

## GenICam Suzhou Meeting Minutes – 2019-03-25/26

1. *Welcome and Introduction (Bozhon & Fritz Dierks, Basler)*
2. *Agenda Review (Fritz Dierks, Basler)*
3. *Homework Status/Voting Members (Fritz Dierks, Basler)*
  - Allied Vision – GenTL Validation Framework, GenTL Certification, Embedded
  - Basler – GenICam 3.2, Embedded, VS 2017 support
  - Baumer – GenTL Producer Framework
  - BitFlow – CLProtocol
  - MATRIX VISION – GenICam 3.2, PFNC
  - Matrox – SFNC 2.5, GenDC, PFNC
  - MVTec – GenDC SFNC, GenTL Producer Framework, Administration
  - NI – PCLint
  - Pleora – PFNC image generator
  - SICK – GenDC SFNC
  - Silicon Software – Processing Results, GenICam/OPC UA
  - STEMMER IMAGING – C-Bindings, Python bindings, GenCP, GenTL
  - Teledyne DALSA – GenICam device validation
4. *Chair Election (led by Bob McCurrach, AIA)*
  - Election of Chair and Vice-Chairs for next 3-years period 2019-2022
  - Elected (unanimously and each without any objection):
    - Fritz Dierks from Basler as chair of the GenICam Standard Group
    - Stéphane Maurice from Matrox Imaging as vice-chair (SFNC)
    - Rupert Stelz from STEMMER IMAGING as vice-chair (GenTL)
    - Christoph Zierl from MVTec Software as vice-chair (Marketing&Operations)
5. *GenApi (Fritz Dierks, Basler)*
  - GenApi reference implementation v3.2
    - #2063, #2064, #2065: Fix errors reported by sanitizer tools
      - Done
    - #1956: Merged \_dev Branches
      - #1946, #1951, #1739, #1618: done
      - #1881, #1823, #1593, #1991: in progress (HOMEWORK!)
      - Release candidate planned soon within Q2/2019
  - GenApi (new) tickets
    - #2050: Crash loading feature set
      - Windows -> Linux issue
    - #2055: Add virtual destructors for IFirmware\* interfaces
    - #2056: Problems with statical linking
    - #2062: Don't deregister callbacks while they are firing

- Fix by documentation
- PCLint for GenICam (Katie Ensign, NI)
  - Enable Linting in CMakeLists.txt as a prebuild step
  - Does it affect the build system? May need additional Python modules.
- Python Bindings (Kazunari Kudo, STEMMER IMAGING)
  - Requirements:
    - Python 3.4 – 3.7
    - 64-bit versions of Linux, macOS & Windows
  - Included in GenICam build system
  - Easy install and distribution
  - Add new Trac component for Python bindings
- ProcessingResults Handling (Andreas Beyer, Silicon Software)
  - Current state
    - No semantics for arbitrary data structures
  - Benefit of standardization
    - Producer <-> Consumer
    - Embedded devices
    - Interfacing with OPC-UA
  - “Extended chunk description” enabling complex data within chunk
    - Use ChunkParser to decode it on host side
  - Examples: ConfidenceFloat, BlobData
  - Basic principles:
    - Categories describe structure
    - Collections are formed by nested Categories
    - Selectors indicate that the category holds iterable content
  - Naming conventions:
    - Structure buffer as you like
    - Describe structure in category “ProcessingResults” which is a feature of “DeviceControl”
    - Announce presence “ProcessingResults”-Chunk as feature of “ChunkSelector”
  - Next steps
    - Extension of ChunkSelector
    - Protected category name
    - Standardized terminology for frequently used data elements
- GenApi C-Bindings (Sascha Dorenbeck, STEMMER IMAGING)
  - Use cases
    - Stable ABI
    - Enable dynamic loading (DLL/so)
    - Enable “stacking” (use different GenApi versions in one process, make “glue” possible)
  - Current state
    - Merging into trunk is in progress
    - Completed NodeMap features (incl. polling, loading/saving, chunks, events)
    - Completed node features

