

APA for Defense

Altair's comprehensive array of software for the defense sector is continuously growing with the addition of Altair Partner Alliance (APA) tools, expanding HyperWorks capabilities in occupant safety, manufacturing, electromagnetics and many more. 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

Composite Modeling & Analysis

CoDA, KTex Family, LAP, MultiMech

Composite materials are increasingly applied in the defense industry. Due to their strong, lightweight and durable properties, composites are a great solution for maximizing the life of military vehicles exposed to adverse operating conditions. They are also helpful in the design of protection systems against explosions, bullets and similar threats.

APA software designs and optimizes composite materials for ballistics, provides material and micromechanical modeling and performs structural, detailed failure and stress analysis.

Durability, Fatigue, Stress & Reliability Analysis

CAEfatigue VIBRATION, FEMFAT, nCode DesignLife, RAMDO, StressCheck

Military vehicles are constantly working under mission critical conditions, so it is important to test the reliability of components to minimize equipment failure. In addition, closely monitored budgets create the need to be sure that ships, planes and other vehicles will last long enough to be worth the necessary investments.

APA software can help reduce initial costs by eliminating some physical testing and having the opportunity to evaluate multiple design options for the manufacturers. Users can simulate vibration fatigue, stress, and fatigue failures resulting from crack initiation and propagation, random response analysis and mixed loading conditions, weight reduction optimization, uncertainty quantification, reliability analysis, reliability based design optimization and weld analysis.

Electromagnetic Analysis

SENSE, Optenni Lab, VSim

Electromagnetic devices are key in powering, operating and protecting large ships, land vehicles and aircrafts. 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, VSim for applications dealing with electromagnetics and plasma related to multipacting, travelling wave tubes, and satellite charging and SENSE for touch screen design.

Safety & Ergonomics

MADYMO, HUByx, Santos® Pro

Testing the competency of aircraft seating and effects of impacts in various conditions help ensure passenger survivability. Minimizing the energy transfer from vehicle to occupant is crucial.

APA software can help ensure occupant safety with the ability to analyze virtual dummy models and the effects experienced at impact. Users can also incorporate human-centered design to analyze ergonomics of a vehicle, aircraft, or watercraft and determine whether actions can be performed without strain.

Manufacturing Processes

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

Manufacturing processes involve high development costs for setting 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. Design for casting, forging and welding processes as well as assess manufacturing maturity and risk with APA products.

Noise, Vibration and Harshness (NVH) Simulation

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

Considering sound and vibration in the military is crucial due to regulations limiting vehicle occupant exposure, as well as in keeping tabs on the location of friendly or potentially threatening vessels and maintaining a low profile when in a hostile environment.

APA users can simulate the underwater and structural acoustics and noise emissions of submarine hulls and ship engine housings as well as analyze the directivity of sonars, identify main paths of power transfer for radiated noise and meet interior noise level requirements.

Systems Simulation

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

Tanks, fighter jets, humvees, battleships, etc. are all made up of complex systems of individual parts. System level modeling tools simplify the analysis process by allowing users to understand the overall behavior of a vehicle more easily. 1D and physical system modeling tools within the APA help users model and analyze systems at different levels of detail that yield best performance in parts such as hydraulic actuators, propulsion systems, electronic controls and landing gear. APA software can also be used to perform co-simulations, and validate performance on the system level.

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.

Thermal and Computational Fluid Dynamics (CFD) Analysis

AVL FIRE™ M, LOGEresearch, ProteusDS, ShipMo3D, scSTREAM, SC/Tetra, TAITherm

CFD solutions play a large role in the defense industry, from considering the water's interaction with a battleship or submarine to anticipating the effects of wind conditions on a fighter jet. Altair and the APA Partners provide a number of solutions, such as aerodynamic analysis of entire planes, testing for cavitation on ship propellers and fluttering simulation of a wing with fluid structure interaction. Avionics, chemical combustion, particle based fluid dynamics and various heat transfer effects are also addressed by APA solutions.

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