



**MARTINO FERRARI**

on behalf of

**BE-BI-SW**

# **CHALLENGES AND CONSTRAINTS FOR BI/SW**

16.10.2014

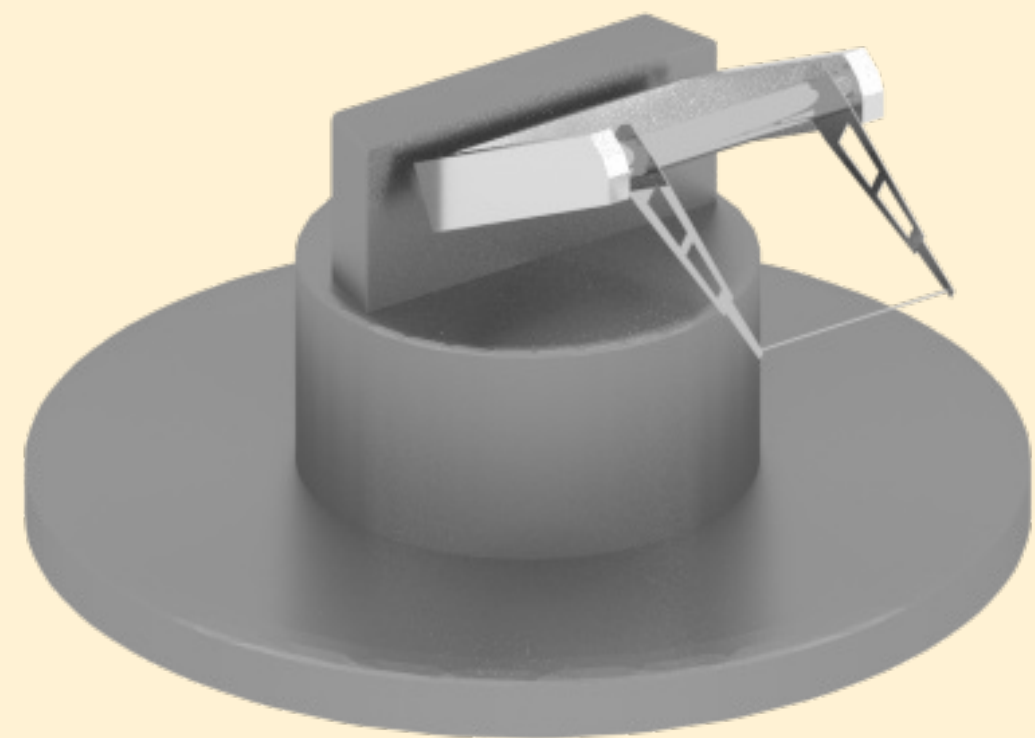
**BI DAY**

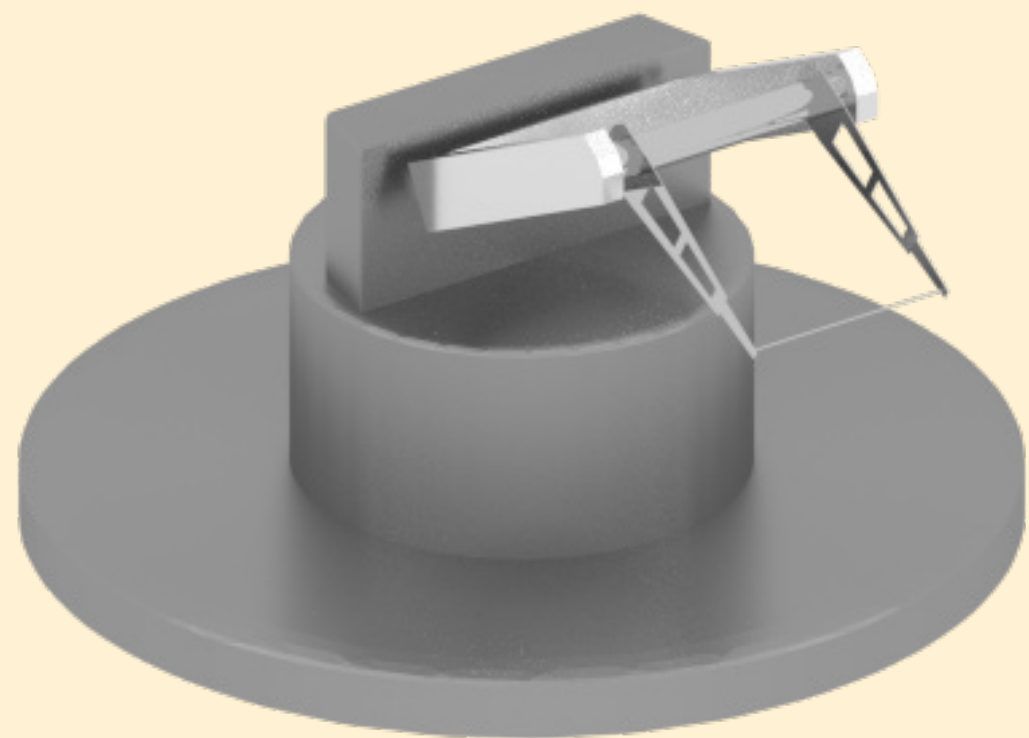
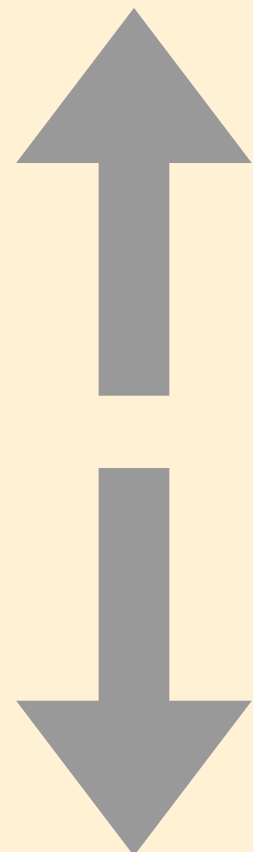
# OUTLINE

1. Who we are
2. Accelerator Control System overview
3. What we do
  - 3.1. Custom board and driver
  - 3.2. Front End Computer
  - 3.3. FESA overview
  - 3.4. FESA development
  - 3.5. Expert applications and other tools
4. Constraints
5. Conclusions



