APA for Aerospace

Altair's comprehensive aerospace offering is continuously growing with the addition of Altair Partner Alliance (APA) software, expanding HyperWorks capabilities in composites, durability, 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

Noise, Vibration and Harshness (NVH) Simulation

AlphaCell, EFEA, Insight+, SEAM

Considering sound and vibration in an aircraft is crucial in managing passenger perception and experience, not to mention the effects the vibrations during flight have on the structural integrity. Too much rattling or noise can cause weakness in the body of the plane and uneasiness and fatigue in the passengers, so it is important to manage these as much as possible.

APA software can help aerospace engineers assess the noise and vibration levels from various sources in the aircraft and then design the appropriate sound treatment to address any issues. Vibration related structural assessment is essential for safe design and operation.

Durability, Fatigue, Stress & Reliability Analysis

CAEfatigue VIBRATION, FEMFAT, nCode DesignLife, RAMDO

Different flying conditions, thermal cycles and many other factors affect the fatigue life of aircrafts. Simulation can be used to supplement physical tests to accelerate the product development cycle and meet safety regulations and certifications. Take into account the mechanical and structural design of wings, engines, and interiors to examine variability of materials, manufacturing, and operating conditions.

With APA software, 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.

Composite Modeling & Analysis

CoDA, KTex Family, LAP, MultiMech

Composites are widely used in all areas of the aerospace industry for their unique characteristics in lightweight design, damage tolerance, high strength and stiffness and good shear properties. However, they come with many challenges related to the design and manufacturing of composite structures.

In addition to optimizing composite materials, APA software provides material and micromechanical modeling, structural analysis, detailed failure and stress analysis.

Occupant Safety & Ergonomics

MADYMO, 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 an aircraft and determine whether actions can be performed without strain.

Altair | Partner Alliance

Systems Simulation

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

Aircrafts contain multiple complex systems. System level modeling tools simplify the analysis process by allowing users to understand the overall behavior 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 and landing gear. APA software can also be used to simulate these systems, perform co-simulations, and validate performance on the system level.

Manufacturing Processes

Additive Works, 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 3D printing, casting and welding processes can all be simulated by APA products.

Thermal & Computational Fluid Dynamics (CFD) Analysis

AcuNexus, AVL FIRE™ M, Flow Simulator, LOGEengine, scSTREAM, SC/Tetra, TAITherm

CFD solutions are essential in reducing fuel costs and risks of turbulence in aircrafts. Altair and the APA Partners provide a number of solutions, such as aerodynamic analysis of entire planes and rotorcraft, spacecraft re-entry and fluttering simulation of a wing with fluid structure interaction. Avionics and chemical combustion are also addressed by APA solutions along with fluid system design for thermal systems, combustion, lube & fuel systems.

Electromagnetics Analysis

Optenni Lab, SENSE, VSim

Complementing Altair's electromagnetic simulation tools (FEKO, WinProp and Flux), HyperWorks 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.

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

Altair Engineering Inc., World Headquarters: 1820 E. Big Beaver Rd., Troy, MI 48083-2031 USA
Phone: +1.248.614.2400 • Fax: +1.248.614.2411 • altair.com • info@altair.com