GenICam Meeting Notes

Pilsen April 2008

Manuel Studer,
Leutron Vision

Additional notes from:
Francois Gobeil,
Pleora Technologies

Sascha Dorenbeck,
Stemmer

GeniCam Meeting Notes Index

Attendees

Company	Name
AIA	Jeff Fryman
AVT	Philipp Beyer
Basler	Thies Möller
Basler	Fritz Dierks
DALSA	Eric Carey
DALSA	Eric Bourbonnais
e2v	Frederic Devrière, e2v
e2v	Pascal Pellet
e2v	Yves Delzoppo
Euresys	Jean-Michel Wintgens
IDS	Carsten Bienek, IDS
JAI	Karsten Ingeman Christensen
Leutron Vision	Manuel Studer
Leutron Vision	Stefan Thommen
Leutron Vision	Jan Becvár
Matrox	Stephane Maurice
MVTec	Ivonne Puhlmann
MVTec	Christoph Zierl
MVTEC	Thomas Hopfner
NI	Eric Gross
Pleora	Francois Gobeil
Pleora	Vincent Rowley
Stemmer	Sascha Dorenbeck
Stemmer	Rupert Stelz
Toshiba TELI	Koichi Yamakawa

GenICam GenApi Meeting, day 1

Monday 7th April 2007
Marriott Hotel, Pilsen

Welcome – Jan Becvar

- Welcome Participants to rainy Pilsen ;-)
- Agenda review
- Homework review
    - Established list of members with voting rights
    - E2V is no more active member of GenICam and therefore did not finish/make homework
    - GenTL Windows-specific implementation document not needed anymore
    - IDS has a GenTL producer, MVTec has a GenTL consumer, Stemmer both
        - IDS has worked with Stemmer and MVTec to demonstrate/ensure interoperability
    - All marketing items closed, marked as completed
    - Some homework is going to be discussed within the meeting
- Stemmer proposed Mantis as homework-tracker.

GenApi Status/Testing Report – Jan Becvar

- Allow high degree of interoperability, create technology
- “Thought I knew it, but implementation was surprisingly painful and not straightforward”
- Unanswered questions on development, showed up some examples
    - SwissKnife example accessing NI node
    - XML loops, infinite recursion in GenApi
    - Variable names in SwissKnife expressions *need* to be uppercase but not documented
    - StructReg with overlapping bits, 63 bits limitation, IntSwissKnife, ReadReg on every bit
    - Happy path testing may not be enough
- The features are mostly not documented – GenICam members propose to look at the code of GenApi.
- A writer of a GenICam XML should not need to deal with GenApi code to find the answers to open questions.
- Need documentation for the interface between XML and reference implementation.
- Basler propose to publish such open questions within a Wiki structure.
- A good start would be to port the current documents to a Wiki.
- Wiki content could be compiled in a separate document – *a posterior* standard document?

- The information which is collected within the Wiki should then also be ported back to the official documentation (around once every half year).
- Everybody should provide a list of open questions/problem he had during implementation of GenApi. This would help to build up a consistent documentation.
- Need a list of “known restrictions”
- How could we test XML side of GenApi better?
- AllGenApiNodesTest.xml, example for GenICam newcomers, test-bed for pre-processor
- We should consider testing on a clean machine
- Default values don’t seem to be applied by the pre-processor
- The schema should serve two purposes
    - Define and enforce the standard
    - Help the developer
- Standard enforcement is not fulfilled right now
- Various proposals from Leutron on improving the schema
- There should be a beginner example available
- Schematron, supports errors and warnings
- Relax NG
- GenICam Documentation looks more like informal documentation than a standard text
- GenApi 1.1 released with known issues
- How do we proceed with open bugs which are fixed currently by using workarounds?
    - Better we use workarounds than breaking compatibility. So some features which where bugs (e.g. StructRegs) won’t be used within the next releases
- [ACTION] Build up Wiki
- [ACTION] Collect bugs/restrictions within the Wiki
- [ACTION] Report all Bugs to Mantis and provide list of new bug entries on mailinglist
- [ACTION] ReleaxNG

GenApi Status & New Features for version 1.2 – Fritz Dirks

Competition Law

- EU regulations force to take care about the “competition law”
- Group should avoid uniform behavior, privately sharing sensitive data
- EMVA requests to change voting period for changes to the standard text and schema to 30 days
    - This is against the current GenICam voting rules as currently changes can be made within a meeting.
    - An option would be to specify the date until a new change is valid 30 days after the decision made within the meeting.
    - [ACTION] Fritz makes a proposal to EMVA to change voting procedure