- Future steps
    - Better integrate with C++ GenApi
    - Header-only C++ Wrapper
    - Review current state
- GenICam Device Validation (Eric Bourbonnais, Teledyne DALSA)
  - GigE Vision TC would like to validate GenICam compliancy as USB3 Vision does within the U3V certification tool
  - What would be needed?
    - New requirements for GenICam compliancy
    - Certification code to test the requirements
    - Then, GEV spec could make it mandatory to be GenICam compliant
  - GEV requirements for GenAPI-related compliancy
    - MUST include a “Root” node with an ICategory interface. It MUST also be marked as standard.
    - MUST include a “TLParamsLocked” with an IInteger interface. This node MUST NOT be streamable. It MUST also be marked as standard.
    - MUST include a “Device” node with an IDevice interface. This node MUST NOT be streamable. It MUST also be marked as standard.
    - Readable features MUST be valid.
    - Readable features MUST stay valid when related nodes are changes (in particular selectors).
    - When a Feature is readable and writable, it MUST be possible to write back the current node value. This does not apply to nodes with an ICommand interface.
    - Swissknives equations MUST be properly formed.
    - Non-features nodes MUST NOT be marked as streamable.
    - Streamable features MUST accept and correct invalid values when the validation option is false
    - All features that require persistence MUST be marked as streamable.
  - GEV requirements for SFNC-related compliancy
    - SFNC features MUST be marked as standard.
    - Standard features MUST use the interface specified in SFNC.
    - Standard features names and enumeration entries names MUST be defined in a SFNC specification.
    - Non-features nodes MUST NOT be marked as standard with the exception of the “Device” port.
    - Non-standard features MUST NOT include standard enumeration entries.
    - Standard features “DeviceRegisterStreamingStart” and “DeviceRegisterStreamingEnd” MUST be present when at least one feature is streamable.
  - GEV requirements for GenDC-related compliancy are part of GenDC spec
  - GenICam Device Validation
    - Source in GenICam repository
    - Tested with Camera Link

- Based on Python bindings
- Virtual SFNC device
- Conclusion:
  - Adopt new requirements (as part of GenICam procedures)
  - Release tests for device validation (tag in SVN)
- Working Group needed
  - At least 4 companies
  - Also: Test and feedback on dev branch!
- Transition period for introducing, in particular also in case of new TL version!

#### 6. *GenICam for Embedded (Werner Feith, Euresys & Thomas Lück, Allied Vision)*

- Status from EMVA IEVIS (Industrial Embedded Vision Interface Standard)
  - Started efforts to define modules within kernel mode using media control framework
  - GenTL producer as main kernel to user interface
  - Communication with MIPI about membership
- Three layers:
  - User layer: GenICam
  - Kernel layer: Enable easy adaption of embedded boards
  - Hardware layer: Enhancing SLVS-EC /MIPI CSI-2.0-PHY
- Next steps:
  - Communication with V4L group
  - Collaboration with MIPI group
  - Alignment on name for the standard
  - White paper about concepts and goals

#### 7. *GenICam for Embedded – GenTL to V4L Adapter (Fritz Dierks, Basler)*

- Two use cases
  - Video System – ISP on Camera Module
  - Video System – Using Processor's ISP
- Emulating V4L/gstreamer from GenTL
  - Need for a GenTL to V4L converter
  - Also useful for GEV and U3V
- First experiments with prototype
  - Start GenTL-V4L bridge with V4L loopback together with camera GenTL Producer
  - Use e.g. vlc or gstreamer to see the live images
- Next steps
  - Bind standard V4L parameters to GenTL
  - Handle more than one device
  - Zero copy using DMAbuf
  - Start/stop capturing

#### 8. *GenICam & OPC Vision (Ralf Lay, Silicon Software)*

- Idea: Combine classical GenICam components with IoT / Industry 4.0
  - Factory layer

- Application layer
  - Device layer
- First step: Allow direct access to the camera by a generic OPC-UA server
- Proof of concept based on on GenTL/Python/Harvester and FreeOPCUA
  - Successful connection between OPC-UA and GenICam
  - Several limitations related to used OPC-UA server
- Proposal: Combine efforts with the VDMA OPC Vision core working group
  - See OPC Vision session on Thursday, March 28<sup>th</sup> during IVSM 2019 Suzhou

#### 9. GenTL (*Rupert Stelz, STEMMER IMAGING*)

- GenTL v1.6
  - Stacked info function
    - DSGetBufferInfoStacked
    - DSGetBufferPartInfoStacked
  - Release is planned until the next IVSM meeting in October 2019
- GenDC support
  - Wording: buffer, subbuffer/segments and composites
    - Segments, transported on flows
    - Flow sets, transported on streams
  - Flowset/composite buffer
    - Flow information should be available to the Producer via bootstrap, otherwise Producer must provide nodemap features
  - Re-use existing functions (automatic split into segments if needed):
    - DSAnnounceBuffer
    - DSAllocAndAnnounceBuffer
  - New function:
    - DSAnnounceCompositeBuffer
    - Additional functions to inquire number of flows/segments
  - New payload format for GenDC
  - Support of early processing should be possible, but not planned for v1.6 release
- GenTL Validation Framework (Tom Kirchner, Allied Vision)
  - Cleanup of sources
  - Refinement of release process, see #2057
  - Integration of certification, see #2058
    - Test result as a self-enclosed certificate using given key pair
    - Integrate the core functions into the existing interface
  - Integration of external tests, see #2059
    - Add custom test suites easily
    - More flexible test suite interface
  - Resolve the UI state, see #2060
- GenTL Producer Framework (Roman Moie, MVTec)
  - Prepare v2.0
    - Release candidate is ready, announcement on mailing list soon
    - Some weeks review/testing period
    - Then start ballot

- New tickets for future releases v2.1 or v3.0
  - #1889 (expose buffer nodemap)
  - #1988 (introduce GenTL Core mode allowing direct stream control)
  - Still open tickets: #1891, #1893, #1928, #2071, #2072, #2073

