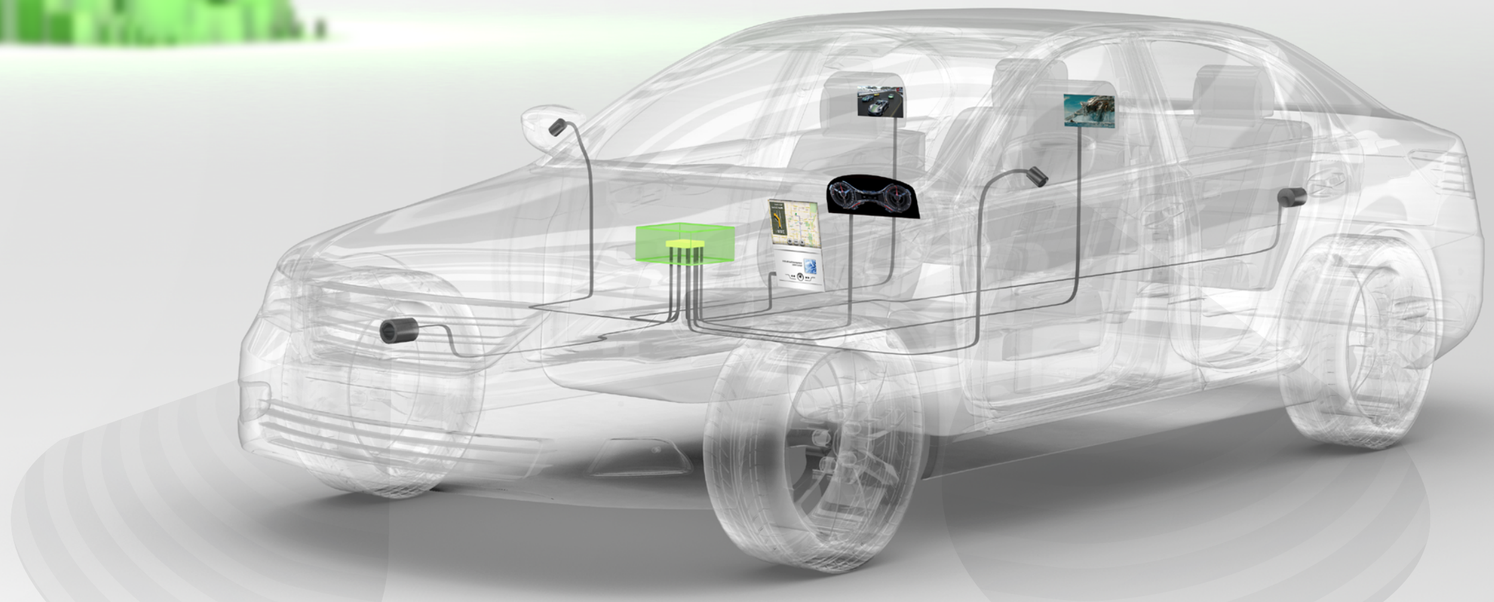


(Actual Size)

NVIDIA powers the infotainment, instrument cluster, and rear-seat entertainment (RSE) systems in more than 35 car models. The multi-core Tegra mobile processor builds on this leadership with visually stunning in-vehicle entertainment and critical safety applications, truly bringing the driving experience to life.

The Tegra system-on-a-chip (SoC) integrates numerous specialized processors, including an energy-efficient quad-core ARM® CPU, a powerful GPU, and dedicated audio, video, and image processors. But, it consumes 50 times less energy than the typical CPU.

The newest Tegra K1 processor also supports the NVIDIA® CUDA® parallel-processing architecture, bringing supercomputing architecture into the car.



Explore the new vision in digital instrument clusters.

NVIDIA processors open amazing new possibilities for smart, intuitive, dynamic digital instrument clusters and head-up displays. Clusters can be customized to create a unique experience for each driver, and can even render photorealistic materials like carbon fiber, brushed metals, or glass.

Enjoy the ride with NVIDIA infotainment and navigation.

3D navigation with intuitive, glanceable displays. Natural voice recognition. Interactive cockpit controls. NVIDIA enhances the driving experience with rich, easy-to-read graphics and responsive touch controls.

Pre-production Tesla Model S shown.

Peace of mind is no accident with NVIDIA driver assist.

Bringing NVIDIA computing power to the car makes drivers more aware and responsive. Advanced Driver Assistance Systems (ADAS) include pedestrian detection, speed limit recognition, lane departure warnings, and collision avoidance.

Bringing CUDA and computer vision to the car is a smart next step in improving the driving experience—and making drivers safer.