# WHO WE ARE



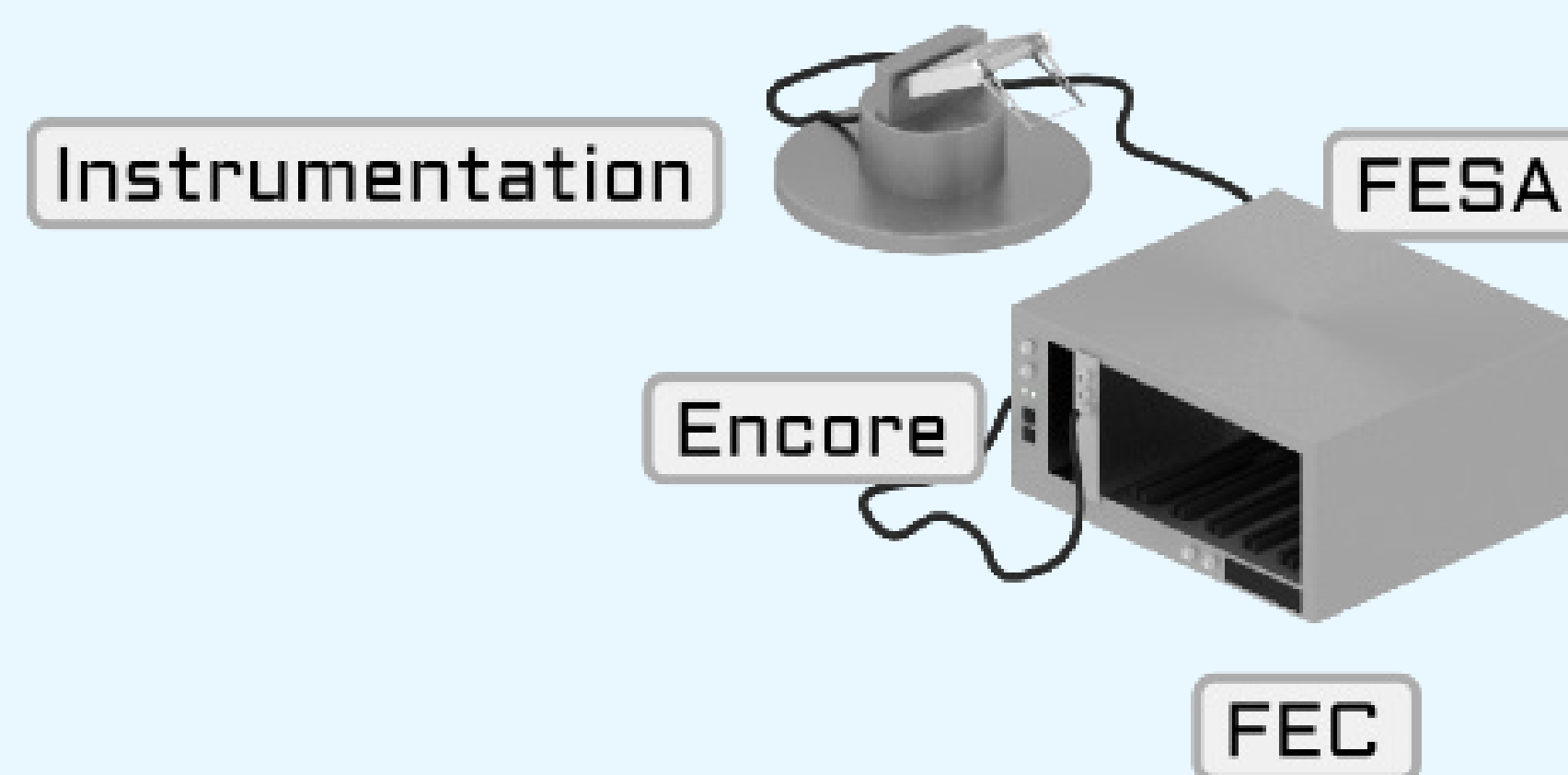


## WHO WE ARE

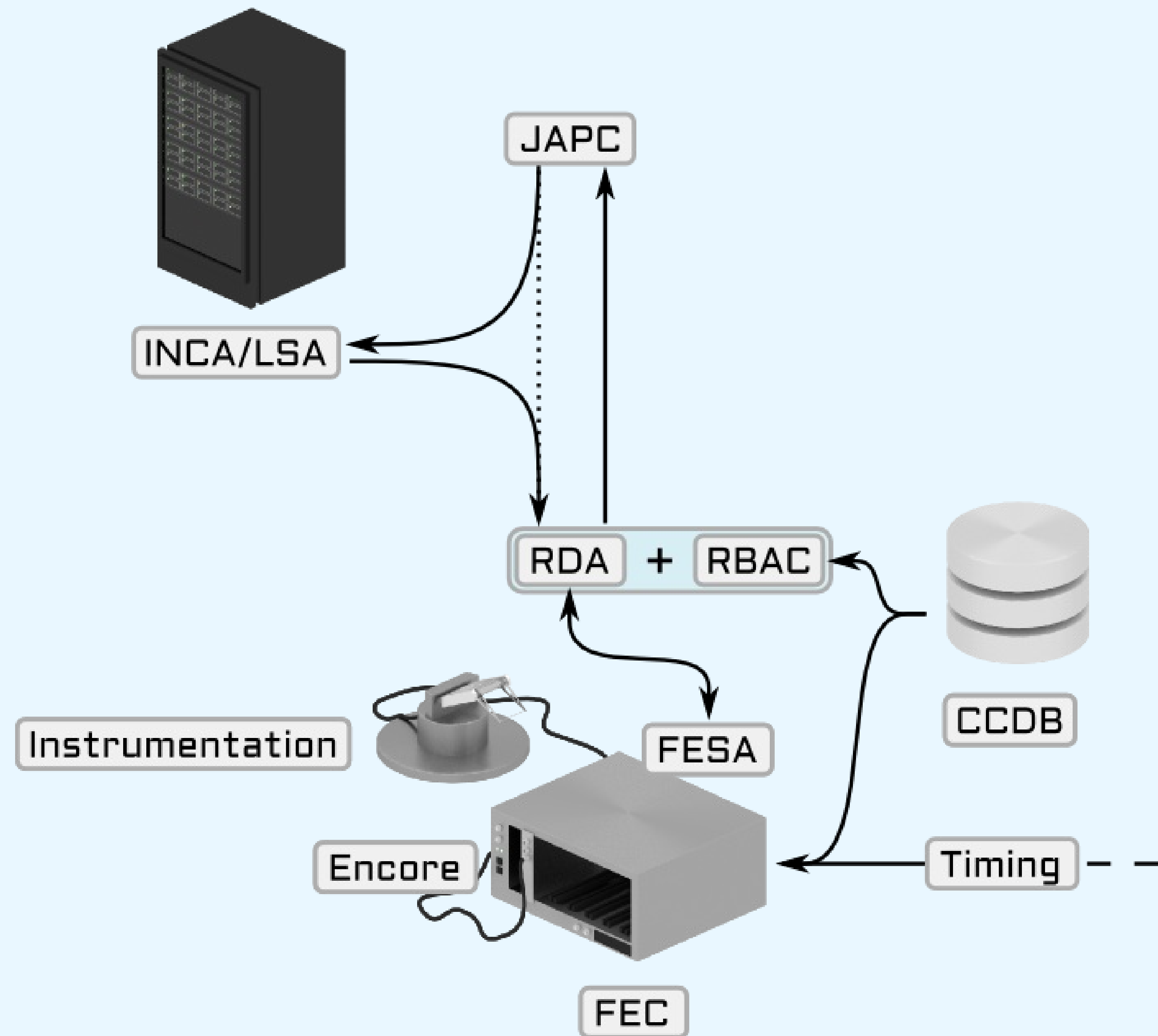
The **BE-BI Software Section** provides all the software necessary to develop, test, diagnose and maintain the different instruments produced by the Group.

We provide tools to allow other people to work (operators/hardware experts)