Mantis items

- Accepted on 2008-02-08

- All bugs should be officially reported, one bug per report please!
- Is a maintenance release required?
- `GetGenICamRootFolder()` don't user `getenv()` on Win32
- "*...operates only on the data structures accessible to the runtime library and not on the environment segment created for the process by the operating system*"
- 0000118 Deploy for Linux:
  - Licence prohibits public distribution of source code, need a way for distributing binaries.
  - As no one is using special compiler flags, we can agree to provide for Linux a TAR archive with the headers and binaries or a RPM/DEB package.
  - The binaries needs to be available for different platforms (x86, PPC, etc.).
- 0000054: Blob data up- and download
  - currently not synchronized with SFNC
- 0000053: Persisiting the Node Tree
  - [ACTION] Error management? A callback should be added, Francois to add it to Mantis
  - Property bag can (should) be replaced, it is mostly an example
  - `DeviceStreamingStart/Stop` not currently used
  - Features which may become RO or NA depending on the context
  - Default value of `IsStreamable` is false
  - [ACTION] NI to document what streamable means and explain persistence order
  - [ACTION] Iteration limit – Francois to add a proposal to Mantis
- Other open issues in v1.1: 20, 108, 111, 2, 99, 124, 110
  - Should we change schema v1.0 to fix problems – high risk for XML files
- 0000115: Use more than one schema version in parallel
  - Implementation ready
  - Linux/Win64 tests missing
  - Code not yet on CVS, Fritz to do a pre-release zip
  - Schema migration guide presented
  - Validation code supports schema 1.0 and 1.1, both are used as of now
- 0000103/0000117: Support Visual Studio
  - Makefile, Project, and Workspace Creator (MPC)?
  - [ACTION]: NI offers to maintain 7.1
- 0000125: Refine the definition of "backward compatibility" in the standard text
  - XML engine is optional, GenApi can be used without it
  - Without XML engine, can easily be compiled on light-weight embedded systems
  - About XML version number – when to increment what
- 0000120: Introduce an IScalar interface
  - `IFloatEx` could have a `StepUp()` and `StepDown()` methods

    - `IScalar` combines `IFloat` and `IInteger`, binds Raw and Abs concepts
    - Unit does not need to be defined
    - Implicit operators should not be used
    - Add optional extension to `IFloat`, when implemented `StepUp()` and `StepDown()` are available?
    - Aliases could be used to solve this problem
    - How is it possible to enumerate the possible/valid value range/item? StepUp/StepDown only supports the next near value.
    - [ACTION]: Move this discussion to SFNC
- 0000122: Allow MaskedIntReg to work on a Register
    - Get rid of the central cache – reduces reads/writes on masked register
    - Cache can be invalidated by “zapping” the port
- 0000123: Introduce Namespace “Both”
    - Namespace `Both`: `Custom` and `Std`. Could be introduced in order to deal with custom features becoming standard features
- 0000094: Detect cycles in the nodemap at load time
- Cycle breaker: write, read or call cycle – some dynamic, some at runtime
- Extending XML caching
    - Storing terminal nodes: first load would take longer but XML cache hits would be faster
    - Graph algorithms could help. Cycles could be identified with such algorithms
    - “Replicated” nodes could be tagged as such to provide a hint
    - Private/public key pair matching the MD5 of the XML to “prove” the XML has been validated. We could use a more thorough validation approach.
- pIndex/@pOffset, SwissKnife/Variable (constant), pDisplayName (for enumerations)
- Extend SwissKnife with formulas for Min/Max/Inc/AccessMode (optional)
- Implicit access mode adjustments by GenApi
- App <pCachable> to deal with self clearing flags in Auto-Features
- Manifest – will be covered in GigE Vision

JIIA

- New JIIA standard working group IIDC-WG
- Developing new camera control protocol for general use with no limitation of physical layer
- Looks like GenICam purpose/idea, reinvent the wheel?
- Register based, claimed that it should work with GenICam.
- Not very clear how it really works.
- [ACTION] EMVA need to contact them to find the dialog for possible cooperation. Maybe try to invite to GenICam conference.

