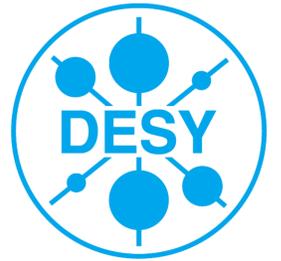


STATUS, RECENT DEVELOPMENTS AND PERSPECTIVE OF TINE-POWERED VIDEO SYSTEM, RELEASE 3.

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Abstract

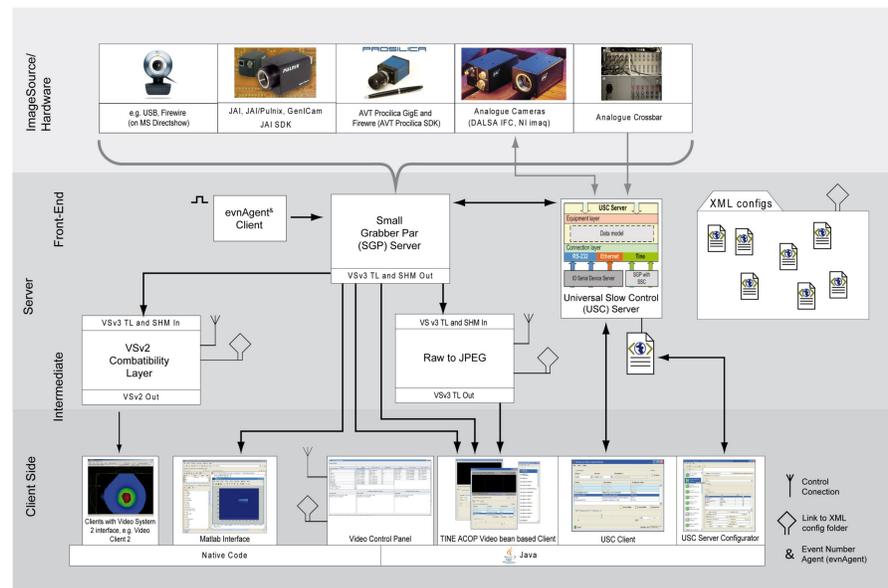
Experience has shown that imaging software and hardware installations at accelerator facilities needs to be changed, adapted and updated on a semi-permanent basis. On this premise the component-based core architecture of Video System 3 was founded. In design and implementation, emphasis was, is, and will be put on flexibility, performance, low latency, modularity, interoperability, use of open source, ease of use as well as reuse, good documentation and multi-platform capability. In the past year, a milestone was reached as Video System 3 entered production-level at PITZ, HASYLAB and PETRA III. Since then, development path has been more strongly influenced by production-level experience and customer feedback. In this contribution, we describe the current status, layout, recent developments and perspective of the Video System. Focus will be put on integration of recording and playback of video sequences to Archive/DAQ, a standalone installation of the Video System on a notebook as well as experiences running on Windows 7-64bit. In addition, new client-side multi-platform GUI/application developments using Java are about to hit the surface. Last but not least it must be mentioned that although the implementation of Release 3 is integrated into the TINE control system*, it is modular enough so that integration into other control systems can be considered.

Facts:

- Flexible image source interface, focused to Prosilica and JAI Gigabit Ethernet cameras
- Raw grayscale images up to 16 bits per pixel
- Raw colour images (RGB24)
- Integrated JPEG (also grey)
- Focused to Gigabit Ethernet, GigE Vision, GENiCAM cameras
- Loss-less acquisition, transport and analysis
- High-bandwidth (tens of megabytes per second)
- Low latency (tens of milliseconds range)
- Image data type, integrated in TINE
- Up to 30 frames per second are easily achievable
- Lightweight SHM for video stream
- Multicasting of video
- Interface to Matlab
- XML configuration files
- Integrated Universal Slow Control solution (a pretty good show on its own)
- Platform-independent source code easy to port
- Client-side mainly Java

* <http://tine.desy.de>

Collection of Components



Acronyms

- VSv3** Video System 3
- VSv2** Video System 2
- TINE** Three-fold Integrated Networking Environment
- TL** Transport Layer
- USC** Universal Slow Control
- ACOP** Advanced Component Oriented Programming Interface
- SHM** Shared Memory

Image source

Any device with 2d matrix data which is updated at regular intervals can be integrated.

- GENiCAM - compatible cameras
- Allied Vision Tech. Prosilica GigE
- JAI and JAI/Pulnix GigE
- Devices supported by MS DirectShow
- Analogue cameras via
 - Dalsa PCVision card
 - National Instruments IMAQ
 - ...