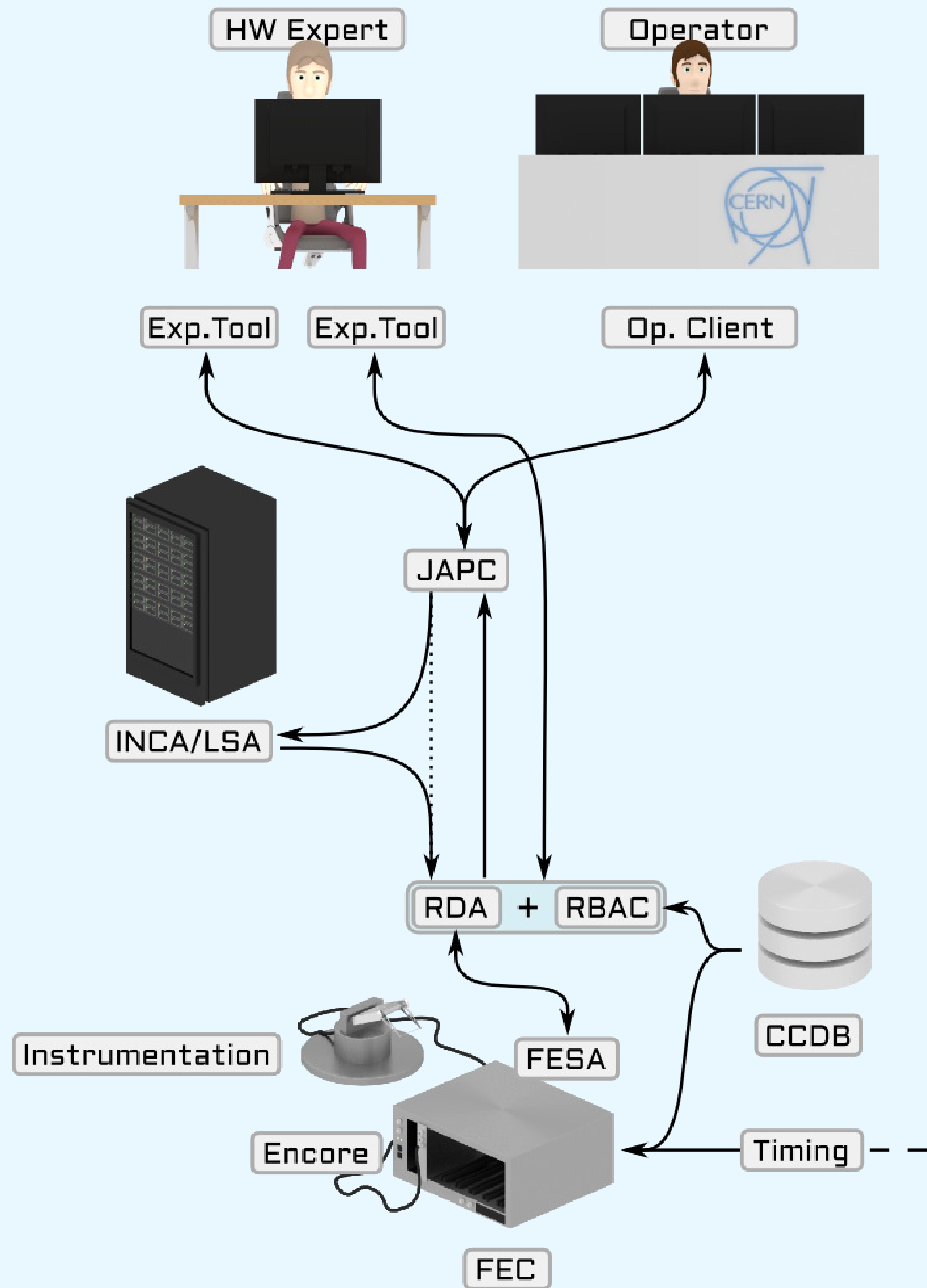
# ACCELERATOR CONTROL SYSTEM



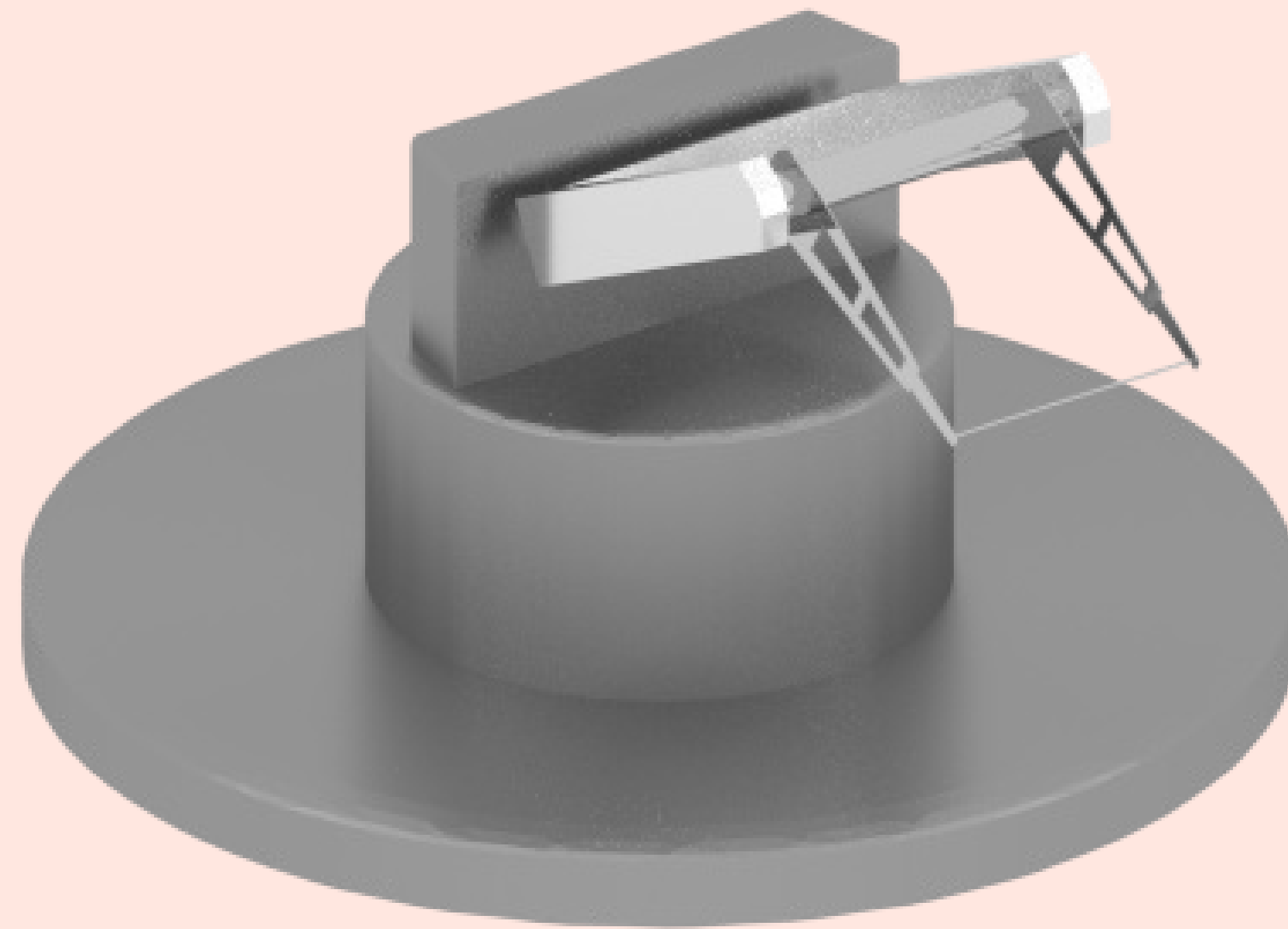
# ACCELERATOR CONTROL SYSTEM



# ACCELERATOR CONTROL SYSTEM

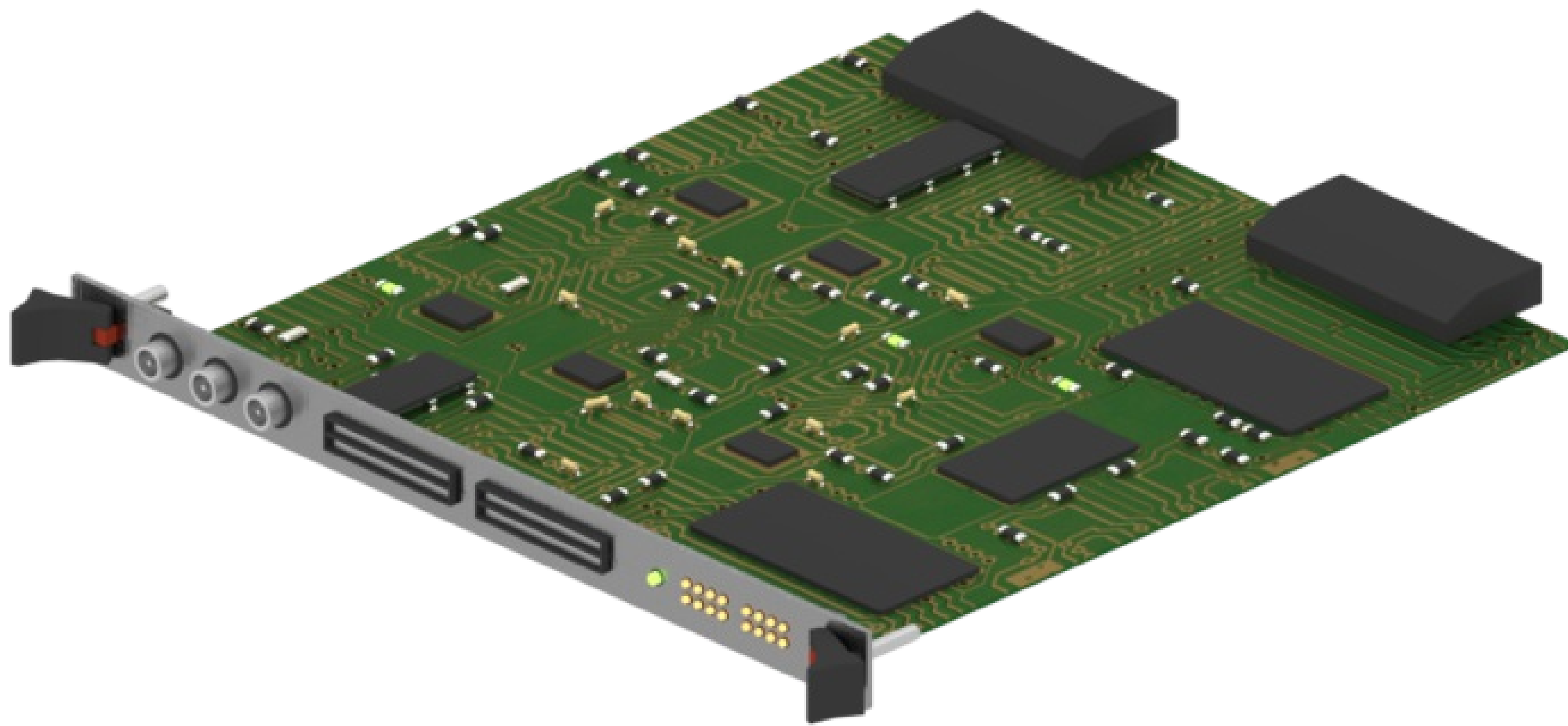


# WHAT WE DO

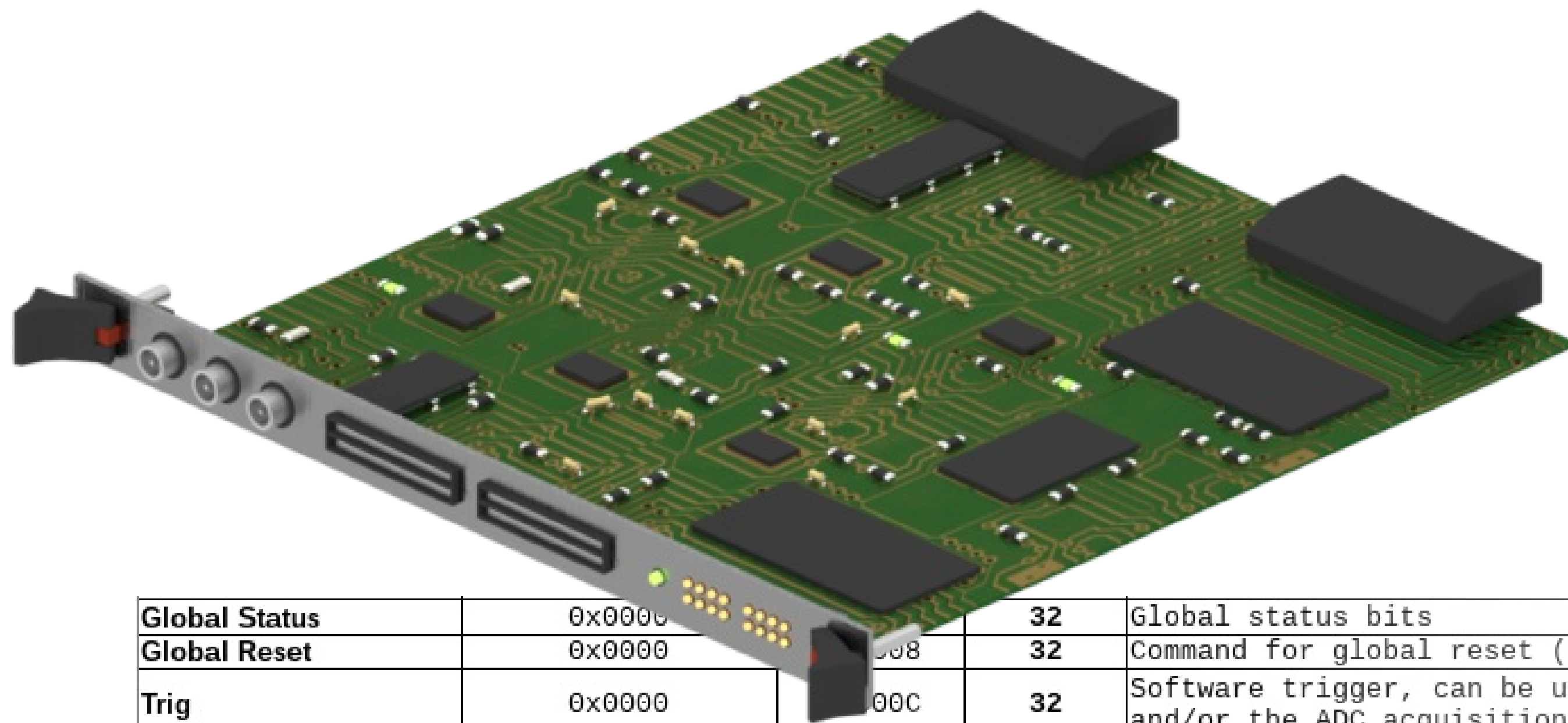




# A CUSTOM BOARD AND ITS DRIVER



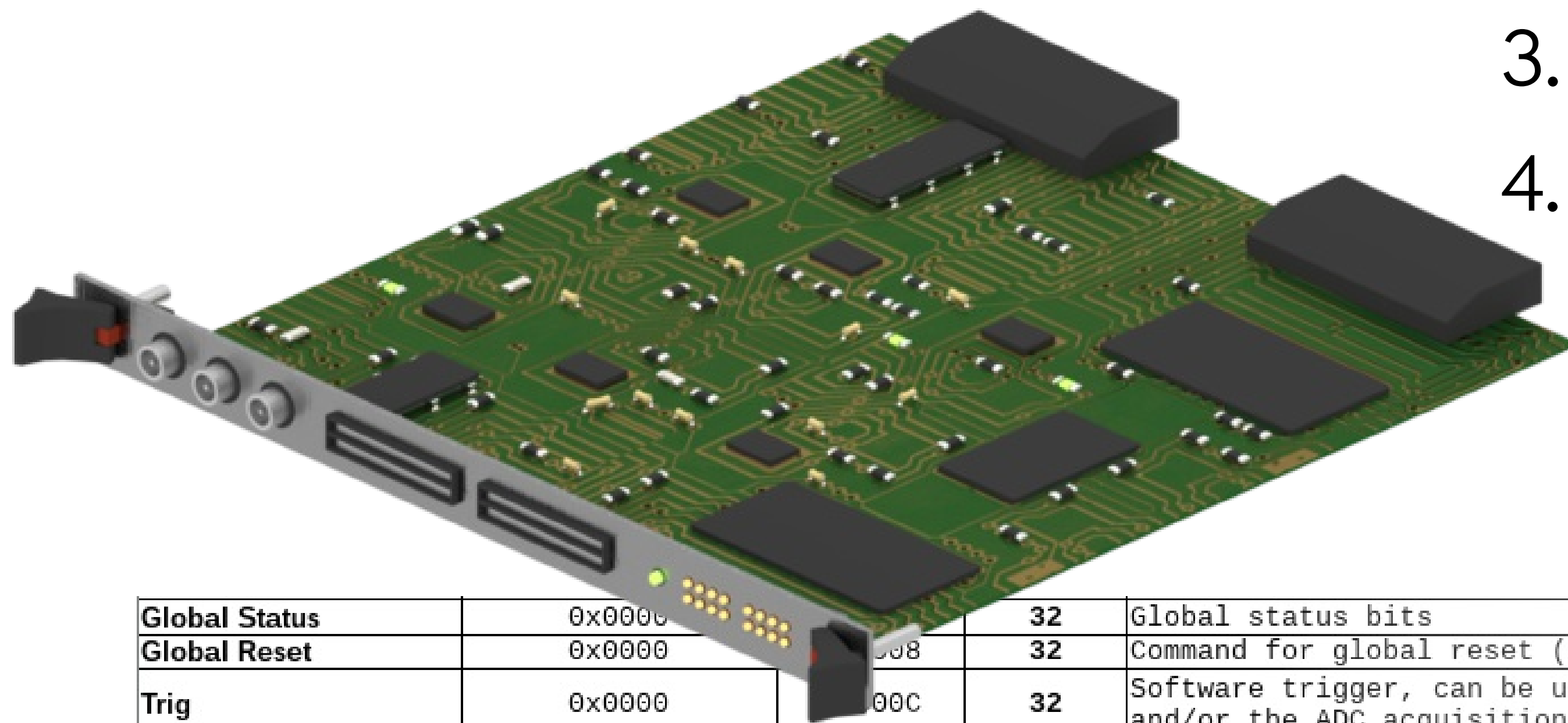
# A CUSTOM BOARD AND ITS DRIVER



<b>Global Status</b>	0x0000	0x0008	32	Global status bits	R	32	T.B.D.
<b>Global Reset</b>	0x0000	0x0008	32	Command for global reset (in parallel with VME SYSRESET)	W	0	
<b>Trig</b>	0x0000	0x000C	32	Software trigger, can be used to start the motor movement and/or the ADC acquisition	W	0	
<b>Clock Selection</b>	0x0000	0x0010	32	Select the global clock source	R/W	1	0 == External 1 == Internal