Camera Link Protocol Driver DLL

- Strip down to three basic functions
  - ReadRegister
  - WriteRegister
  - GetDeviceName
- Small and simple interface
- Camera manufacturer would provide this library
- The DLL can be made state free thus simplifying implementation and test
- First GenTL needs to be finished before starting standardized CL control interface
- On CL the grabber and camera are totally independent not as consistent as a GEV/1394 camera.
- At least to have the most important features like for example shutter/gain/etc.
- How is the interaction between camera and frame grabber i.e. settings which needed to be set either on frame grabber or/and camera.
- Is it still needed as CL is already well implemented at most places?
- How is the general interest on side of camera manufacturers of implementing of such standard interface? Is there a majority available?
- [ACTION] Basler makes a proof of concept, providing a first implementation of such library.

Postponed topics

- Blackbox

Marketing Subcommittee Update – Vincent Rowley

- Four proposals for a GenTL logo. Not yet officially voted but the majority goes for proposal Nr. 4
- [ACTION] Post on mailinglist for approval
- GenICam one-pager completed, available online
- GenICam “nutritious facts” completed
- GenTL press release for Vision 2007 completed, available online
- Official name is now SFNC, Standard Naming Feature Convention
- Product registration
- Product Certification
  - Three proposals:
    - Outsource version: Independent 3th party company which make whole certification process
    - In-house version: Committee out of GenICam group which do all certification.
    - Status quo version: Self-verification
  - Matrox: What about doing something similar than GEV with Validator and internal Plugfests? Many features could be tested automatically.
  - Pleora: Plugfests are not deep enough. Mostly only basic interoperability is tested.

- Matrox: Propose that software providers like Matrox/MVTec/NI/Stemmer can make some extended tests out of their libraries to achieve best interoperability.
- Leutron: Propose to have some kind of compliancy matrix with minimal mandatory features out of GenApi/SNFC.
- Stemmer: Request to establish a quality level which can not be covered by a compliance tool.
- Should the validator be manufacturer independent?
- [DECISION] Marketing committee is not responsible for certification process, GenICam subcommittee cares about this.
- [ACTION] New subcommittee managed by Stephane Maurice which makes certification proposal.

GenICam GenTL Meeting, day 2

Tuesday 8th April 2007
Marriott Hotel, Pilsen

JIIA More Information about IIDC 2.x – Koichi Yamakawa

- No permission to distribute latest document
- Register based control
- Standard goes to be called IIDC 2.x
- Bus independent, separate camera feature control and bus control
- Reason why?
    - IIDC 1.3 has many unusable features
    - Respects backward compatibility
- Directory based
- One CSR (control status register) to one feature. Merge inquire, status and control. Categorize register types.
- CSR structure is directory based
    - Blocks are identified by key codes
        - Category key + feature key. The codes are fix documented.
        - Each CSR has a XML file. This leads in many XML files per camera.
    - Claim that blocks are fixed at dynamic address. Features are available within fix offsets within a block but the address of the block may have dynamic address.
- Main reason is due “GenICam is too complex”
- “Hope that it connects to GenICam/GEV”

GenTL Status of Implementations – Rupert Stelz

- Mostly copy & paste typos
- No functional change
- Matrox/Pleora have concern regarding interoperability because only MVTec, STEMMER and IDS had a successful test
- Interoperability over multiple Transport Layers
    - No more internal threads/etc.
    - Interface is completely platform independent
- The goal is to pass the current version for release. All new changes will go to 1.1
    - Enables companies to start implementation
    - Release vote includes
        - Standard text
        - Mandatory features (GEV)
        - Basic C-Interface (header files)
    - No requirements are released yet. Requirements would go to 1.1

    - Should be precise enough to make a compatible implementation of consumer and producers
    - Vote is planned to be on the current document without the requirements in about one month via the Mailing-List
- Every company is welcomed to make new implementation of producer/consumers

GenTL Draft Review

- [Leutron] 1.3.2 should be deleted
- Ending of the dynamic library stays cti
- Add cti to the acronym table
- [Pleora] 2.2.1 FG1/ 2.2.2 FG2
    - Clarify that multiple transport layer technologies are allowed per system and thus remove the recommendation in 2.2.1. Still each interface is required to be of one TL technology
- [Leutron] 3. Module enumeration & instantiating
    - No reference counting on producers.
    - May give some inconsistency for information propagation
    - Is it needed to have the feature for opening the handle multiple times?
    - The advantage is convenience only
    - Multiple consumers in one process could get in conflict
    - [DECISION] Prohibit multiple open on producers. On 2nd open the module returns the “busy”-Error code.
- [Dalsa] 3.2
    - Clarify the issue between the convenience MAC address for retrieval and the unique ID of a module. Perhaps use “convenience name” instead of “name” and add the function to retrieve the ID
- [Leutron] 3.4:
    - Prohibiting unique name change may not always be enforceable Must stay in between session: for a frame grabber this reference is to the physical fg port
    - Might be alleviated by the introduced CL Port from Basler
    - The purpose of the unique ID to address always the same camera/port. If one is changing the camera on the frame grabber this needs to be reconfigured.
- [Pleora] Schema versioning
    - GenTL should reference the schema version supported
- [Pleora] 2.1.1 A GenTL Producer should not be referred to as a library
- XML Versioning
    - Two schema versions on camera. Host may not yet understand new schema version.
    - How can the schema version be determined on current GEV 1.0 versions?