10. *GenTL SFNC (Mattias Johannesson, SICK)*

- Already agreed proposals for v1.2
  - Clarify events (#1305)
  - PacketSize renegotiation (#1942)
  - Feature persistence (#1985)
- Tracking more suggestions for v1.2, see #1750
- Release v1.2 planned after GenTL v1.6 update (GenDC)
  - Event NewBufferData
  - Support of GenTL flows/segments (GenDC)

11. *GenCP (Rupert Stelz, STEMMER IMAGING)*

- GenCP 1.3 just released
  - Stacked read/write commands and acknowledges
  - Clarification about the meaning of existing DeviceVersion register
  - Minor changes

12. *PFNC (Uwe Hagmaier, MATRIX VISION)*

- PFNC v2.3 just released
  - DataX formats
  - Several new DataX Pixel formats
- Polarizer pixel formats
  - Fully/partly- or non-self-describing?
  - Problem: Lots of pixel formats
  - Proposal (for PFNC 2.4 with additional new polarizer values)
    - Keep it self-describing
    - List used angles as part of the PFNC format name once and refer to by index, e.g., POLARIZED\_0\_45\_90\_135\_xxxx (e.g., xxxx = 2130 as indices to 0, 45, 90, 135)
    - Fully describe the matrix in case of color+polarized, e.g., POLARIZED\_CFA\_0\_45\_90\_135\_xxxxxxxxxxxxxxxxxx\_yyyyyyyyyyyyyyy (e.g., xxxxxxxxxxxxxxxxxxxx=2121303021213030\_RRGRRGGGGBBGBB)
    - For square filter patterns with width=height keep CFA notation POLARIZED\_CFA\_xxxx
    - Short-form color filter would also be possible for standard cases, e.g., POLARIZED\_CFA\_0\_45\_90\_135\_2130\_RGGB  
Is this sufficient for the moment? Start HOMEWORK ticket
  - Support of polarizer pixel formats should be the “last complex pixel format” covered by PFNC as it is today
  - Start working group to discuss future complex data types, in particular supporting hyperspectral sensors

### 13. GenDC (Stephane Maurice, Matrox Imaging)

- GenDC v1.0 released in December 2018
- First prototypical implementation with GEV server and also GenTL Producer Framework already successful
- Some new clarifications, in particular regarding the requirements
- Further Clarifications needed
  - Flow table endianness
  - Handling of GenDC metadata Components including GenICam Chunk in a container
- Addition of XML Metadata needed
  - Support fully self-described chunk data in a Container

### 14. SFNC (Stephane Maurice, Matrox Imaging)

- SFNC 2.5 Draft1 already available
- GenDC related features
  - Add value "GenDC" for feature TestPayloadFormatMode
  - ComponentIdValue (predefined value for all known component types)
  - New feature GroupIdValue
  - New feature GenDCDescriptor (IRegister)
  - New feature GenDCFlowMappingTable (IRegister)
  - New feature GenDCStreamingMode
    - Vote 6:4 for value "Automatic" instead of "Mixed"
  - New feature GenDCStreamingStatus
    - GenDCStreamingStatus (Off, On)
  - Open issue: Define ways to identify conditional mandatory features
- Clarify SFNC model for components with different resolutions
- Release Candidate available soon

### 15. Marketing & Operations (Christoph Zierl, MVTec)

- Update on membership: 15 new member companies since last meeting
- Currently 13 contributing members, see above
- Roadmap
  - Planned updated content of next GenICam Package Release end of Q2/2019
    - GenICam reference implementation 3.2 (in progress)
    - GenApi Standard 2.1.1
    - SFNC 2.5 (start ballot right after meeting)
    - PFNC 2.3
    - GenTL 1.5
    - GenTL Producer Framework 2.0 (not included in public download) (in progress)
    - GenTL Validation Framework 1.5.x (not included in public download)
    - GenCP 1.3
    - GenDC 1.0
    - CLProtocol 1.2
    - License 1.7 (in progress)

- [www.genicam.org](http://www.genicam.org)
  - Minor changes
  - Regular updates on “News” page
- New homework packages:
  - Publish official GenICam introduction based on new CVSM training presentations
  - Create first version of a GenICam FAQ
  - Explain the standard(s) and its compliancy rules on a separate web page
- Clarification of rules for distributing GenICam runtime/SDK files (Chendra Hadi Suryanto, Omron Sentech)
  - Users are confused with GenICam license information files
    - Different meaning of the terms Development/Runtime
    - Suggestion: Update text in License\_ReadMe.txt
    - Rename official Windows download files like the Linux ones
    - Make clear that GenICam\_License\_yyyymmdd.pdf must be included when distributing the reference implementation
  - New homework ticket to actually integrate the proposed changes

*16. Homework session (Fritz Dierks, Basler)*

- Go through homework list/items
- Next meeting:
  - 2019, October 7-8, hosted by Lakesight in Stresa, Italy