

Library for IMage Acquisition

- Overview
- HowTo: e.g. Pilatus detector
- What next?
- LIMA for MCA?



- ☺ UK
- ☺ US
- ☺ SP



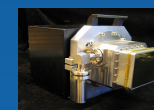
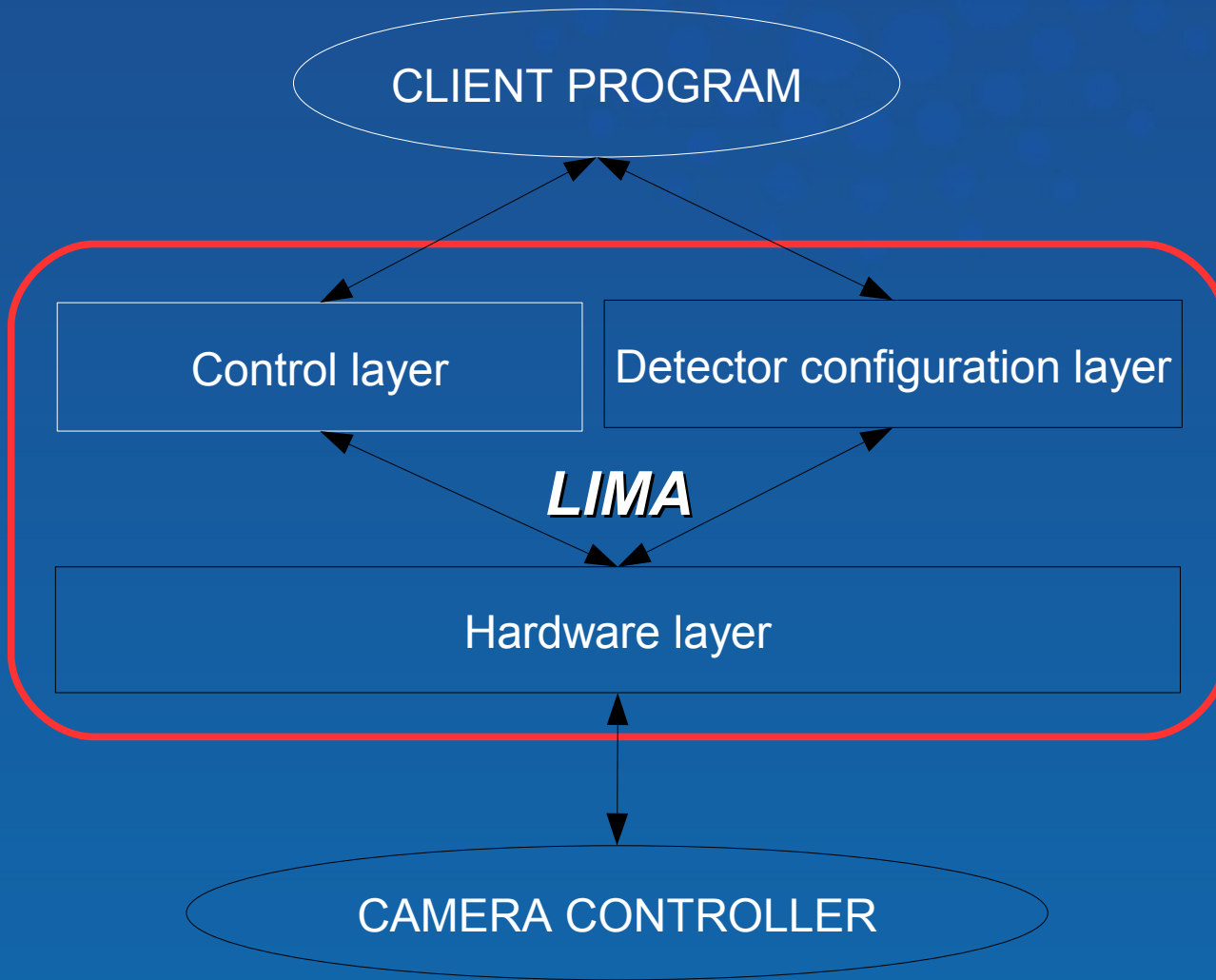
- ☺ UK
- ☺ US

LImA Overview

- Unified control of 2D detectors
- Separate hardware specific code from common software configuration and features
- Standard acquisition control:
 - Exposure
 - Triggering
 - File saving
 - Image processing

