NEW: FRAUNHOFER IIS/EAS GOES UVM-SYSTEMC

The worldwide standardized Universal Verification Methodology (UVM) is now available as an Open Source modeling language. Fraunhofer IIS/EAS provides various support and service offerings related to the new UVM-SystemC.

For the first time, the standardized Universal Verification Methodology which the electronics industry can apply to design processes, is available as an Open Source solution. An alternative access to the verification method has been made available with the integration of UVM into the SystemC free modeling language. In contrast to previous approaches, it now has been successful to set up UVM for SystemC in the same way as for commercial languages. For the user, the clear benefit is that, in many fields, the language permits much more flexible work with the verification method than was previously possible.

Fraunhofer IIS/EAS has integrated various support and service offerings into its portfolio to open up these new UVM-SystemC options to companies. These options include consulting and service for individual customer projects as well as services for simulation of SystemVerilog-UVM models in UVM-SystemC and of UVM-SystemC in SystemVerilog environments. We also offer our customers and partners training on this topic - in English and in German - to meet their respective needs. In addition, Fraunhofer IIS/EAS offers the design environment COSIDE for mixed signal systems design, with the help of SystemC and SystemC AMS, which also includes the verification standard. The Accellera Systems Initiative is currently in the process of evaluating the approval of UVM-SystemC as a new industrial standard.

UVM SystemC was made possible by work within the framework of the European research project Verdi, in collaboration with Fraunhofer IIS/EAS. The offerings of the division are based on the class library developed in Verdi. The project’s goal was to develop a verification method at system level. It increases the reliability of integrated circuits and embedded systems, and it makes their development more effective.

Contact: Stephan Schulz
stephan.schulz@eas.iis.fraunhofer.de
The main focus of the monitoring of bridges and other structures is to promptly detect damage and safety hazards. But conventionally designed measuring systems do not always meet the essential requirements. So Fraunhofer IIS/EAS has developed a powerful self-configuring system for networking that merges the benefits of wired and wireless communication. It allows measurement results to be transmitted flexibly, robust and reliably, even under difficult conditions.

Operators of buildings and other structures apply sensor data to avoid safety risks and promptly detect potential hazards related to material damage, environmental factors or strain. However, conventional measuring systems have decisive disadvantages when it comes to monitoring large structures or difficult environmental conditions. Inflexible, expensive and often very long cables are faced with wireless systems that usually have to be configured again for every use. And they almost always use a standard wireless technology such as ZigBee or WLAN. The former is not powerful enough for many applications. On the other hand, because not every wireless node can be connected to all of the others in larger networks (fully meshed network), the range of WLAN is limited.

Combined wireless/cable solutions require that the user invests extensive configuration effort to adapt to the specific application. Fraunhofer IIS/EAS has developed an alternative solution to counter all of these detrimental factors. It combines the two approaches such that the entire system of cable and wireless components configures itself. This greatly reduces effort and expense.

The hybrid system has the distinctive advantage that significantly less cable is needed. This means vast savings and much less installation work, particularly for larger structures such as bridges or high-rises. Cable is then needed only in areas where a wireless connection is not possible. Everywhere else, wireless technology is used that achieves the performance of WLAN and combines it with the great flexibility and full meshing of sensor networks.

Researchers at Fraunhofer IIS/EAS have created a network strategy with which the hybrid measurement system configures itself. It detects the existing conditions in the network, enabling a modular monitoring system to be established that automatically and better adjusts to the individual structural properties.

This means it can be used flexibly and - because of the combination of wireless technology and cable - is resistant to interference. The system was developed as part of the partner project RadCoM, supported by the German Federal Ministry for Education and Research. The system is currently being used to monitor railway bridges. In these cases, the effort required to lay cables - often over distances exceeding 10 kilometers - could be greatly reduced. The Fraunhofer researchers have also designed the wireless communication in the sensor system so robust that factors such as passing locomotives do not have a negative impact on measurement results.

Contact: Andreas Frotzscher
andreas.frotzscher@eas.iis.fraunhofer.de
GERMAN TECHNOLOGY FOR CAMERAS IN ULTRA HD

Televisions with Ultra HD technology are already successful on the market, and there are more and more high-definition film contents. However, video cameras with 4K technology are usually still very expensive and, in professional applications, do not meet all of the requirements for special solutions, such as high-speed recordings. Fraunhofer IIS/EAS is currently participating in a research project to allow production of inexpensive, high-performance cameras. Its partners are working together to develop a storage connection that is particularly small and energy efficient.

For video cameras to make the leap to Ultra HD technology, they must be able to record image signals with pixels that are four times as small as those of Full HD resolution. The data volume that has to be processed in the same time increases for data recording as well. This can be achieved only with highly developed, very powerful and efficient data processing. A highly specialized 3D microchip design is especially suitable to meet these stringent requirements. The main reason is that the classic design reaches its limits when it comes to improving essential performance characteristics and meeting the requirements regarding to increasingly smaller and more energy efficient systems.

This is why the Fraunhofer researchers are collaborating with the design service company Dream Chip Technologies on a prototype for storage connection especially for video cameras. Fast and energy-saving communication between the processor and the memory chip is intended to enable high-performance data processing in the devices. This is accomplished by placing both devices on one interposer in the same package. The three-dimensional integration technology means that the entire electronic system is substantially smaller than classic designs with standardized component sizes. This in turn requires shorter connections between the various components. So data is transmitted between the devices much more quickly and with greater energy efficiency, enabling a significant rise in frame rate and data rate. The goal is to achieve data rates between the memory and the processor of up to 400 Gbit/s for the greater requirements in the future. The project is supported by the German Federal Ministry for Economic Affairs and Energy as part of the Central Innovation Program for SMEs (small and medium-sized enterprises).

Contact: Andy Heinig
andy.heinig@eas.iis.fraunhofer.de