

October 2006

**MILITARY
ELECTRONICS**
Research & Development

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Resizable Displays Show Promise For Military

Jack Browne, Technical Director

CUSTOM DISPLAYS are an essentially part of the operator interface in many military electronics systems, although they are also a considerable portion of the hardware budget. In an effort to help the military move away from dependence upon custom displays, the United States Display Consortium (USDC, www.usdc.org) sponsored a research and development program for the development of low-cost, resizable liquid-crystal displays that are usable in custom military applications. These resizable commercial active-matrix-liquid-crystal-display (AMLCD) devices were validated for military use earlier this year by General Dynamics Canada (www.gd.com) and offer the potential of high-performance display solutions at one-tenth the cost of equivalent custom displays.

This use of commercial-off-the-shelf (COTS) display technology in place of expensive, custom displays provides military systems designers with the flexibility to size their designs according to application needs, while maintaining reasonable cost restraints. According to Dr. John Pellegrino, director of the US Army Research Laboratory's (www.arl.mil) Sensors and Electron Devices Directorate, which provides oversight to the USDC program, this is a major stride forward for military

electronics systems integrators: "Prior to the completion of this project, LCD resizing technology was unproven and considered to be an unacceptable risk element for military display solutions. USDC, General Dynamics Canada and other participating companies have taken a major step forward in enabling affordable COTS-based form-fit-function display solutions. This work is of vital importance to the US Army in sustaining existing custom-format systems, as well as providing more economical custom-fit display solutions for new weapons systems."

Until this research program, commercial display units have been available only in standard sizes. In addition to the more rugged environmental requirements of military electronics compared to components for commercial use, military systems are often designed around the special dimensions of a cockpit or a transport seating area, requiring the use of nonstandard display sizes. This research program has shown that it is possible to resize lower-cost standard commercial LCD components to fit the needs of both new and legacy military electronics systems.

Since resizing commercial display components does involve new manufacturing processes that introduce additional stress on the display during the electronics disassembly, glass cutting, reseal-

ing, and electronics reattachment, the validation process was needed to determine the suitability of the resulting displays for military use. Under contract with the USDC, General Dynamics Canada produced and implemented a resized AMLCD equivalent of its custom-format electroluminescent (EL) display product and subjected the resized LCD to the same performance, environmental, and electromagnetic-interference (EMI) qualification tests specified for displays used in the US Army's Stryker Mobile Gun System (MGS). The multi-wheeled, lightweight armored vehicle MGS mounts a 105-mm gun often used in hostile conditions—an ideal test for the resized display components.

General Dynamics Canada is a member of USDC's Military and Avionics User Group (MAUG), which is chartered with identifying and managing display integration projects. As a sub-contractor to General Dynamics Canada on the project, Interface Displays and Controls (www.interfacedisplays.com) conducted a companion study to qualify cut glass (as used for LCDs) for airborne applications, reinforcing the conclusions of General Dynamics Canada.

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