<b>Internal Clock Divider</b>	0x0000	0x0014	32	The internal clock frequency is equal to 1 MHz divided by the content of this register (plus 1). The clock (internal or external) is used to clock the ADC sampling and to generate the control gate pulses for the <u>preamplifier</u> .	R/W	20	0 - 0x1FFFFFF (1 MHz - 0.48 Hz)
<b>External clock delay</b>	0x0000	0x0018	32	The external clock pulse can be delayed by putting a non zero value in this register. Delay [ <u>ns</u> ]= reg*40	R/W	32	0 - 0xFFFFFFFF

# A CUSTOM BOARD AND ITS DRIVER

1. Getting your specifications
2. Defining the memory registers in the Control DB
3. Generating the driver with ENCORE
4. Testing it!

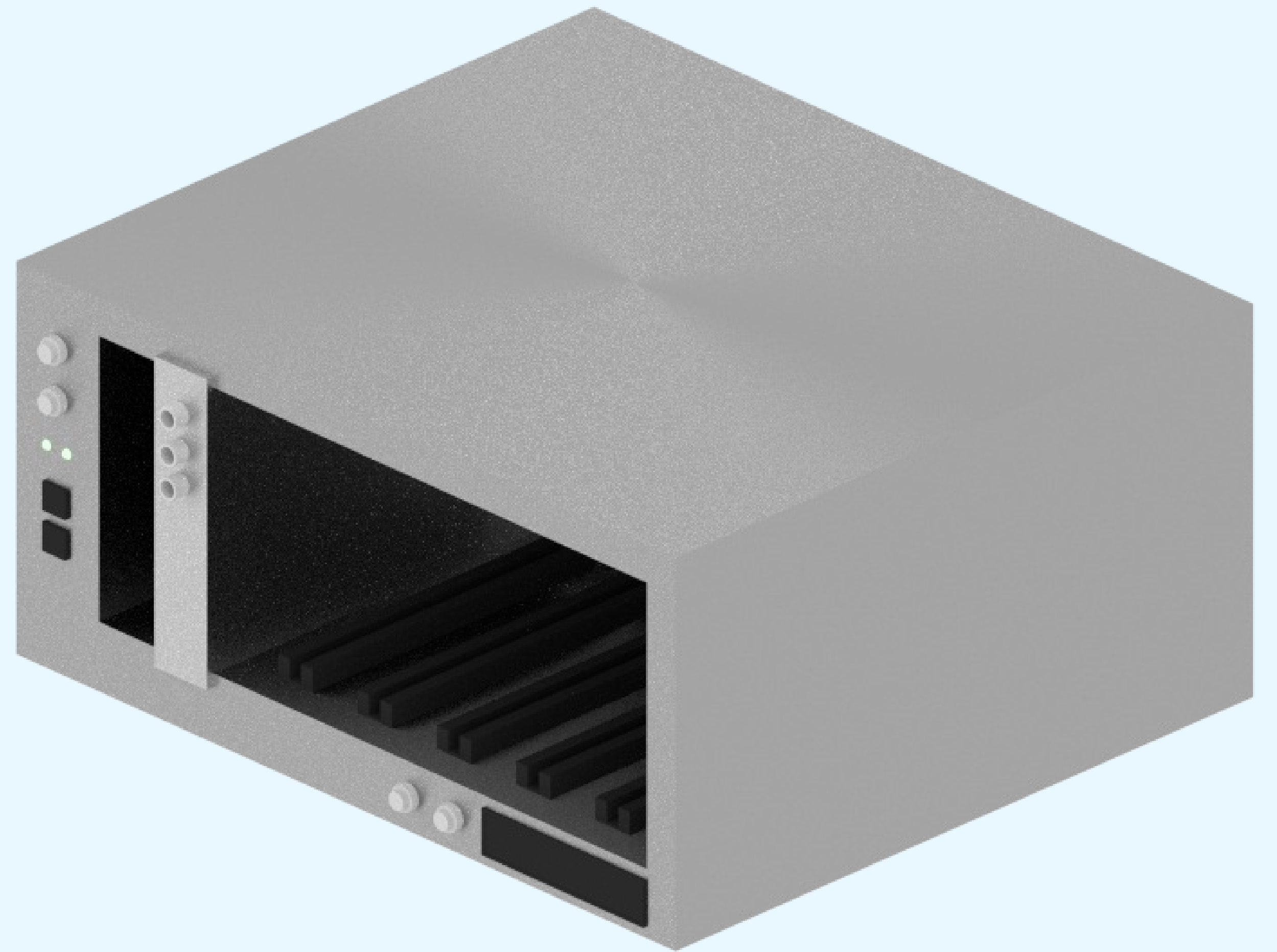


<b>Global Status</b>	0x0000	0x0008	32	Global status bits	R	32	T.B.D.
<b>Global Reset</b>	0x0000	0x0008	32	Command for global reset (in parallel with VME SYSRESET)	W	0	
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# FRONT END COMPUTER

