

Eurofighter Typhoon

BAE Systems Keeps Pace With The Future Using the VAPS Toolset

BAE Systems is using Engenuity's VAPS cockpit design tool to keep the Eurofighter Typhoon at the forefront of avionic design. By adopting the VAPS toolset, BAE Systems will be able to satisfy changing requirements for the Typhoon for decades to come.

BAE SYSTEMS

The Eurofighter Typhoon is the world's most advanced swing-role combat aircraft. Developed by Germany, Italy, Spain, and the UK, the Typhoon Project is truly a collaborative endeavor. The Project brings together the most sophisticated development teams in Europe and is set to fulfill air force requirements for decades to come. The Typhoon has already achieved Type Acceptance, and the first of the 620 planned for the four Partner Nations were delivered in 2003.

The Typhoon's unrivalled capabilities include improved situational awareness, high survivability, and the most advanced array of integrated sensors, making it a total solution for modern air superiority. In addition, the Typhoon was designed with continuous growth capability to 2010 and beyond, allowing the fighter to meet Europe's changing air defensive needs well into the future.

For the Typhoon project, the UK's BAE Systems is part of the Eurofighter GmbH consortium, which also includes EADS-D, EADS-CASA and Alenia Aeronautica. Together, they are responsible for the development and production of the Typhoon's complete

weapon system and for the delivery of that system to NETMA, the NATO Eurofighter and Tornado Management Agency.

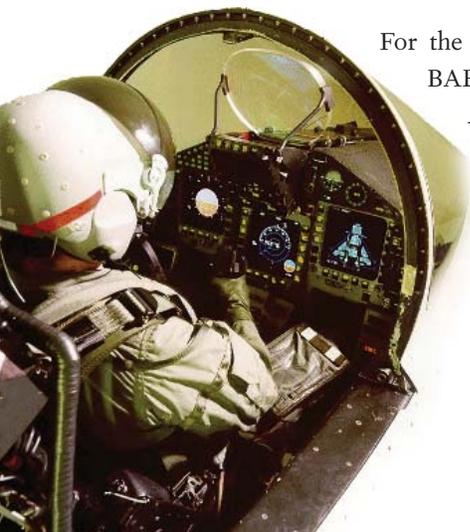
Typhoon Symbology

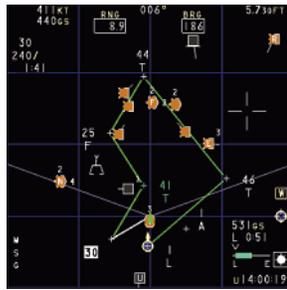
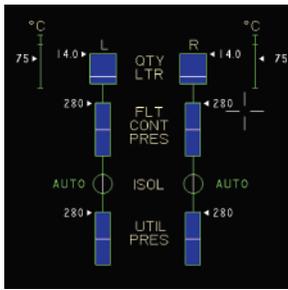
Within the Eurofighter GmbH consortium, BAE Systems is responsible for designing numerous systems, including avionic integration, displays and controls, integrated monitoring and recording, defensive aids, aircrew equipment assembly, electrical, fuel, crew escape, and life support.

Initially, in-house tools were used to design the current standard for the Typhoon's cockpit display graphics or symbology. The challenge for the Enhanced Process and Toolset (EP/T) Team on the second tranche of the Typhoon was to implement a state-of-the-art cockpit design process and associated toolset that would be able to incorporate the future functionality requirements within the fighter's avionics system.



According to Russell Porter, Eurofighter EP/T Cockpit Working Group Leader, "moving forward with further development of our in-house solution was considered, but, due to existing limitations with the tool as well as the associated future development, maintenance, and support overhead, we decided instead to employ VAPS, Engenuity's HMI design tool. Using VAPS will allow us to address current toolset obsolescence issues as well as support future developments of the Typhoon's aircraft cockpit symbology set."





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State-of-the-Art Technology

Porter says that “The use of the VAPS toolset provides us with the capability to develop a graphics-based expression of the product that is employed from the front end prototype and requirement capture phases right through to the formalized deliverable product.”

The ability to use a single expression of the symbology throughout the entire workflow has allowed the team to sub-contract parts of the life-cycle to an external supplier. Porter also believes that using VAPS will provide greater supplier collaboration as well as make the symbology implementation transparent to the end customer.

As Porter explains, “This is the first time that a single toolset has been used by different specialists in different phases of the software life-cycle to derive a common product. The flexibility of the GUI, together with the capability of the qualified code generator to produce error-free qualified code, leads to improved development, reduced risk of error, and, ultimately, significant time-savings.”

Moving to VAPS

According to Porter, by using the VAPS toolset, “the team expects to realize significant life-cycle improvements. By employing VAPS, we will have graphical compatibility across the Typhoon cockpit rig set as well as onto the aircraft itself and will be able to employ a single graphics expression to be used throughout development and to satisfy desktop animation graphics requirements.”

Porter is quick to highlight *VAPS DesignDoc* and *VAPS QCG* as key strengths of the VAPS cockpit design tool. DesignDoc, the automatic document generation feature in VAPS, outputs Microsoft Word documents detailing all aspects of a VAPS-built HMI, and BAE Systems will

use this feature to easily record and update their documentation. BAE Systems will also use Engenuity’s qualifiable code generator for VAPS models—VAPS QCG—to provide test and validation evidence against their supplier-provided QCG certifiable code. This will allow BAE Systems to receive from their supplier all of the certification evidence documentation and test results to satisfy DO-178B requirements.

Porter also points to the rapid prototyping and animation capabilities of the VAPS toolset, as well as its ability to graphically specify a graphical interface right from the requirement capture phase of the design life-cycle, as major strengths for the Typhoon project.

Time-Saving

Using VAPS will save the Typhoon Cockpit Team a considerable amount of time. Although VAPS is not yet deployed as the Symbology Design Tool for the Typhoon, the EP/T Team anticipates that the toolset will offer significant time-saving by, for example, reducing the time from concept to initial rig test and by eliminating the unit test and code walkthrough phases by using VAPS QCG. As Porter says, “we hope that using VAPS will save us more than 6 months in the development of future enhancements in the Typhoon symbology set.”

The EP/T Team also expects to see real improvements in the turnaround time for changes made to the symbology. Because of its up front availability of graphical specification and animation of symbology, using VAPS will reduce the time it takes to update or modify the existing symbology.

Perhaps the most significant time-saving feature, according to Porter, “is the ability of VAPS to run the graphics firmware on both host and target platforms. Previously, it required two software products, which, due to different architecture and graphical ASIC on target applications, meant that we didn’t have a common software between the two systems. But now, with VAPS, we have just one architecture and one set of graphics.”

Porter’s confidence in BAE Systems’ future use of the VAPS toolset is based, in part, on his team’s relationship with Engenuity. “We have developed a strong working relationship with Engenuity. They are very communicative with regards to the current status of software development and are always prompt in offering support when we need it. We believe that they understand our requirements for a Symbology Design Toolset and are committed to supporting our use of the VAPS tool.” ☺