Project started in April 2009

LImA Overview



The Core

Control library

- Detector information
- Acquisition: commands + parameters
- Image parameters
- File Saving
- Software operations: image, counter, monitor, visualisation
- Callback framework: Acquisition ending, Saving, post-processing

Process library (ProcessLib)

- Software operations: Flip,Roi,Bin, BPM, Reconstruction
- Internal uses from Control library
- External use for extra image treatments

Hardware Interface

- **Virtual Class Library**

- DetInfoCtrlObj: Type, Model, PixelSize, AreaSize ...
- SynchCtrlObj: Triggering, Acquisition parameters
- BufferCtrlObj: Accessing the acquired images

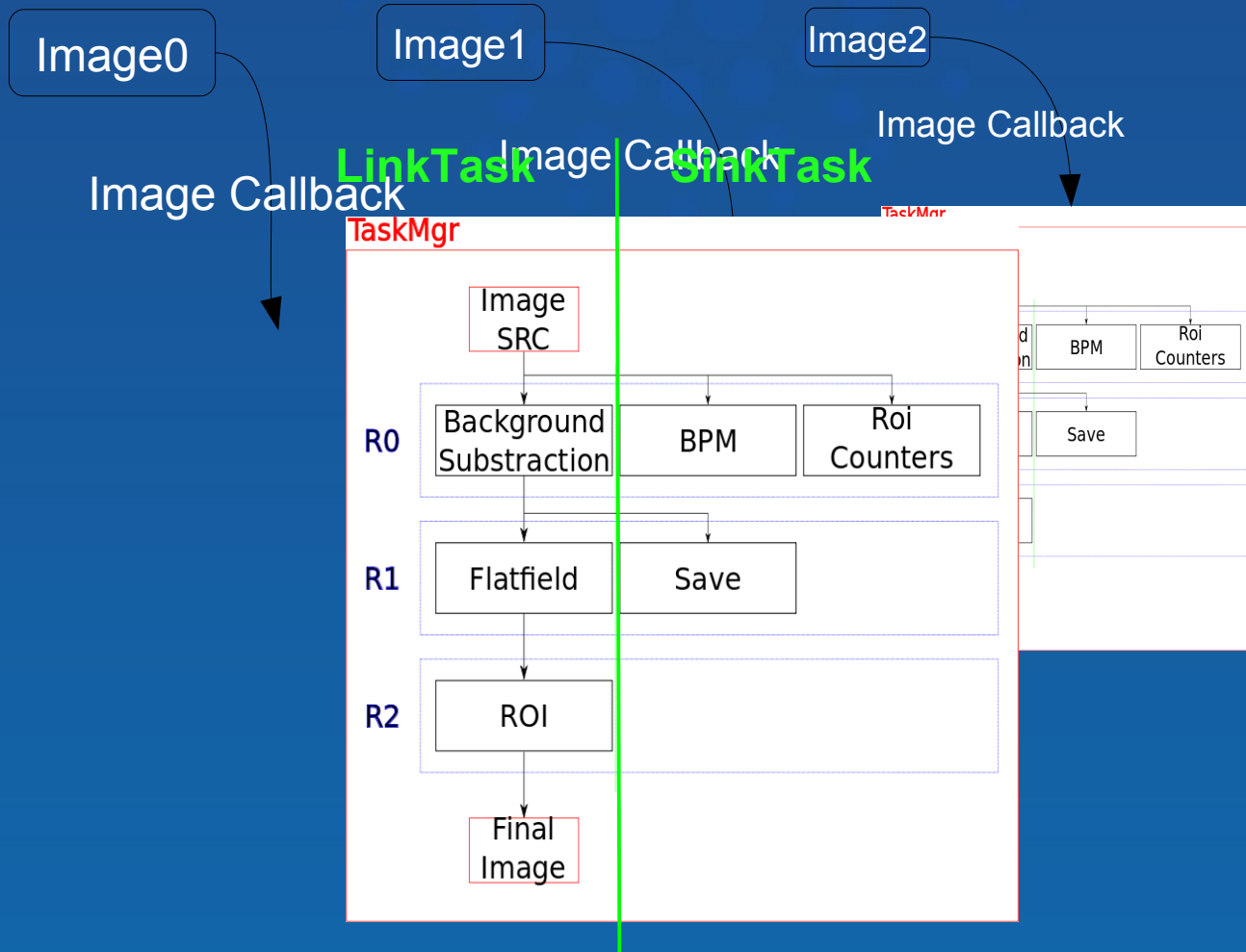
- **Utility Library**

- BufferManagerCtrlObj: implementation of software buffer
- ThreadUtils, StreamUtils, Exception and Debug classes
- Simulator class

