

VITA TECHNOLOGIES

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Embedded Tech Trends 2017 wrap-up



JERRY GIPPER EDITORIAL DIRECTOR

In January, Embedded Tech Trends 2017 was held at the wonderful Bourbon Orleans Hotel in the heart of the New Orleans French Quarter. Bordered by Bourbon Street to the west with Jackson Square and the mighty Mississippi River to the east, the attendees had easy access to the sights and sounds of the true essence of New Orleans (NOLA).



Leveraging the history of the area, the theme for 2017 was *“The Voodoo Behind Critical and Intelligent Embedded Systems.”* The focus and emphasis of the presentations during the event was on the magic of the technology and solutions behind high-performance computing

problems. Embedded Tech Trends is a small, but extremely effective forum where suppliers of components, boards, and system level solutions can meet exclusively with members of relevant industry media to discuss technologies, trends, and products. The small venue of the Bourbon Orleans Hotel was great for true social networking free from the stress of large venue events.

Many of the presenters had some fun with the voodoo theme by incorporating it into their presentations. The following are short synopses of the presentations:

The magic of secure processing

By Rich Jaenicke, Director, Strategic Alliances and Market Development, Mercury Systems, Inc.

Defense electronic systems are constantly under attack making it seem that sometimes magic is needed for protection. Jaenicke discusses several of the threats affecting these systems, key elements of a secure deployed system, and what steps are needed to ensure that they are secure, trusted, and rugged.

The evolving role of GPGPUs in C4ISR applications

By Doug Patterson, Vice President of Sales and Marketing, Aitech Defense Systems, Inc.

Object detection, tracking, and classification are critical to any system that relies on computer vision systems. General-purpose graphics processing units (GPGPUs) are rapidly becoming a game-changer in many command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) applications. GPGPUs are opening the doors to new levels of deep-learning and neural network vision systems never before possible. Patterson explains how the role of GPGPUs have evolved and what they can do improve our vision system technology.

Chassis cooling: Do you need a witch doctor?

By Justin Moll, Vice President, U.S. Market Development, Pixus Technologies Inc.

Chassis cooling seems more like black magic than most technology. Justin ponders if using a witch doctor might be a beneficial way to solve cooling problems. On the way, he demonstrates how something as magical as changing the location of cooling fans may be the best solution.

Infinite possibilities, infinite choices, infinite challenges?

By Ken Brown, Applications and Program Manager, LCR Embedded Systems

What challenges does a chassis manufacturer face when implementing VPX? Brown dives into the many I/O options available to a VPX chassis manufacturer. He presents the pros and cons of six options with suggestions on choosing the best solutions for various scenarios.



Figure 1: Ken Brown from LCR Embedded Systems giving his presentation at Embedded Tech Trends. Photo courtesy of Trevor Gipper.

Embedded Tech Trends: Market insights

By Brian Arbuckle, Senior Market Analyst, IHS Markit

Market data is extremely valuable in making good business decisions and determining the health of an ecosystem. Arbuckle discusses key highlights of the latest IHS Markit study on embedded computer boards, modules, and systems. He wraps up with information on current defense budgets on unmanned air, ground, and sea vehicle market trends.

Data to decision: Enabling good decision-making

By Simon Collins, Senior Product Manager, ADLINK Technology Inc.

The military relies on the timely analysis of aggregated intelligence to fulfill short-term mission and long-term strategic aims. The enabling technology needs to be both open and robust, to ensure rapid deployment and efficient use of resources in the face of loss of connectivity, while being secure against any attack. Collins looks at advances in cloud computing, sensor data processing, and machine learning that are providing solutions to convert real-time data into decisions.

6U of connectivity in a 3U bag: Meeting the demand for density and speed

By Michael Walmsley, Global Product Management, TE Connectivity

Embedded computing industry trends have always led to interconnect challenges. Fortunately, the connector suppliers are up to the difficult task at hand. Walmsley covers a broad swath of what is stewing in the cauldron to improve VPX interconnect density and speed. He offers that there is tremendous potential for emerging interconnect technologies that will remove the bottlenecks of today's solutions.

Introducing COTS to the rail industry

By Rob Persons, Sr. Field Sales Architect, Artesyn Embedded Technologies

Since 2007, the Federal Railroad Administration has been pushing the industry to implement fail-safe positive train control systems. Persons discusses how a data lock-step method eliminates some of the synchronization and upgrade issues used in previous methods.

A decade with a solution looking for a problem

By Michael Humphrey, Business Development, Thermal Management Solutions, Parker Aerospace

Liquid flow through cooling has been around for some time now. Humphrey presents a solution that combines the best of traditional conduction cooling with a closed loop liquid flow through in the sidewalls of a conduction chassis.

Lighting the way for embedded systems

By Michel Tetu, Senior Business Development Advisor, Reflex Photonics Inc.

Electronic Warfare (EW), Signal Intelligence (SIGNIT), and safety is driving the demand for accurate information from embedded computers connected to high resolution sensors such as infra-red cameras and phased array radars. The choice of interconnect architecture and technologies are critical to the successful realization of high-performance embedded systems. Tetu discusses optical interconnect technologies that are scalable and deliver high bandwidth, high reliability, and low size, weight, and power (SWaP) to meet the needs of embedded systems for today and tomorrow.

FPGA coprocessors for acceleration of shape algorithms in hybrid VPX HPEC systems

By Thierry Wastiaux, Sr. Vice President of Sales, Interface Concept

Advances in field-programmable gate array (FPGA) technology enable improvements in shape recognition algorithm processing. Wastiaux reviews results of research leading to improvements in Fast Fourier Transform (FFT) and Discrete Cosine Transform (DCT) algorithms leading to reduced execution time and decreased use of FPGA resources.