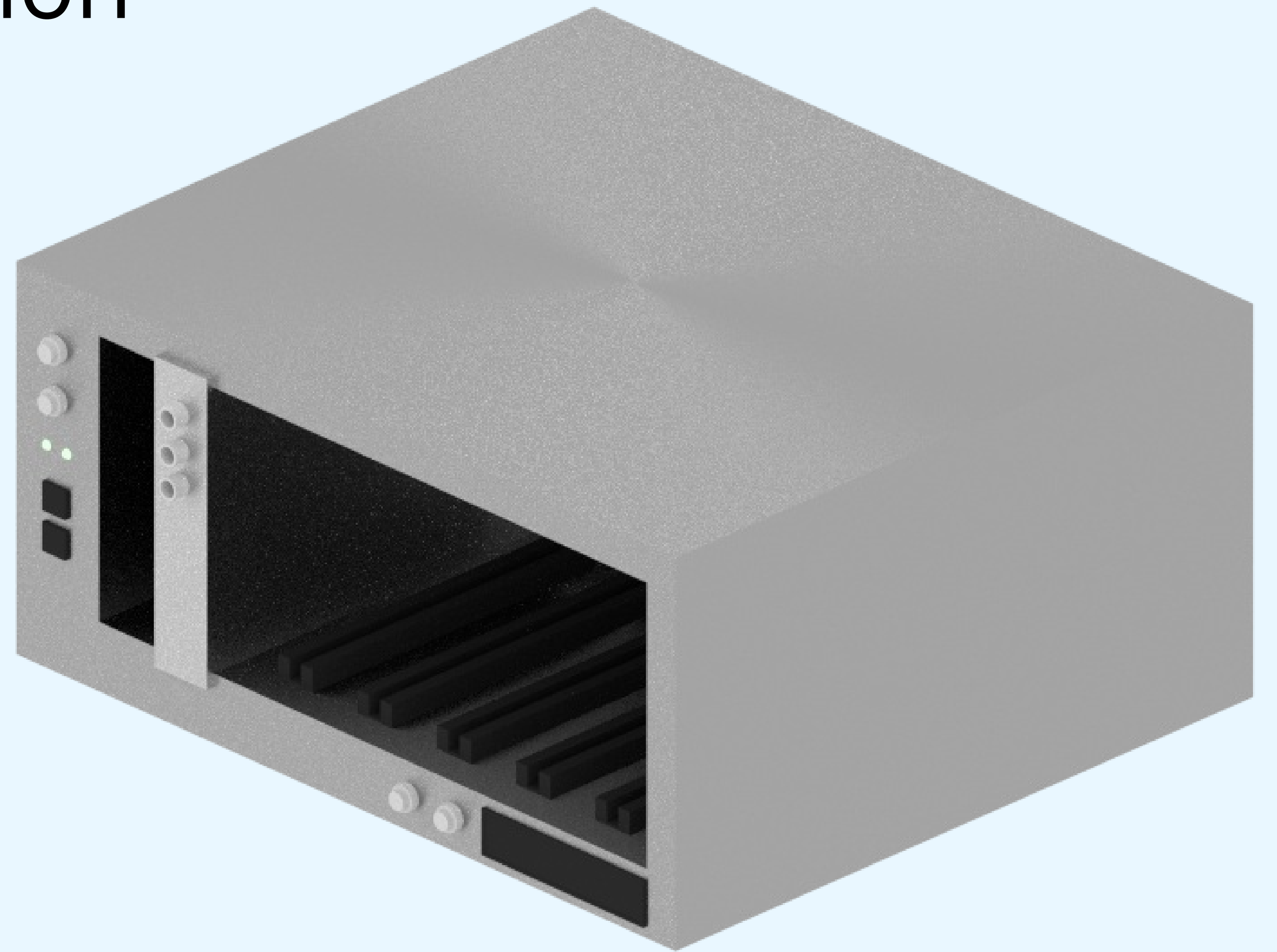


# F.E.C.



# F.E.C.

- Control DB configuration
- System configuration



# F.E.C.

- Control DB configuration
- System configuration

```
*****  
# $Id: transfer.ref,v 1.21 2013/10/23 13:19:30 anag Exp $  
*****  
# WARNING: File generated from database. Can be overwritten at any time
```

```
# Host      cfv-865-bidev6
```

```
#  sl  ss  lun  module-type      vendor device  subv  subdev  
#@#  1   0   0  CTRP                10dc   0300   10b5   9030
```

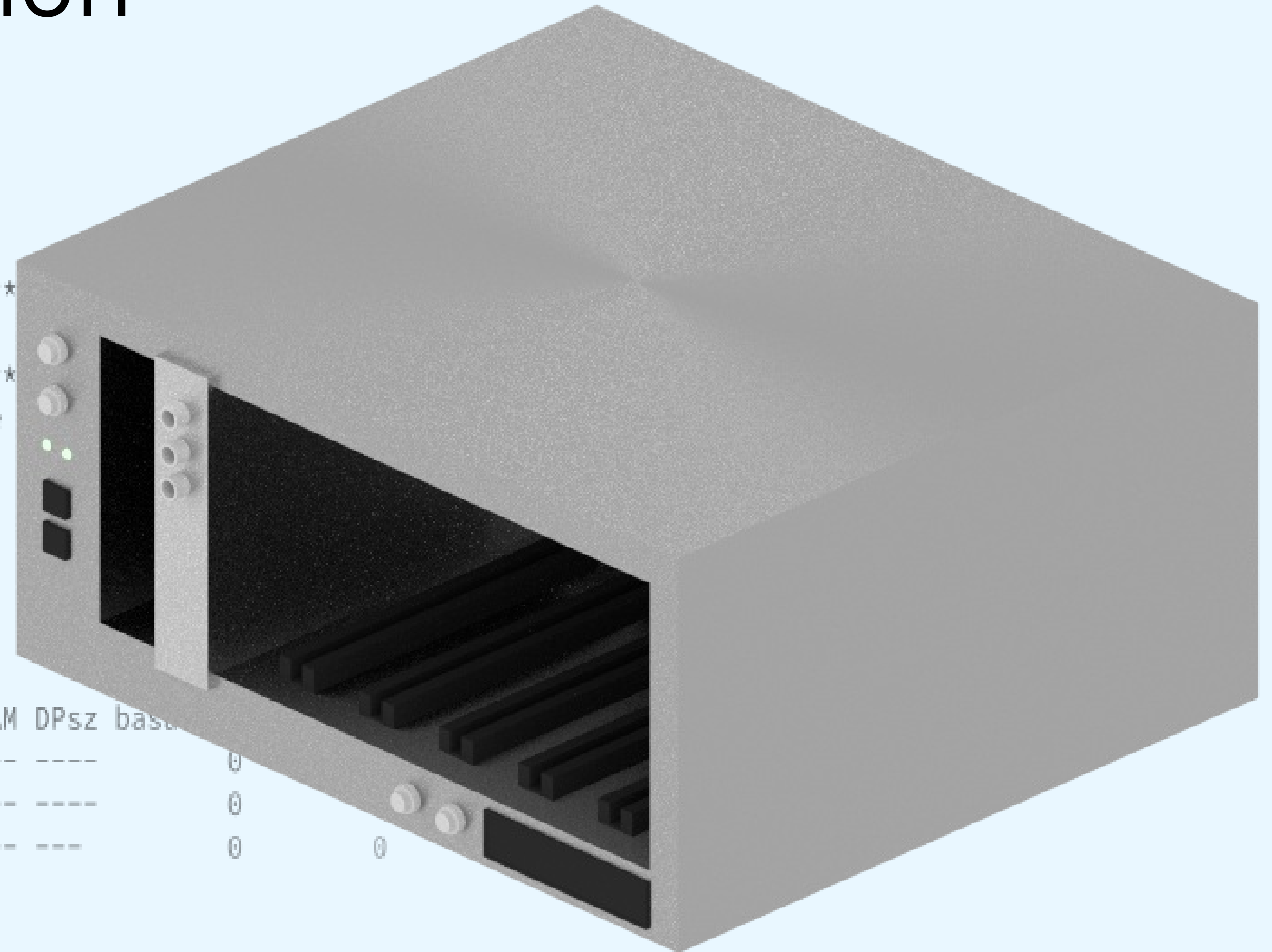
```
#  ln  mln  bus  mtno  module-type      lu  W  AM  DPsz  basaddr1  range1  W  AM  DPsz  base  
##+  1   0  PCI  502  CTRP                0  N  --  DP16      0           0  N  --  ----      0  
##+  2   0  VME  2279  MEN-A20           0  N  --  DP16      0           0  N  --  ----      0  
##+  3   0  VME  2408  BI_ADCSTEP        0  N  ST  DP32    300000    100000  N  --  ---      0      0
```

```
##% mkdir -p /nfs/cs-ccr-nfs6/vol21; /bin/mount -o intr,rsize=8192,wsiz=8192 cs-ccr-nfs6:/vol21 /nfs/cs-ccr-nfs6/vol21
```

```
# Restore DataTable for GM equipment  
##% dtrest >/dev/con 2>&1
```

