GigE Vision – What it is

GigE Vision is a standard managed by the Automated Imaging Association that provides the vision industry with an open framework for transferring images and control signals between cameras and PCs over standard Gigabit Ethernet (GigE) connections. From day one, the GigE Vision framework was designed to support a range of different performance levels and feature sets. This approach was taken on purpose so that vendors would have room to innovate and differentiate their products, and vision system designers and integrators would have the broadest possible selection of compliant products with which to work.

GigE Vision Version 1.0, ratified in May 2006, has four main elements:

- Device Discovery, which defines how compliant devices such as cameras obtain IP addresses and are identified on the network;
- GVCP (GigE Vision Control Protocol), which defines how to specify stream channels and control and configure compliant devices;
- GVSP (GigE Vision Stream Protocol), which defines how images are packetized and provides mechanisms for cameras to send image data and other information to host computers; and
- An XML (extensible mark-up language) description file that provides the equivalent of a computer-readable datasheet of features in compliant devices. This file must be based on the schema defined by the EMVA's (European Machine Vision Association) GenICam™ standard and include the seven features in Table 1

In addition to these elements, GigE Vision includes standard feature naming conventions for recommended and optional features in GigE cameras beyond the mandatory seven.

Feature	Description
Width	Image width
Height	Image height
PixelFormat	Pixel format as defined in GVSP
PayloadSize	Number of bytes transfer-red for each image on the stream channel
AcquisitionMode	Manner in which images are sequenced from the camera
AcquisitionStart	Starts image acquisition in the specified mode
AcquisitionStop	Stops image acquisition in the specified mode

Table 1. Mandatory features in GigE Vision XML camera description file

GigE Vision – What it is NOT

Compliance with the GigE Vision standard means only that products follow a certain connectivity method. It is not a performance guarantee. Compliance does not, for example, mean that a product will operate reliably, recover from packet loss in the GigE connection, deliver deterministic real-time operation, or meet the precisely timed synchronization requirements of multi-element applications.

As with any other vision product, GigE Vision cameras and PC software must be assessed for reliability and quality of implementation.

GenICam

The GenICam initiative began in late 2004. Its primary goal is to provide a generic camera control interface for all camera types, regardless of the interface technology they use (i.e. GigE, Camera Link©, 1394 DCAM, etc.) or the features they implement.

The first version of GenICam, released by the European Machine Vision Association in September 2006, defines rules for how a generic XML camera description file must be formatted. The standard is supported by GenApi – a reference implementation of a dynamic API that uses the XML file to present camera parameters to end users or developers.

Many vision applications require access to features and capabilities not available through GenICam. For this reason, users may decide to use other camera control methods. The use of GenICam is NOT mandatory for compliance with GigE Vision.