

GenICam – a brief overview

Introduction

The introduction of GenICam offers great hope for developers who want to easily use and interchange a range of GenICam-compliant cameras, regardless of the interface technology, using a compliant application running on their PCs.

GenICam is relevant for three product categories:

- **Cameras**
- **Transport Layers**
- **Libraries**

Simply put, these product categories form a chain, in which image data is transported from the camera via Transport Layers (low-level software drivers or frame grabbers) to Libraries (or applications) running on a PC. In the other direction, control data can be sent from the PC to the camera, allowing users to adjust features and settings inside the camera. A key objective of GenICam is to allow users to control a wide range of cameras – GigE Vision, Camera Link, IEEE 1394 and USB – using the same application.

GenICam consists of three modules:

- **GenApi** – an XML description file format defining how to capture the features of a device and how to access and control these features in a standard way.
- **The GenICam Standard Features Naming Convention** – common naming convention for camera features, which promotes interoperability between products from different manufacturers;
and
- **GenTL** – Generic Transport Layer Interface, between software drivers and libraries, that transports the image data from the camera to the application running on a PC (*Not yet released*).

While GenApi and the Standard Features Naming Convention were included in version 1.0.1 of GenICam, the GenTL module is still under development. A final, production ready definition of a Generic Transport Layer Interface is still some time away. The GenICam committee is working toward approving the GenTL standard document in the second quarter of 2008.

The absence of GenTL today constitutes a challenge, as complete GenICam-compliant systems require a Transport Layer Interface to deliver images to the PC. As a result, many vendors have developed their own, proprietary, Transport Layer components, located “inside” their SDKs or software packages. This interim solution allows these vendors to offer complete, functioning systems to their customers – with full support for GenApi and the Standard Features Naming Convention – while GenTL is being developed.

Since the GenTL module is not yet available, the GenICam standard has been divided into two parts, with different levels of GenICam compliance. The two parts are:

- **GenICam** – available today
and
- **GenICam TL** – available when GenTL has been released

This document is a guide to understanding what constitutes GenICam compliance, and more specifically, the differences between GenICam-compliance and GenICam TL-compliance.



GenICam: The XML File and the GenApi

A product is considered GenICam-compliant if it:

- produces an XML file compatible with GenApi (GenICam Standard v. 1.0);
or
- consumes an XML file compatible with GenApi (GenICam Standard v. 1.0).

Examples of GenICam Producers include cameras and potentially frame grabbers.

Examples of GenICam Consumers include libraries and software packages (e.g. including a driver and a library).

The XML file presented by a GenICam Producer must include all the public features of the product it describes. Furthermore, it must follow the GenICam Standard Features Naming Convention, whenever applicable or possible, in order to be considered GenICam-compliant.

The result is that GenICam-compatible software packages can be used with any GenICam-compliant cameras, and GenICam-compatible devices can be used with any GenICam-compliant applications. This solution provides great flexibility for users designing a complete machine vision system.

GenICam TL: The Transport Layer Interface

A product is considered GenICam TL-compliant if it:

- produces a Transport Layer Interface compatible with GenTL

Examples of GenTL Producers include Transport Layer software drivers.

Examples of GenTL Consumers include software libraries and packages.

While Transport Layer consumers are not eligible to use the GenICam TL logo, they are eligible to use the standard GenICam logo.

The arrival of GenICam TL will provide end users with additional flexibility and the ability to mix and match components more freely in the system. For instance, GenICam-compliant cameras from Vendors A, B and C could be controlled by an application from Vendor D, where the default filter driver has been replaced with a high-performance driver from Vendor E.

Product	Logo
Cameras <ul style="list-style-type: none"> - Provides a GenICam XML file 	GEN<i>CAM
Driver <ul style="list-style-type: none"> - Provides software Transport Layer functionality for supported camera interfaces - Includes a GenTL interface (producer) 	GEN<i>CAM ^{TL}
Library <ul style="list-style-type: none"> - Library - Interprets GenICam XML files - Includes a GenTL interface (consumer) - Does not provide TL functionality 	GEN<i>CAM
SDK (Library + Driver) <ul style="list-style-type: none"> - Library - Interprets GenICam XML file - Provides software Transport Layer functionality for supported camera interfaces - Exposes a GenTL interface (producer and consumer) 	GEN<i>CAM ^{TL}
SDK (Library + Driver) <ul style="list-style-type: none"> - Library - Interprets GenICam XML file - Provides software Transport Layer functionality for supported camera interfaces - Does not expose a GenTL interface 	GEN<i>CAM
Camera <ul style="list-style-type: none"> - Does not provide a GenICam XML file 	none
Driver <ul style="list-style-type: none"> - Does not expose a GenTL interface 	none
SDK (Library + Driver) <ul style="list-style-type: none"> - Library - Does not interpret a GenICam XML files - Does not expose a GenTL interface 	none

"Nutritional Table", examples

"Plain Text version"

GenICam Version	1.0
GeniCam XML Producer	Yes
GeniCam XML Consumer	No
GenTL Producer	No
GenTL Consumer	Yes
Camera interface 1394	Yes
CameraLink	No
GEV	Version 1.0
USB	N/A

"Matrix version"

GEN<i>i>CAM	
VERSION	XML
1.0	Producer Consumer
GenTL	CAMERA INTERFACE
Producer Consumer	