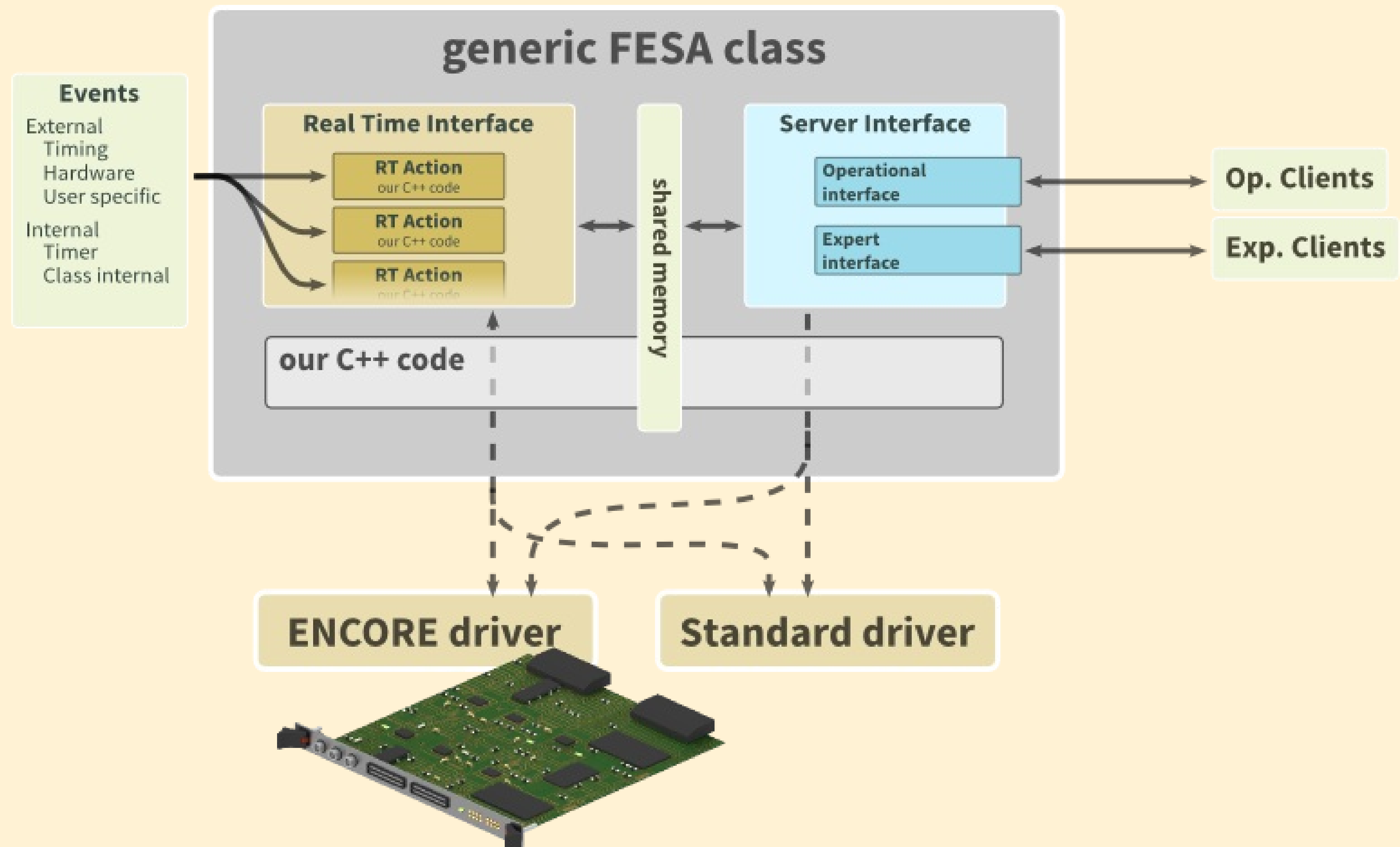
```
# Install data used by ioconfig library  
##% ioconfigInstall >/dev/con 2>&1
```

```
##% cd /usr/local/drivers/ctr; ctrinstall  
##% cd /usr/local/drivers/bi_adc36; install_bi_adc36.sh  
##% cd /usr/local/drivers/bi_adcstep; install_bi_adcstep.sh
```



# FESA

How does it work?

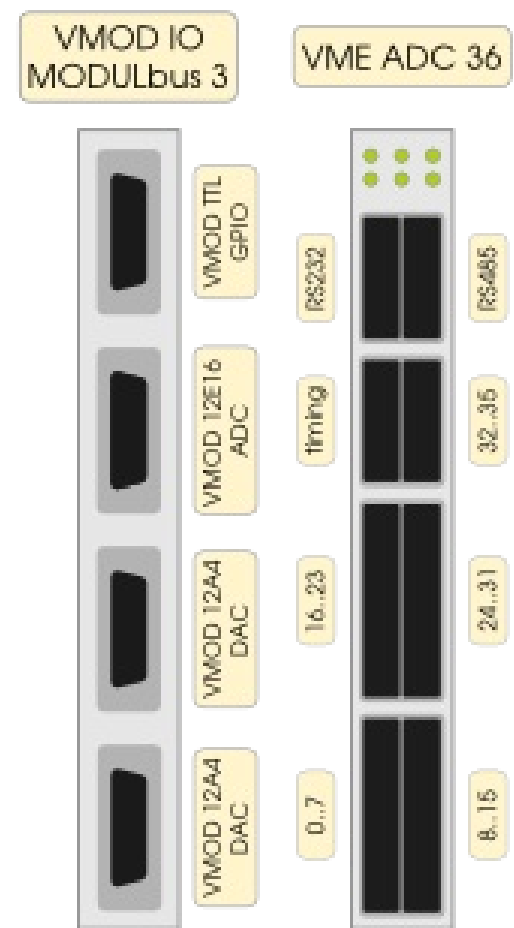




# **SPECIFICATIONS**

# SPECIFICATIONS

## Hardware specifications



**MODULbus 3  
VMOD IO**

**VMOD-TTL**  
20 bit TTL I/O  
Single 4 bit and double 8 bit I/O

IP..01	00	1	14	02	0P..01
IP..01	02	2	15	01	0P..01
IP..01	04	3	16	00	0P..01
IP..01	04	4	17	07	0P..01
080	5		18	05	0P..01
IP..01	05	6	19	04	0P..01
IP..01	02	7	20	01	0P..01
IP..01	04	8	21	00	0P..01
IP..01	04	9	22	07	0P..01
080	10		23	05	0P..01
IP..01	02	11	24	05	0P..01
IP..01	02	12	24	05	0P..01
080	13		25	01	0P..01
080	13				

**VMOD-12E16**  
16 single analog input 12bit resolution  
167 kHz sampling rate max.  
+/-10V, +/-5V, 0-10V, 0-5V inputs

C..00	1	14	C..08
080	2	15	C..01
C..05	3	16	080
C..02	4	17	C..10
080	5	18	C..03
C..11	6	19	080
C..04	7	20	C..12
080	8	21	C..05
C..13	9	22	080
C..16	10	23	C..14
080	11	24	C..07
C..15	12	25	080
080	13		

**VMOD-12A4**  
4 channel analog output 12bit resolution  
100 MHz sampling rate max.  
+/-10V, +/-5V, 0-10V, 0-5V outputs

C..0	1	14
080	2	
C..1	3	
C..1	4	
080	5	
C..1	6	
080	7	
C..1	8	
080	9	
C..1	10	
080	11	
C..1	12	
080	13	
C..1	14	
080	15	
C..1	16	
080	17	
C..1	18	
080	19	
C..1	20	
080	21	
C..1	22	
080	23	
C..1	24	
080	25	

**VMOD-12A4**  
4 channel analog output 12bit resolution  
100 MHz sampling rate max.  
+/-10V, +/-5V, 0-10V, 0-5V outputs

C..0	1	14
080	2	
C..1	3	
C..1	4	
080	5	
C..1	6	
080	7	
C..1	8	
080	9	
C..1	10	
080	11	
C..1	12	
080	13	
C..1	14	
080	15	
C..1	16	
080	17	
C..1	18	
080	19	
C..1	20	
080	21	
C..1	22	
080	23	
C..1	24	
080	25	

**VME ADC 36**  
36 input at 16 bit resolution  
250 kS/s per channel  
2x (digital) trigger input  
+/-5V, +/- 10V input  
Adjustable gain

**RS232**

1	TX
2	TX
3	TX
4	TX
5	TX

**RS485**

1	TX	4	EARTH
2	TX	5	TX
3	TX	6	EARTH
4	TX	7	TX
5	TX	8	TX

**TIMING**

080	1	CLK INPUT
TRIG1	2	080
080	3	080
TRIG2	4	080
080	5	CLK OUTPUT

**32..35**

C..35	1	080
080	2	080
C..34	3	080
080	4	080
C..33	5	080
080	6	080
C..32	7	080
080	8	080
C..31	9	080
080	10	080

**16..23**

C..16+	1	16	C..23+
C..16+	2	17	080
080	3	18	C..22+
C..17+	4	19	C..21+
C..17+	5	20	080
080	6	21	C..20+
C..18+	7	22	080
C..18+	8	23	080
080	9	24	C..19+
C..19+	10	25	C..18+
C..19+	11	26	080
080	12	27	080
C..20+	13	28	+5V

