

Standards Support the Machine Vision Industry

By Jeff Fryman, AIA Director, Standards Development

The AIA is pleased to continue its leading role in the interoperability standardization efforts for digital machine vision applications. The AIA supported Camera Link® and GigE Vision® standards remain the leading interoperability interfaces for machine vision devices today, and into the future. The AIA continues to improve and expand the usability of these standards as well as explore new areas of standardization needs.

The advent of digital imaging devices changed the needs of the vision and imaging industry, both for the manufacturer and the user. Satisfying the need to capture and process a digital image became an integrated solution—camera and image processor—using a proprietary connection. While these solutions work quite well from a technical stand point, they are equally problematic in a competitive and global marketplace. As the market evolved to include many companies specializing in cameras, image capture, and image processing, the case was made that the best solutions may not always come from a single provider. Thus there is the need for standardization to ensure interoperability between devices and manufacturers.

The digital signal emanating from imaging devices (cameras, if you will) can be thought of as a bunch of zeros and ones waiting for capture (frame grabbers) and interpretation (processing). Enter the Camera Link® standard to bring order out of chaos. Camera Link® defines a very specific point-to-point solution for interoperability of vision components. Using prescribed connectors, cable sets, and specific pin assignments; Camera Link® allows cameras and frame grabbers from different manufacturers using the same chip set to interface and share information. This solution is very robust, and offers users

Camera Link® will remain relevant for years to come, but recognizing the limitations of the first digital interface standard, two new successors have been introduced—Camera Link HS™ sponsored by the AIA and CoaXPress™ sponsored by the JIJA. These new interfaces offer greater bandwidth and cable distances, but retain the commonality of requiring dedicated cabling and frame grabbers for image processing. Camera Link HS™ is unique in offering distances of 300 meters using fiber optics as the native physical layer.

Our most popular digital interface standard—GigE Vision®—supports network connectivity and “plug-n-play” capability for machine vision. It processes images using only software on a regular PC and an Ethernet® connection. Although there are other solutions on the market using Ethernet® connectivity, only GigE Vision® and its GenICam™ compliant XML files provides true “plug-n-play” interoperability of devices from multiple manufacturers designed for the machine vision market. The latest release—version 2.0—introduces new features as well as direct support for 10Gigabit systems. The standard continues to show its extensibility and works well at any Ethernet® speed connection and distances up to 100 meters.



GigE Vision Plugfest, Stuttgart, Germany 2011

a high quality configured signal over a defined but limited-length path.

Improvements and variations in the original Camera Link® standard have been introduced over time, and have been consolidated in the newest version 2.0 to the standard. These include a “mini” connector that reduces the footprint required of the 26-pin connector. Further in the support of miniaturization requirements, is Power over Camera Link (PoCL®)—the capability to provide power to the camera without the need for an additional cable and connector by using the Camera Link® cable to provide both the signal and the power. In cooperation with the Japan Industrial Imaging Association (JIJA), PoCL®-Lite was introduced, providing a new “entry level” digital interface capability featuring an even smaller format 14-pin connector. With the cooperation of the European Machine Vision Association (EMVA) and their GenICam™ standard, “plug-n-play” capability is now available with Camera Link®.

The newest digital interface interoperability standardization effort by the AIA is the new USB3 Vision™ standard expected for release in late 2012. This standard will combine the best features of both GigE Vision® and GenICam™ with the new capabilities of Super Speed USB 3.0 to provide significant improvement in bandwidth, albeit with the reduction in cable length.

In support of these interoperability standards, the AIA hosts “plugfests” around the world where vision engineers come together to test products with one another to assure that the devices and processing capabilities are indeed interoperable and compliant to the respective standards.

You can find more detail at www.visiononline.org. Click on “Vision Standards” to find all of these standards.

Sponsoring standardization activities is an important way that AIA serves the industry. Expect future announcements about other new and innovative standardization initiatives and product introductions.