Safety-certifiable avionics with COTS

By Mike Slonosky, Senior Product Manager, Curtiss-Wright

There is an increasing demand for commercial-off-the-shelf (COTS) DO-254 safety critical avionics solutions that the digitization of cockpits is leading in commercial and military aircraft of all types. Slonosky expands on the advantages of using COTS technology to meet this demand.



Figure 2: Curtiss-Wright's Mike Slonosky discusses the trends of DO-254 certification process during Embedded Tech Trends. Photo courtesy of

Trevor Gipper.

A steaming cauldron of VPX fixin's – All the wicked ingredients you need for high-speed wizardry

By Michael Munroe, Technical Product Specialist, Elma Electronic Inc.

Having the right ingredients to solve a complex application is a necessary part of any recipe. Munroe reviews the ingredients and wizardry behind VPX that make it the right choice for high-speed critical embedded platforms.

Connector technology trends

By Bob Hult, Director of Product Technology, Bishop & Associates

It all starts at the connector so understanding trends in the industry can provide guidance in selecting the right technology. Hult shares his knowledge of the connector industry in strategic areas of the embedded computing industry.

The top five issues I encountered working with embedded vendors and why I decided to join the industry to address them

By Mrinal Iyengar, Vice President of Product Management, Abaco Systems

Iyengar presentation focuses on understanding that the customer requires almost magical-like skills. Iyengar recently moved from the demand side to the supply side of the equation. She shares her experiences as a customer while presenting challenges for what the supply side of the industry must do to satisfy those customers.

Building hybrid rugged systems using a mix of applicable embedded standards

By Bill Ripley, Business Development, Alligator Designs Pvt Ltd

Sometimes a solution requires a hybrid of standards to meet the design requirements. Ripley presents a case for building a rugged system that is more efficient and the “right size” for the target platform.

The dark powers of Intel processor boards

By Nigel Forrester, Technical Product Marketing, Concurrent Technologies Plc

Intel processors are widely used in critical embedded applications. Within the latest processors are “dark powers” that can enable new capabilities for users of single board computers. Forrester points out the advantages of several of these dark powers, challenging us to push even further with the capability of Intel processors.

Get consolidated!Virtualization technology for railway communication systems

By Michael Plannerer, Director Global Research & Development, MEN Mikro Elektronik GmbH

The modern train is becoming a rolling communications infrastructure. Plannerer details how the voodoo magic of operating system virtualization, widely used in modern information systems, can fulfill the requirements of these rolling communications platforms.

Protecting safety critical systems from voodoo curses

By Scott Engle, Director of Business Development, Mercury Systems, Inc.

Sometimes it just seems that someone has put a voodoo curse on your safety critical system; high integration costs, too many suppliers, managing for obsolescence, not planning for upgradability, and robustness of suppliers seem to plague a designer. Engle delves into

these curses, presenting options for what can be done by a customer to avoid them.

Sometimes hoodoo rituals are needed to implement new technology features in OpenVPX chassis

By David Hinkle, Field Applications Engineer, Elma Electronic Inc.

Dealing with emerging technology in a complex system can sometimes lead one to contemplate hoodoo rituals to get to a solution. Hinkle shares his experiences in managing the complexities, offering insight into how to overcome them in process of selecting an [OpenVPX](#) chassis.

New tools and standards boost embedded systems performance

By Rodger Hosking, Vice President and Cofounder, Pentek, Inc.

Developing real-time embedded [signal processing](#) systems poses many challenges. Much has changed in tools and standards critical to these systems. Consequently, Hosking navigates us through many of those challenges with his tutorial for developers of FPGA-based platforms.

Addressing the platform challenges of next generation electronic warfare systems

By Haydn Nelson, Director of Marketing and AE, Abaco Systems

Weapon systems are now primarily electronic, creating a new set of challenges for platform designers. Nelson reviews some of the fundamental concepts utilized in electronic warfare discussing how a modular platform addresses the various challenges to next generation electronic warfare systems such as integration, Internet Protocol (IP) Security, I/O, and compatibility.

High speed VPX signal integrity

By Ivan Straznicky, Technical Fellow, Curtiss-Wright

The challenges of signal integrity become greater with each speed step. The parameters get tighter to accommodate higher signaling rates.

Straznicky talks about some of the hoodoo-oodoo that engineers must use to eke out more performance.

OpenVPX tutorial

By Greg Rocco, MIT Lincoln Laboratory

Greg Rocco is perhaps the most knowledgeable VPX person in the world. He created a tutorial for OpenVPX and during his presentation, he shares an introduction to his material. If you think of the OpenVPX standard as a reference manual, then think of this material as a user's manual. It helps you sort through the large number of options in the standard, further locks in common industry practices, helps build a more consistent ecosystem, and provides invaluable suggestions for best engineering practices.

CERDEC C4ISR/EW hardware/software convergence

By Greg Rocco, MIT Lincoln Laboratory

Communications-Electronics Research, Development, and Engineering Center (CERDEC) has been instrumental in driving hardware and software convergence initiatives. Joined by government, industry, and academia participants they have established working-level teams to coordinate development activities and conduct yearly demonstrations. Rocco provides an update on the activities and demonstrations.

HOST and SOSA Update

By Patrick Collier, NAVAIR

Several Department of Defense (DoD) programs are zeroing in on VPX as the architecture of choice for various platforms. Program offices are working together to define common ground for technology. The stage is set for a shift in the industry. Collier discusses the latest reports from two of the key initiatives.

All of these presentations, with video, are posted at
www.EmbeddedTechTrends.com

vita.mil-embedded.com/articles/embedded-tech-trends-wrap-up