

APA for Automotive

When it comes to automotive, Altair HyperWorks and the Altair Partner Alliance (APA) software covers virtually the entire industry, offering numerous software solutions for any major simulation necessary in designing and building a quality vehicle. The APA grants customers access to partner applications using their existing HyperWorks Units with little or no incremental cost, under one simple licensing model.

Learn more about the APA and the products mentioned below at www.altairhyperworks.com/apa

Noise, Vibration and Harshness (NVH) Simulation

AlphaCell, AVL EXCITE™ Acoustics, Coustyx, EFEA, Insight+, SEAM, VMAP

An important factor in improving vehicle quality and perception is guided by how vehicles are designed for NVH.

APA users can simulate full vehicle noise among all frequencies, accurately perform model correlation, modal analysis, and test vibration on various material models, including heterogeneous, poro-elastic, visco-elastic, screens and fabrics.

Durability, Fatigue & Reliability Analysis

CAEfatigue VIBRATION, FEMFAT, LW Finder, nCode DesignLife, RAMDO, S-Life

With moving and load carrying parts exposed to thermal cycles and different drive conditions, automobiles have different requirements to meet objective quality criteria. The APA provides the best of the fatigue assessment technologies that help minimize product recalls and warranty costs by addressing quality requirements upfront in the product development process.

With APA software, simulate vibration fatigue, strength, uncertainty quantification, reliability analysis, reliability based design optimization weld analysis, ect. using actual loading conditions, apply random response options to reduce the need for physical testing and decrease manufacturing costs and identify the ideal strain gauge placement.

Composite Modeling & Analysis

CoDA, CONVERSE, KTex Family, MultiMech

Lightweight design is the most promising trend to meet increasing fuel efficiency standards, and composites are playing an important role in the current and future generation of automobiles. Composites also offer tailored properties, desirable material properties and flexibility in manufacturing.

In addition to optimizing composite materials, APA software provides micromechanical modeling, structural analysis, detailed failure and stress analysis, crush analysis and fiber orientation of reinforced plastics and mold-filled parts.

Impact Analysis & Ergonomics

MADYMO, Santos® Pro

Occupant safety and managing the energy in a crash event are important in protecting drivers out on the road. By testing the effects of impacts at various velocities, engineers can better anticipate where more work is necessary to achieve ultimate safety in automobile designs.

APA software can help ensure occupant safety with the ability to analyze virtual dummy models and the effects experienced at impact. APA software can also be used for human-centered design to analyze ergonomics of the vehicle and determine whether actions can be performed without strain. Users also possess the ability to optimize and design thin-walled cross sections for beams by swapping out materials and placement and comparing results to find the best combination.

Manufacturing Processes

Amphyon, AFDEX, Design Profit, Materialise 3-matic, NovaFlow&Solid, Virfac®

Manufacturing processes involve high development costs to set up tool and die designs if done only by trial and error — simulation of these processes can identify and rectify manufacturing defects before production to improve part quality. Casting and welding processes can be simulated by APA products.

Electromagnetic Analysis

Optenni Lab, SENSE

Electromagnetic analysis is an up and coming technology in the automotive world with the increasing interest in electric vehicles, fuel efficiency and touch screens, among many others. Complementing Altair's electromagnetic simulation tools (FEKO, WinProp and Flux), APA enabled-customers can use Optenni Lab to quickly and easily design matching circuits for antenna systems and SENSE for touch screen designs.

Systems Simulation

AVL Cruise™ M, ChassisSim, CosiMate, DSHplus, Flow Simulator, MapleSim, ModelCenter®, XLDyn

System level modeling tools simplify the vehicle analysis process by allowing users to understand overall system behavior in a matter of seconds. Multibody dynamics (MBD), 1D and physical system modeling tools within the APA help users model and analyze systems at different levels of detail that yield best performance.

Computational Fluid Dynamics (CFD) Analysis

AcuNexus, AVL FIRE™ M, FieldView Express, scSTREAM, SC/Tetra, TAItherm

CFD solutions are essential when thermal management and a vehicle's fuel economy plays such an important role in its success in the market. Altair and the APA Partners provide a number of solutions, such as aerodynamics analysis to help reduce any extra friction produced by different aspects of the vehicle. Electronics cooling, underhood thermal management, HVAC system and air conditioning system analysis are all also key factors for creating a comfortable and safe ride.

Optical Design

TracePro

Illumination and optics are a key component of any vehicle. Making sure drivers can see and be seen by others on the road and view interior displays are vital to vehicle safety. Automotive lighting designers can use TracePro for the design and analysis of interior lighting, exterior lighting, instrument panels, and head-up displays.

Material Information

CES Selector, Matereality Workgroup Database Pro, Total Materia

Use APA software to access a comprehensive materials database and quickly pre-screen materials to identify the most promising solution before investing significant time in a design. Making the correct material choice at the start of the process minimizes costs of both materials and development. Build and maintain a fully scalable material database, and empower team members with data ownership while still achieving consolidation. Data is always globally available precisely when you need it.

For more information on Partner products, visit www.altairhyperworks.com/apa