Server-side

- Component-based design
- Well-defined structure
- XML configuration files
- TINE remote control interface, high-bandwidth low-latency video transport

- Front-end stream acquisition, image pre-processing, fill in metadata, generic source code base

- Transcoding raw to JPEG stream

- Slow control server for e.g. gain, shutter speed, focused but not limited to camera control

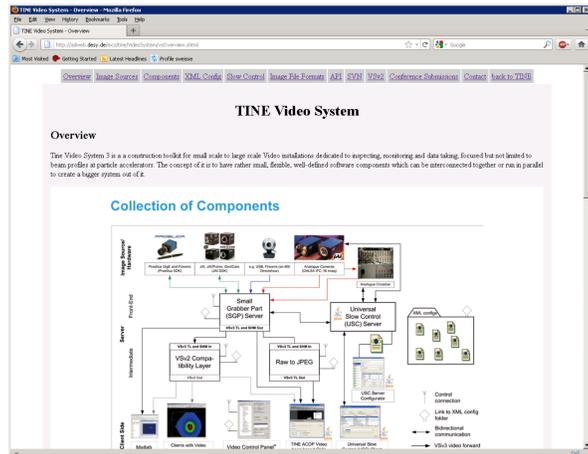
- Multicasting of general event number, attach it to newly acquired images

Client-side

- Many TINE ACOP Video Bean-based GUIs
- Universal Slow Control Client
- Video Client 3

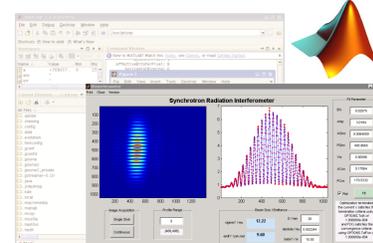
- Measurement wizards
- Matlab interface
- Legacy Video System 2 clients

Recent Developments: Documentation Website



Matlab

VSv3 to Matlab interface has been extended and is used enthusiastically by the physicists. Our aim is to provide the user with a wide range of tools on any necessary platform, so that one is able to use its favorite working environment.



As development cycle regarding the Matlab interfaces is maturing and the physicists are providing feedback, more external functions can be expected to be implemented.

On Notebook

Some local installations on notebooks have been used, primarily at REGAE and CTA.

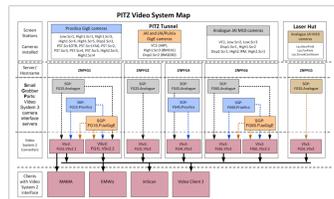
Server as well as client applications can be run on the notebook locally. A local Ethernet interface is used to connect a GigE camera. As a bonus, the software was set up in such way that if a network connection to a site-network exists, video system components located therein can be accessed if necessary. First installation on Windows 7/64 notebook has been completed.



CTA notebook equipped with Windows 7/64 bit running VSv3 and matured VSv2 applications together

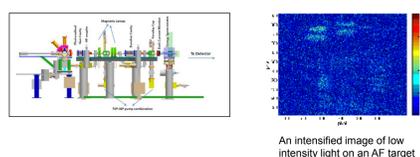
Applicability at PITZ

- FEL linear accelerator
- Studying and conditioning e-gun and photo injector
- Test facility



- Video system is set up in a heterogeneous way
- Various types of cameras coexist next to each other
- Snapshot-triggered by central timing (10 Hz)
- Matlab interfaces growing

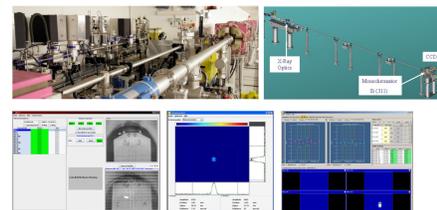
REGAE



An intensified image of low intensity light on an AF target

PETRA III

- Provides infrastructure at PETRA III for user experiments further downstream

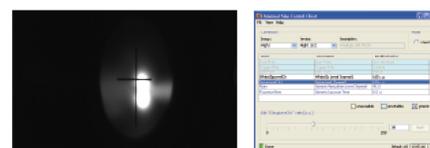
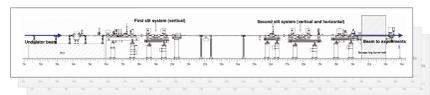


- VSv2 legacy installations upgraded to VSv3
- To reduce bandwidth, additional JPEG feed has been introduced
- A synchrotron radiation interferometer commissioned
- Diagnostics beam-line upgraded to JAI BM141 camera
- Custom-built rich Java clients
- integrated Java video image analysis*

* made by Cosylab in co-operation

HASYLAB

- High brilliance synchrotron light source, controlled by expert operators
- Feeds user experiments with high brilliance beam
- User facility



- Installation at client-side of Petra III has constantly been extended
- Video stream and control of about 90 cameras running in parallel at slow non-triggered update rates
- Prosilica GigE cameras
- Server-side distributed across three server hosts running XP Pro

EMBL Hamburg

In the past, the European Molecular Biology Laboratory (EMBL) Hamburg has used the Video System 2 (VSv2) for sample changer monitoring and control to great satisfaction. As step by step EMBL user beam-lines are commissioned at PETRA III, VSv3 components are available to be installed there.

Perspective

- Replace still existing Release 2 technology
- Camera Profiles
- Windows 7/64-bit
- Introduce more Release 3 APIs (C/C++, Matlab)
- Work towards easier set-up, maintenance and use
- Linux
- SGP/Andor iXon