**24..31**

C..24+	1	18	C..28+
C..24+	2	19	080
080	3	20	C..27+
C..25+	4	21	C..26+
C..25+	5	22	080
080	6	23	C..25+
C..26+	7	24	C..24+
C..26+	8	25	080
080	9	26	C..23+
C..27+	10	27	C..22+
C..27+	11	28	080
080	12	29	080
C..28+	13	30	+5V

**0..7**

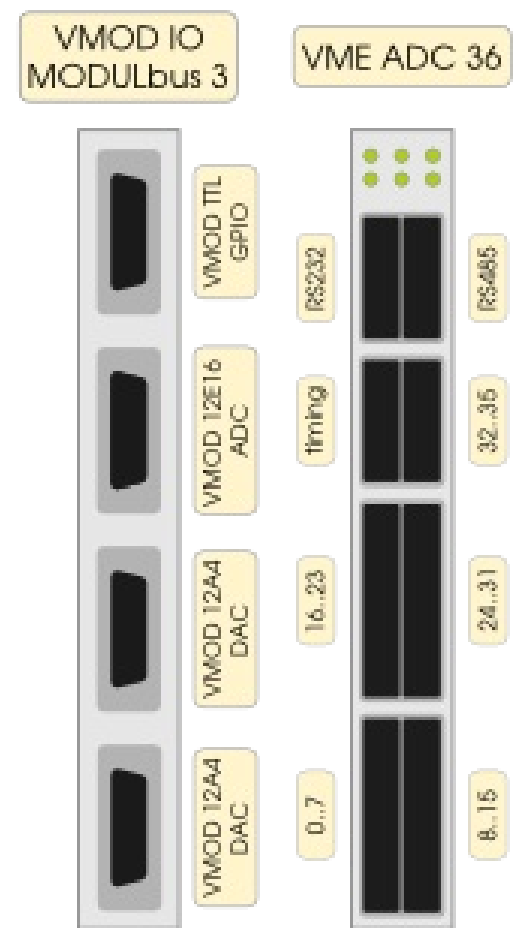
C..0+	1	14	C..4+
C..0+	2	15	080
080	3	16	C..3+
C..1+	4	17	C..1+
C..1+	5	18	080
080	6	19	C..0+
C..2+	7	20	C..4+
C..2+	8	21	080
080	9	22	C..3+
C..3+	10	23	C..1+
C..3+	11	24	080
080	12	25	080
C..4+	13	26	+5V

**8..15**

C..8+	1	18	C..12+
C..8+	2	19	080
080	3	20	C..11+
C..9+	4	21	C..10+
C..9+	5	22	080
080	6	23	C..9+
C..10+	7	24	C..8+
C..10+	8	25	080
080	9	26	C..7+
C..11+	10	27	C..6+
C..11+	11	28	080
080	12	29	080
C..12+	13	30	+5V

# SPECIFICATIONS

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36 input at 16 bit resolution  
250 kS/s per channel  
2x (digital) trigger input  
+/-5V, +/- 10V input  
Adjustable gain

**RS232**  
1 TX  
2 RX  
3 TX  
4 RX

**RS485**  
1 TX  
2 RX  
3 TX  
4 RX

**TIMING**  
1 CLK INPUT  
2 TRIG1  
3 TRIG2  
4 CLK OUTPUT

**32..35**  
5 GND  
6 GND  
7 GND  
8 GND

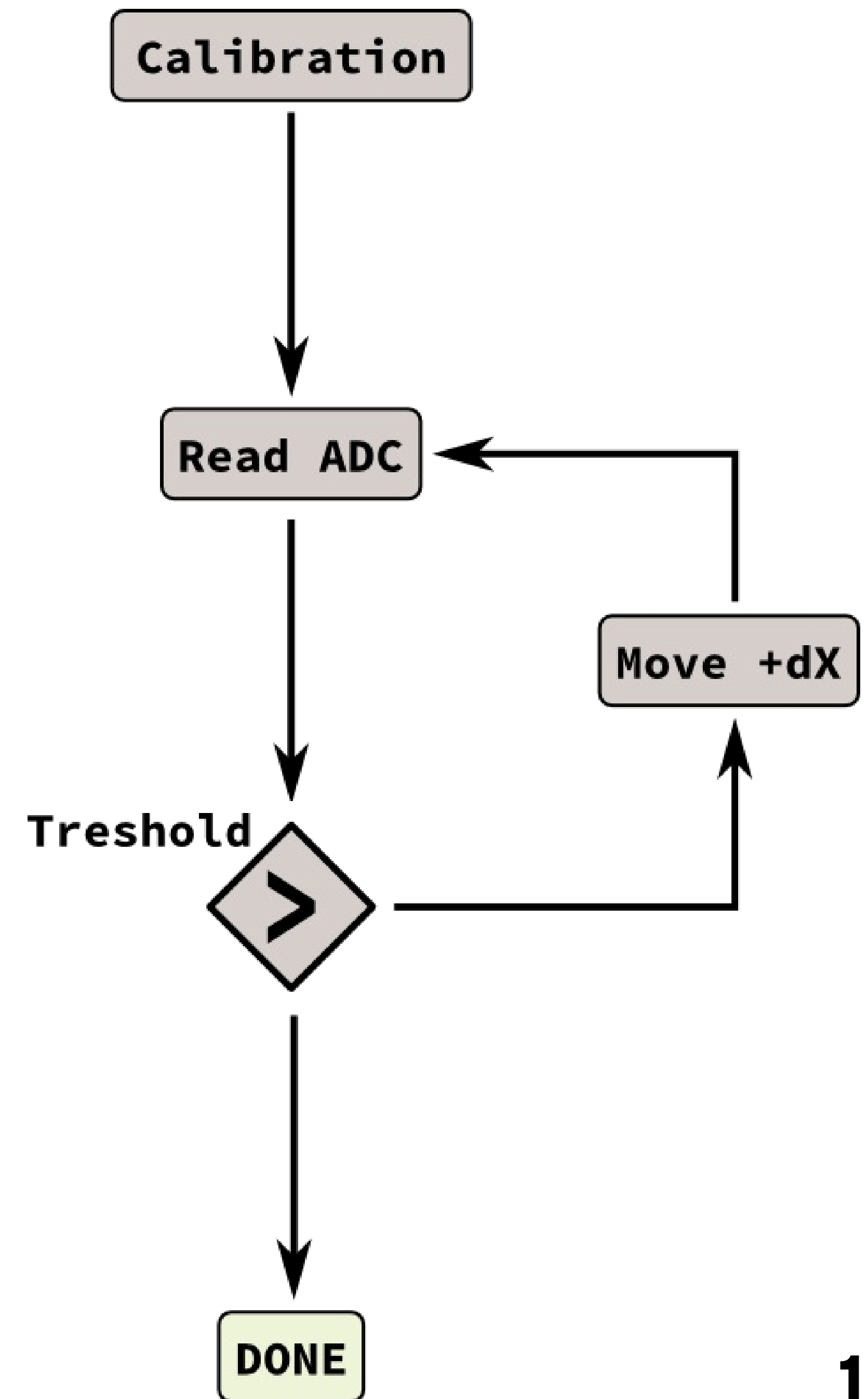
**16..23**  
1 0-5V  
2 0-10V  
3 0-5V  
4 0-10V  
5 0-5V  
6 0-10V  
7 0-5V  
8 0-10V  
9 0-5V  
10 0-10V  
11 0-5V  
12 0-10V

**24..31**  
1 0-5V  
2 0-10V  
3 0-5V  
4 0-10V  
5 0-5V  
6 0-10V  
7 0-5V  
8 0-10V  
9 0-5V  
10 0-10V  
11 0-5V  
12 0-10V