ProcessLib

- Dedicated post processing library for 2D camera.
(Flip,ROI,reconstruction, FF,bkg...)
- Thread Pool: parallel tasks
- Easy to use and contribute
- Routine capitalisation

ProcessLib / TaskMgr



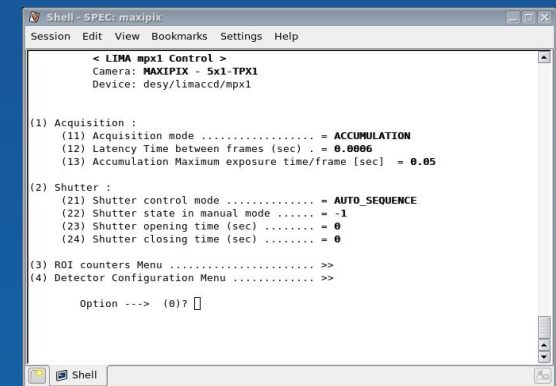
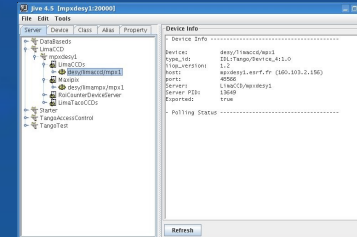
Applications

- TANGO device server
 - Common device: LimaCCD class
 - Camera device: for configuration
 - Taco like device: backward compatibility

- SPEC macros
 - Taco + Tango devices

- C++/Python code (CtrlSystem-less)

- Simulator test code



How To interface a camera?

HowTo: e.g. Pilatus HwInterface

class DetInfoCtrlObj(Core.HwDetInfoCtrlObj) :

```

•getPixelSize()
•getCameraType()
•...
    
```

Conf.
Files

class SyncCtrlObj(Core.SyncCtrlObj) :

```

•setTriggerMode()
•setExposureTime()
•prepareAcq()
•...
    
```

class Communication() :

```

•Connect()
•Set_gain()
•Set_exposure()
•...
    
```

socket



Images

class BufferCtrlObj(Core.BufferCtrlObj) :

```

•registerFrameCallback()
•getLastAcquiredFrame()
•...
    
```

disk

HowTo: e.g. Pilatus HwInterface

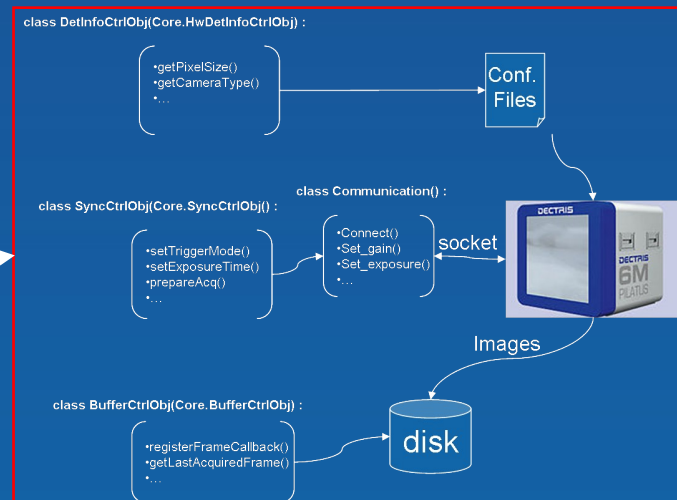
class CtControl() :

- CtControl(HwInterface *)
- acquisition()
- image()
- buffer()
- shutter()
- saving()
- ...

Callbacks

class Interface(Core.HwInterface) :

- getCapList()
- prepareAcq()
- startAcq()
- ...