    - [DECISION]: Append the schema version to the URL with some delimiter in between.
        - Consumers gets a list of fully qualified URL Strings including the appended schema version
        - Example: `Local:Filename;A000;7B8?SchemaVersion=1.0`
- GenTL naming convention:
    - Producer is always a “driver”
    - Consumer is always a “library”
- [Leutron] The “length” in a XML-URL reports always the real length (not aligned)
- [Leutron] 4.1.2 Local URL: the length field is the actual length and not the aligned one
- [Leutron] 4.2.1: Event type EventFlush, DSFlushQueue is not clear EventFlush function “also” buffers are discarded.
- [Leutron] 4.2.1: Feature Invalidate: Not clear how to reference the node map
  There is an ambiguity between TLDevice and Device: Only allow that event for a Device module so that this command only refers to the remote device’s node map
- [IDS] CBI1: Text has been fixed in current document already
- [IDS] CBI2: Text has been fixed in current document already
- [Leutron] 6. GCReadPort change DWORD into four-byte aligned. (Search and Replace in document)
- [IDS] 6.5 EVENT_NEW_BUFFER must be renamed to EVENT_NEW_BUFFER_DATA to avoid name clash in C interface
- Chapter 6
    - Inconsistency in using the names of Producers/Consumers
    - [ACTION] Jan provides a List
- [Leutron] 7.
    - Nobody uses UVC
    - UVC is kept as a place-holder but not specified further
- [Matrox] 7.1.1: TL prefix should be renamed to Sys or System
    - TL refers to the C interface and thus stays fixed.
- [Matrox/Leutron] TLType “none” can be misleading, “Mix” may be better
- [Matrox] InterfaceUpdateList is per design readable to allow polling.
    - Currently it is optional. Need for having it mandatory?
    - In general it makes sense to allow polling depending on the device type
    - [ACTION] Go through all features and re-think about optional read access
- [Matrox] s5 7.3: CL part will be removed from the official 1.0 document
- [Matrox] Naming consitency for IFType, better InterfaceType
- [NI] GevSubnetIPAddress can be misleading but makes sense due to strict naming conventions with prefixes.
- [Matrox] GevMACAddress is not consistent with other MAC Address definitions.

- [ACTION] General definition/naming clarification
- [Leutron] DeviceAccessStatus: When another application has exclusive access to the device, name it as “Not Accessible”.
- [IDS] DeviceInfoAccessMode: Reference to DEVICE_ACCESS_FLAGS must match with the feature status.
- [Leutron] table 7-5 and 7-7 the TLType is referring to interface instead of e.g. device
- [Leutron] Name of the StreamAnnouncedBufferMinimum to be changed StreamAnnouncedBufferMinimumCount
- [Leutron]: change the wording of when a command is readable Call returns immediately but the action is performed asynchronously
- Starter Framework for GenTL
    - Transport Layer Simulator
    - Dummy memory images

GenTL Roadmap

- Stemmer expect to have it released/voted until mid of june
- Plugfest / Remote tests

GenICam Python Extension – Francois Gobeil

- Current GenICam roadmap leads to binaries on camera
    - Glue DLL/CL DLL
    - XML would no longer be enough
- Afraid of ending up with Win32 GenICam Devices
- Remove some of GenICam current limitations
- Python
    - Easy, Powerful and Fast
    - Compatible Licence for GenICam
    - Tricky formating
    - Maybe too powerful
- Other possibilities: LUA, Perl, Ruby, etc.
- Not a replace for GenICam, extension only
- Scripting fully portable
- Only used in non-time-critical path and therefore performance is not as important
- Easy setup: One dll or static lib
- Definition
    - Portable scripted modules
    - Can contain standard interface functions or just about any number of support functions.
- Applications
    - Camera Link extension
- Improve MathParser: Less cryptic, full support of different data types (including string)
- PyBlackBox

    - Defined Read/Write operations
    - Complex node type
    - Acceptable performance
    - Increased XML complexity
- Keep main XML goal alive
- Interface stays the same
- Improves dynamic behavior
- First proof of concept finished
- Validate Performance and pre-identified use-cases
- Roadmap: Planned to have it available within next big release 1.2? 2.0?