Image Courtesy Audi AG

Image Signal Processor

Tegra supports up to 12 MP cameras and video stabilization. Rear-facing, side-facing, and surround cameras can be processed in real time for advanced driver assistance systems, ranging from pedestrian detection and lane departure warnings to blind spot monitoring and traffic sign recognition.

1080p Video Playback

Crystal-clear video from car-mounted cameras increases driver glanceability. Plus, rear-seat passengers can enjoy 1080p movies for theater-quality entertainment.

Close the gap between consumer electronics and automotive infotainment.

NVIDIA is redefining what in-car entertainment can be, transforming the passenger experience with integrated Web browsing, theater-quality HD movies, and console-quality gaming.

The truly "connected" car even provides the ideal mobile workspace. It's a great way to stay connected, from wherever life takes you.

NVIDIA Visual Computing Module (VCM)

The unique VCM gives automakers a fast, easy way to integrate the most recent automotive-grade Tegra processor into their vehicles. It's a flexible design approach that dramatically reduces the technology gap between consumer electronics and in-vehicle systems.

Use photorealistic materials to design the most customizable digital cockpit.

Key to NVIDIA automotive innovation is **NVIDIA UI Composer Studio™**, a world-class instrument cluster and infotainment design tool.

This advanced design tool incorporates 2D and 3D graphics, as well as powerful interactivity capabilities, to deliver amazing graphics in Tegra applications.

Together, UI Composer and Tegra can deliver a photorealistic instrument cluster and IVI systems by levering a Materials Definition Language (MDL). Create and customize using a wide range of materials such as carbon fiber, brushed metals, stitched leather, or glass.

It's a visionary new solution that enables rapid prototyping of multiple design variations, eases usability testing, and fast tracks production so you can create more exciting and engaging driver experiences.

Examples of instrument clusters created using UI Composer

NVIDIA GRID™

Graphics-accelerated virtual desktops and applications

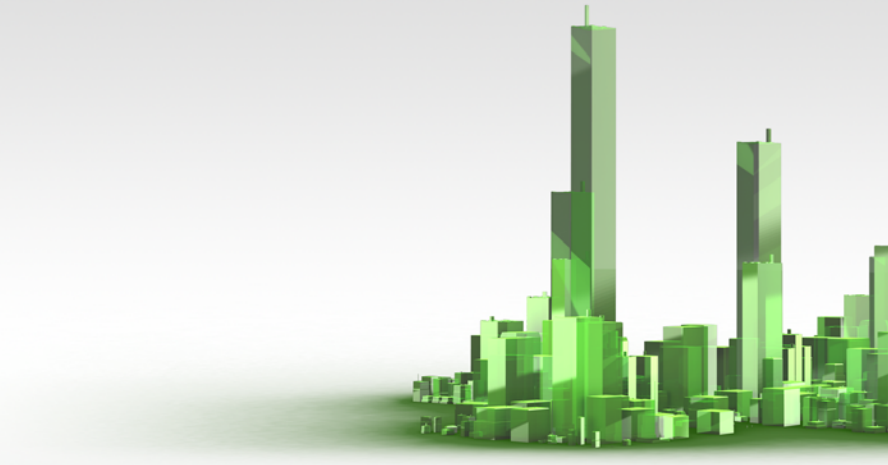
NVIDIA® Quadro® GPUs have been the professional graphics solution of choice since 1999 for everything from styling and component design to in-showroom configuration kiosks. In 2006, NVIDIA expanded into high-performance computing with Tesla® GPUs, which delivered all the power of a supercomputer at a fraction of the cost and power consumption.

Today, NVIDIA is taking auto design and simulation to a whole new level with breakthrough graphics and compute technologies. NVIDIA GRID™ technology offers designers and engineers the ability to offload graphics processing to virtualized environments. Plus, it allows the data center manager to deliver true graphics-rich experiences to users, regardless of the type of device they are on, from tablet to laptop to workstation.

Whether it's enabling remote design reviews or driving an interactive vehicle configurator in the dealership, NVIDIA GRID technology provides a powerful solution. This technology enables true remote, high-performance visual experiences delivered from public, hybrid, and private clouds.

NVIDIA has inspired and enabled automotive innovation for fifteen years.

From conceptual design and styling, to in-vehicle infotainment systems, to cloud-based point-of-sale systems, NVIDIA processors drive innovation across a wide variety of automotive visual computing applications.



Find out more about all the ways NVIDIA is driving automotive innovation

www.nvidia.com/automotive

Image Credits: Audi AG, BMW, Tesla Motors.