HowTo: e.g. Pilatus HwInterface

```
From Lima import Core
From Lima.Pilatus import Interface

pilatusInterface = Interface.Interface()
control = Core.CtControl(pilatusInterface)

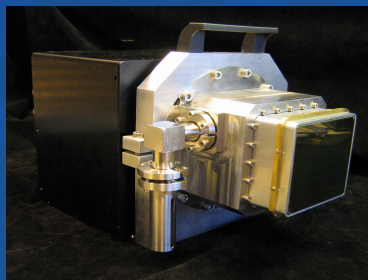
acq = control.acquisition()
acq.setExposureTime(0.1)
acq.setNbFrames(10)
acq.prepareAcq()
acq.startAcq()
```

Status Today ?

Supported detectors

- CCDs

- Frelon (ESRF)



- Pixels

- Maxipix (ESRF)
- Pilatus (ESRF)



- Cmos

- Basler: Scout, Pilot (SOLEIL)



Lima repository

- `git://forge.epn-campus.eu/Lima`

- Master:

- Core

- Camera

- Frelon

- Maxipix

- Espia

- Applications

- Tango

- Submodules:

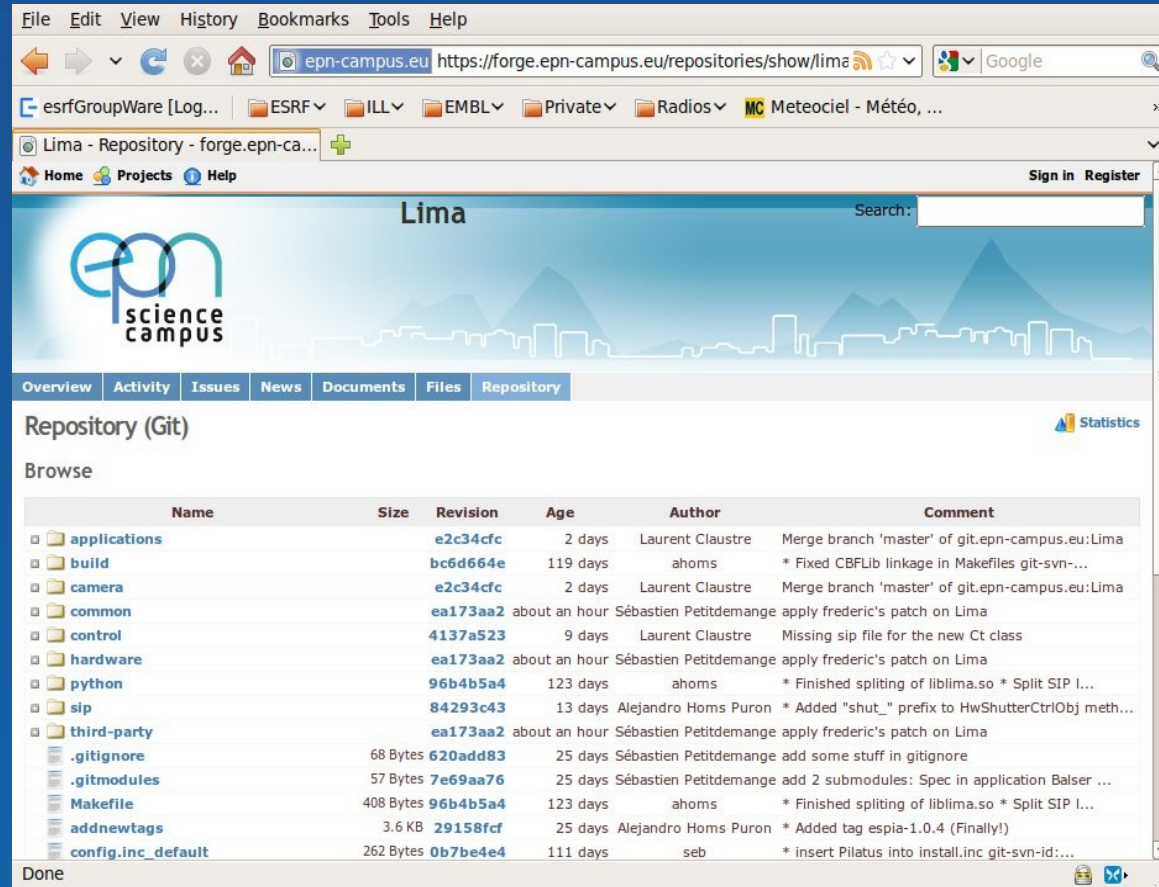
- ProcessLib

- Sps

- CBFlib

- LimaSpec

- Basler



The screenshot shows a web browser window with the URL `https://forge.epn-campus.eu/repositories/show/lima`. The page title is "Lima" and it features the "epn science campus" logo. Below the navigation tabs, there is a "Repository (Git)" section with a "Browse" view. A table lists the repository contents:

