SITUATION CRITICAL

FOR DO-178B & MISSION CRITICAL APPLICATIONS THE VAPS FAMILY CONTINUES TO LEAD THE WAY: **VAPS, VAPS QCG, & VAPS CCG Lite**

Industry leaders, including **BAE Systems**, **BARCO**, **Datel Defense**, and **Elbit Systems**, are working with Engenuity to keep the VAPS toolset at the forefront of innovation. With VAPS, VAPS QCG, and VAPS CCG Lite, Engenuity helps to reduce the cost, time, and risk associated with avionic development.

Developing safety and mission critical aerospace applications is, by its very nature, a time-consuming and costly endeavor. Whether for use on commercial or military aircraft, airborne applications are responsible for protecting human life. As such, the processes used to develop these applications are extremely precise and the regulations that ensure their reliability are extraordinarily rigorous.

Engenuity is committed to providing complete life-cycle solutions that address the specific needs of the commercial and military aviation markets. Through the entire VAPS family of products, Engenuity helps its customers reduce the risk, time, and cost associated with developing avionics applications.

First launched in 1985, the VAPS software tool suite is now the industry standard for the rapid prototyping, designing, testing, and deployment of Human Machine Interfaces (HMI). Teams from premier aerospace companies across the globe are using VAPS to design and test their displays and controls in the most advanced aircraft cockpits currently in development.

BAE Systems uses VAPS throughout the development process for avionics displays on a wide variety of projects, such as the *Eurofighter*, to realize significant time and resource savings. *David M. Andrews, Senior Human Factors Engineer, Systems Process R&D at BAE Systems* (United Kingdom), explains that "VAPS allows our engineers to communicate more effectively with their numerous counterparts and offers significant improvements in overall usability. The result is a decrease in the time necessary to build and maintain effective Human Machine Interfaces."

Two of the distinct functionalities that set VAPS apart from other COTS solutions are the VAPS Qualifiable Code Generator (QCG) and C Code Generator (CCG) Lite. VAPS QCG is a qualifiable code generating solution for deploying VAPS applications into safety-critical embedded systems. And, CCG Lite is the standard VAPS code generation module that allows developers to create embedded executables for a wide variety of target platforms.

DO-178B CERTIFICATION

The Radio Technical Commission on Aeronautics (RTCA) sets the standards governing aircraft development. DO-178B is the RTCA's certification standard that enforces the rigorous processes governing the entire development life-cycle of embedded software in airborne equipment. Adhering to DO-178B can be a costly and time-consuming enterprise. However, with VAPS QCG, embedded display developers can dramatically reduce the time and expense associated with the certification process.

VAPS QCG is the first DO-178B qualifiable graphics development code generation tool qualifiable to RTCA DO-178B Level A. VAPS QCG enables graphics software generated from a VAPS application to be certified with a minimum of effort. Generating code in a subset of ANSI C, VAPS QCG drastically reduces the effort required within the software design, coding, and testing phases of the graphics display development life-cycle.

In addition to being a qualifiable code generator, VAPS QCG is also a qualifiable verification tool. VAPS DesignDoc facilitates the review of VAPS design files against

original high-level requirements as part of the necessary certification process. Using DesignDoc developers can automatically produce the documentation required to support certification.

INDUSTRY LEADERS

BARCO, a leader in the development and manufacture of display systems applications, has been a major test site and co-developer for the VAPS QCG software since July 2000. The development teams at BARCO began using the VAPS tool suite to rapidly develop new prototypes for its family of *Avionics Multi-Function Displays* that serve to visualize the pilot's primary flight information. BARCO now uses VAPS QCG to ensure the reliability of displays for safety and mission-critical applications, resulting in higher quality end products as well as dramatic time and cost savings on all its programs.

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For its *Pilatus PC-21* trainer aircraft project, *Datel Defence* employed the VAPS software solution to develop a glass Cockpit Mission/Display Computer and two Heads Down Displays that were DO-178B Level C certified. The VAPS toolset allowed Datel Defence"to create display software that is agreed on at an early stage of the lifecycle and at a cost effective price," explains Ross Parsell of Datel. The result was a 25% faster time-to-market and 87% lower development costs.

In their development process, *Elbit Systems* uses VAPS and VAPS QCG to reduce manpower and to realize easier collaboration for their advanced, high-performance electronic and electro-optic systems. With the automatic qualifiable code and document generation in VAPS QCG, Elbit Systems realizes significant time savings on all its projects, including intelligence surveillance and reconnaissance systems for defense and homeland security applications.

VAPS CCG LITE FOR GENERATING ANSI C CODE

While DO-178B governs the processes associated with creating software to be embedded in aircraft, ANSI C is the standard that governs coding language. Although not as rigorous as the RTCA standards, adhering to ANSI C standards is important, particularly with regard to issues of portability.

VAPS CCG Lite provides automatic code generation of ANSI C code for application graphics, behavior, and logic and allows for the creation of makefiles. VAPS CCG Lite has also been optimized for increased drawing speed and for significant reductions in generated code size, frame loading time, and runtime transformations.

IMPROVED PRODUCTIVITY

BAE Systems uses VAPS CCG Lite to rehost its avionics displays to a target display environment, which results in significant improvements to the productivity of their software development process. What's more, with this integrated avionics display development system, they are able to support the latest industry standards.

In 2001, *Lockheed Martin* was looking to develop rapid prototyping and demonstration capabilities for the new integrated avionics functions and display formats for *First Flight of the F-22 Raptor Block 3 Software*. Instead of choosing to maintain in-house software and coding, Lockheed Martin elected to use VAPS and CCG Lite to produce the cockpit display avionics code. This COTS solution allowed Lockheed Martin to achieve its initial low-rate production goals more quickly, efficiently, and economically and also contributed significantly to the successful First Flight of the F-22 Raptor Block 3 Software.

As *Mike Morton, F-22 Avionics Architect, Lockheed Martin* (Marietta, GA), explains, "Engenuity Technologies' VAPS and CCG Lite software have greatly enhanced the productivity of our software engineers, thereby enabling us to meet the F-22 Block 3 First Flight Milestone"

Moving forward, VAPS, VAPS QCG, and VAPS CCG Lite will continue to enhance the productivity of industry leading avionics developers. As both aircraft avionics and the standards that regulate them evolve, Engenuity is working with its customers to ensure that all of its safety critical products keep pace. It is through such strong relationships with its customers that all of Engenuity's software solutions stay at the forefront of innovation.

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