GenICam SFNC Meeting, day 3

Wednesday 9th April 2007
Marriott Hotel, Pilsen

SFNC Status Update & Review – Stephane Maurice

- [Basler] File access feature were added.
- DeviceMaxThroughput was changed to IInteger
- Corrected error in Ch.2 for AcquisitionFrame/lineRateAbs to make them IInteger
    - Make a note that ch. 7 is the reference in case of difference
- Corrected 2 mentions of ExposureDuration which is replaced with ExposureTimeAbs and Raw
- Correction of an inconsistency with the numbers that maps to AcquisitionTransferStart/End(0x14/0x15) and FrameTransferStart/End(0x5/0x6)
    - Remove the numbers in EventSelector for event and the mapping to GEV. Put the GEV event defines instead. What about other standard?
    - Define in section 2.6, the name for floating node that maps to the value of the event on the transport layer (e.g. GEV/IIDC/etc.). This name would map to the name in the enumeration in the event table. With a prefix. We should provide an example of how to retrieve the number. This will be in SFNC 1.2.
- Change in pixel format from RGB to COLOR as this will be done in the next Gev spec.
    - Remove pixel format section completely as it will be published from the GEV (a small public part). This will avoid duplication.
- CL features inclusion in the SFNC
    - This will cover the camera side of the problem (i.e. no glue).
    - This includes the DLL for GenICam features translation to CL serial dll.
    - This might cover a proposal to retrieve the XML
    - [ACTION] Basler makes a first prototype/proof of concept based on the current CL SFNC proposal.
- Visibility. Do we include them as given by Carsten and reviewed by Vincent?
    - Add the visibility. Add a note that visibility is recommended (not mandatory).
- LUT and Shading correction features proposal
    - 2 new features: Selector for direct or shadow access + LUT activate feature.
    - [ACTION] Matrox is doing a proposal which will be posted on the mailing list
- SensorPixelClockRaw
    - Accepted: Sensor clock or digitization clock per tap or channel?

    - [ACTION] Proposal to come (see Proposal of Vincent to start).
- DeviceTemperaturSelector
- ColorCorrection
    - Color conversion, coefficient should be described in 1-1, 2-2,etc. transformation instead or correction.
    - Additional Matrix for offset: Add an Y and X selector.
    - [ACTION] Fully specify the color correction feature
- Request to add TLParamsLocked, Device port, Root category and other “standard” subcategories corresponding with individual SFNC sections to SFNC
    - Device (Visibility, Do not apply). TLParamLocked stay IInteger and must be under the root
    - Add the note that everything except the port must be accessible to the user.
    - Section names (Vincent review) should be the same as SFNC sections names and level should be at the same visibility level as the minimal in that section. Level should be the biggest one (but not mandatory, probably all recommended)
    - Root should have mandatory visibility of beginner.
    - Category visibility is the lower one in the category
- Propose to remove Abs/Raw feature.
    - Replace them with unique feature and have a converter
    - Wait for IScalar, everyone should then re-try
    - Can be discussed within a next meeting when it is more clear about how it is working with IScalar.
- Should we highly recommend the usage of “one” based features (e.g. Line1, Line2, etc.) vs. “zero” based
    - Keep current status as is.

SFNC Template and Validation – Stephane Maurice

- Us e the SFNC as starting point for machine readable SFNC and pass it to the Schematron generator and reference XML
- Handle by a GenICam XML validation small group for a proposal
- [ACTION] Matrox: Script to convert SFNC to machine readable format
- [ACTION] Leutron: Scripts to produce XML template and Schematron file
- [ACTION] Improve descriptions in chapter two, so that they can be used in the template document - Who?

SFNC Error mechanism – Stephane Maurice

- No error mechanism is required since existing mechanism are OK.

SFNC Feature Locking – Stephane Maurice

- Handle the lock of streaming when Acquisition is in progress
- [ACTION] Leutron makes proposal and post it on the mailinglist

GenICam Meeting Wrap up – Jan Becvar

- Update homework list
- Next meeting will be in Montreal at Matrox by end of October
- Fritz offers himself to join a JIIA meeting to make a presentation about GEV and GenICam.