Name	Size	Revision	Age	Author	Comment
applications		e2c34fc	2 days	Laurent Claustre	Merge branch 'master' of git.epn-campus.eu:Lima
build		bc6d664e	119 days	ahoms	* Fixed CBFlib linkage in Makefiles git-svn-...
camera		e2c34fc	2 days	Laurent Claustre	Merge branch 'master' of git.epn-campus.eu:Lima
common		ea173aa2	about an hour	Sébastien Petitdemange	apply frederic's patch on Lima
control		4137a523	9 days	Laurent Claustre	Missing sip file for the new Ct class
hardware		ea173aa2	about an hour	Sébastien Petitdemange	apply frederic's patch on Lima
python		96b4b5a4	123 days	ahoms	* Finished splitting of liblima.so * Split SIP I...
sip		84293c43	13 days	Alejandro Homs Puron	* Added "shut_" prefix to HwShutterCtrlObj meth...
third-party		ea173aa2	about an hour	Sébastien Petitdemange	apply frederic's patch on Lima
.gitignore	68 Bytes	620add83	25 days	Sébastien Petitdemange	add some stuff in gitignore
.gitmodules	57 Bytes	7e69aa76	25 days	Sébastien Petitdemange	add 2 submodules: Spec in application Balsers ...
Makefile	408 Bytes	96b4b5a4	123 days	ahoms	* Finished splitting of liblima.so * Split SIP I...
addnewtags	3.6 KB	29158fcf	25 days	Alejandro Homs Puron	* Added tag espia-1.0.4 (Finally!)
config.inc_default	262 Bytes	0b7b4e4	111 days	seb	* insert Pilatus into install.inc git-svn-id:...

Plan for 2011

- License: GPL
- Documentation
 - Doxygen: → Reference Guide
 - User's Guide + Tutorial
 - MediaWiki → epn-campus.eu
- Windows porting: to be use
- Format: HDF5, NexusSoleil
- Cameras:
 - ESRF → PCO 2K, Dimax(win), Andor (win), Prosilica, Basler ACE
 - SOLEIL → marCCD, XPAD
- Video interface specification (streaming?)
- ProcessLib enhancement: IBA, Spatial distortion correction...
- Common **Tango** interface: mono-device Vs multi-devices
- New contributors !



Lima like for MCA?

- Today
 - Canberra
 - Rontec
 - Vantec
 - XIA XMAP
 - Dectris Mythen
- 2 interface definitions :
 - MCA Canberra like interface
 - MCA XIA interface
- TACO only
- No code sharing for software operations

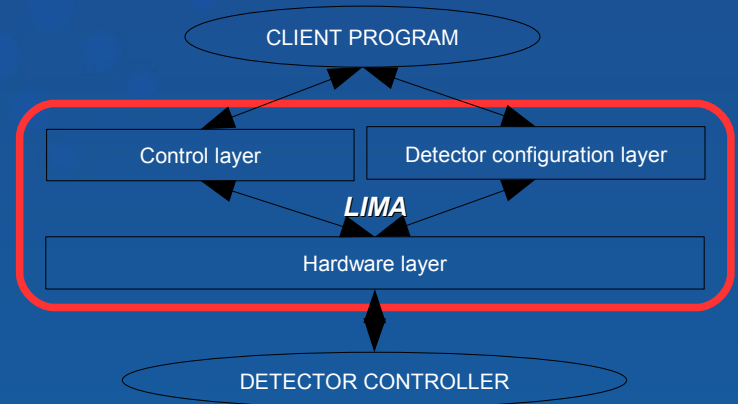
Lima like for 1D detectors?

- Reuse LIMA model

- Hdw Interface
- Control
- Configuration

- Common software operation library:

- Saving (1D, 2D, 3D?)
- Buffer Manager
- ROI
- Life/real time correction
- Other data operation ...



Thanks

- To developpers & contributors
 - ESRF : Alejandro Homs, Sebastien Petitdemange, Emmanuel Papillon
 - SOLEIL: Alain Buteau, Florent Langlois, Arafat Noureddine

- for your attention !