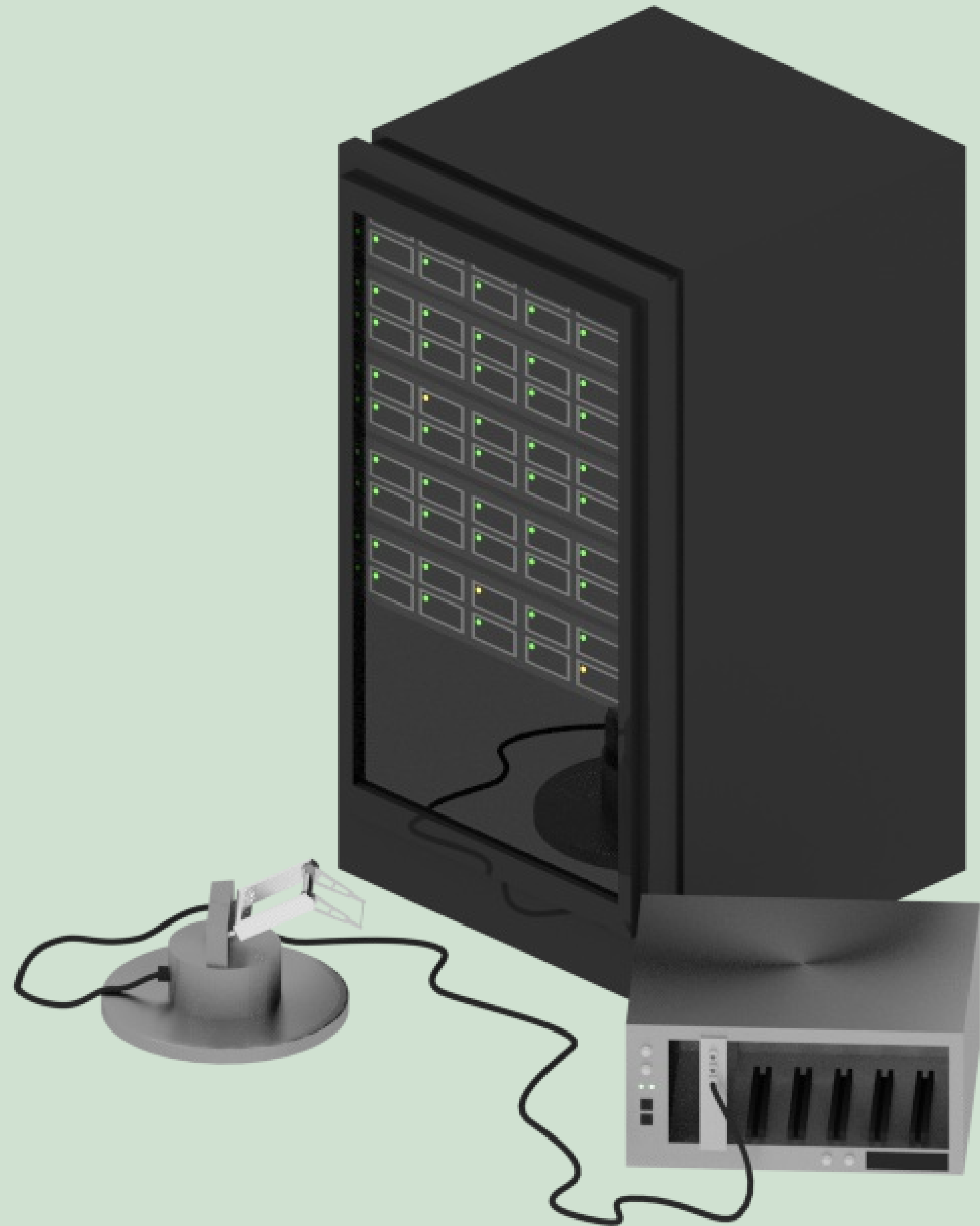
**0..7**  
1 0-5V  
2 0-10V  
3 0-5V  
4 0-10V  
5 0-5V  
6 0-10V  
7 0-5V  
8 0-10V

**8..15**  
1 0-5V  
2 0-10V  
3 0-5V  
4 0-10V  
5 0-5V  
6 0-10V  
7 0-5V  
8 0-10V  
9 0-5V  
10 0-10V  
11 0-5V  
12 0-10V

## Functional specifications

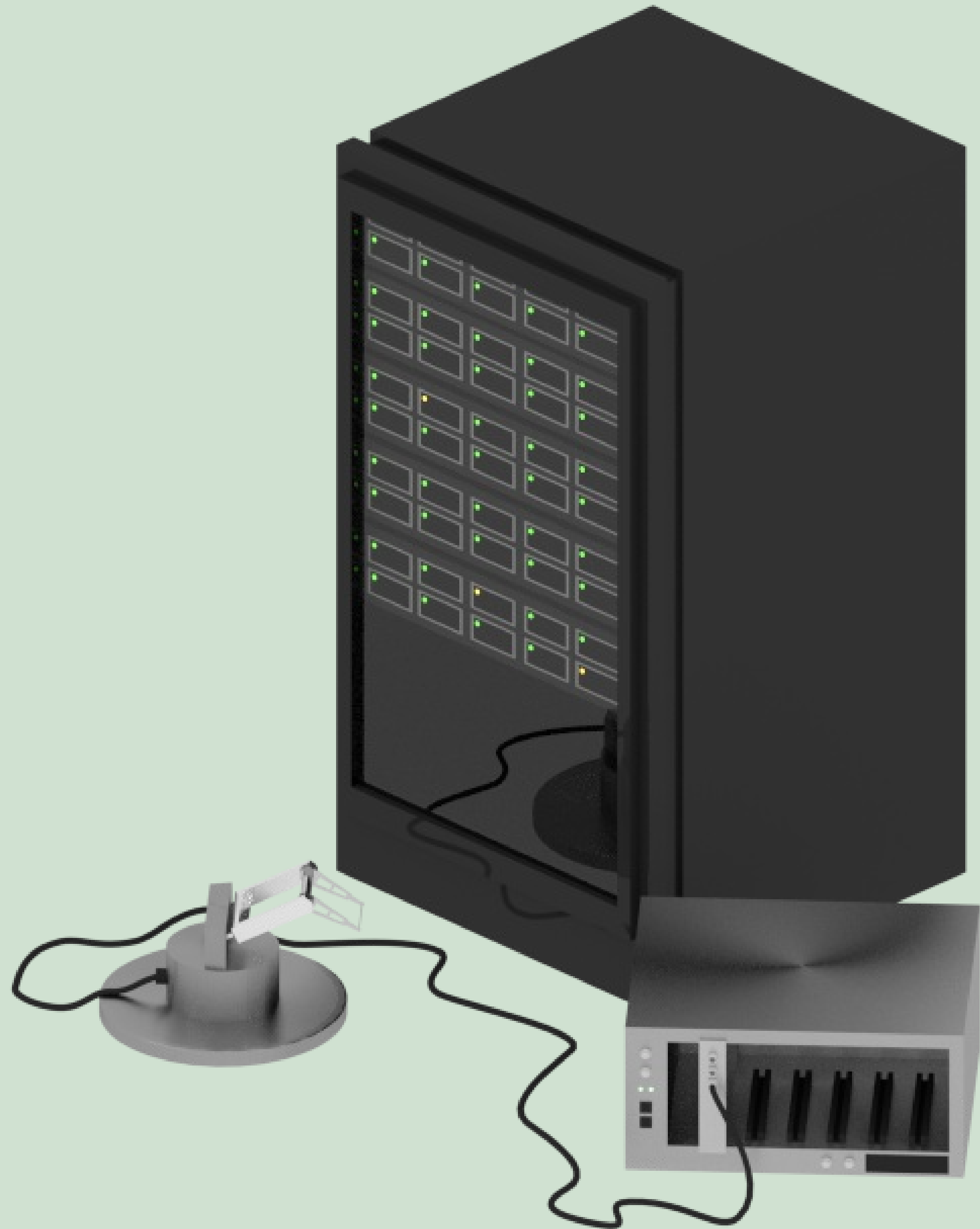


# FESA CLASS DEVELOPMENT WORKFLOW



# FESA CLASS DEVELOPMENT WORKFLOW

- Design
  - Expert level
  - Operational level
- Development
- Deployment and testing



# BI CLIENTS AND TOOLS



# BI SPECIFIC APPLICATIONS

# BI SPECIFIC APPLICATIONS

PR.BWS.68.H\_ROT

Status Settings Comparator Performance check

Category	ID	Name	Value	Unit	Category	ID	Name	Value	Unit
C	0	ALL	9	LHC3	17	MD5	1	SFTPRO1 : SF...	6
P	1	AD	10	LHC4	18	MD6	2	EAST1 : EAST1	3
P	2	EAST1	11	LHCINDIV	19	MD7	3	EAST1 : EAST1	5
P	3	EAST2	12	LHCPR08E	20	MD8	4	MD4 : MD4	6
P	4	ION1	13	MD1	21	SFTP...	5	AD : AD	8
P	5	ION2	14	MD2	22	SFTP...	6	ZERO : ZERO	9
S	6	ZERO : ZERO	15	MD3	23	SFTP...	7	MD2 : MD2	11
S	7	ZERO : ZERO	16	MD4	24	SFTP...	8	EAST1 : EAST1	13
S	8	ZERO : ZERO	17	MD5	25	SFTP...	9	ZERO : ZERO	15
S	9	ZERO : ZERO	18	MD6	26	SFTP...	10	ION2 : ION2	15
S	10	ZERO : ZERO	19	MD7	27	SFTP...	11	EAST1 : EAST1	17
S	11	ZERO : ZERO	20	MD8	28	SFTP...	12	ZERO : ZERO	17
S	12	ZERO : ZERO	21	SFTP...	29	SFTP...	13	EAST1 : EAST1	18
S	13	ZERO : ZERO	22	SFTP...	30	SFTP...	14	ZERO : ZERO	18
S	14	ZERO : ZERO	23	SFTP...	31	SFTP...	15	EAST1 : EAST1	19
S	15	ZERO : ZERO	24	SFTP...	32	SFTP...	16	ZERO : ZERO	19

Parameter	Operational Data	Database Data	User Data	Status
acqClockDiv	ACQ_VALUE	ACQ_500K	ACQ_500K	Red
potThreshold	25000	25000		Green
coarseWireResistance	2.8	2.8	2.1	Green
linPotCalib	0.0	0.0		Green
acqGate	ENABLE	ENABLE		Green
logAmplIDAC	1400	1400		Green
inOutDelay	640			Green
mode	OFF			Green
acqClockDivValue	1000000	100	121	Green
potHome	41200	41200		Green
gateLow	2550	1700		Green
linPotOffset	0.0	0.0		Green
homeSpeed	0.5	0.5		Green
calAdcI	1.221	1.221	1.222	Green
fgAddrMode	FULL			Green
fgClockDivHome	0			Green
gateHigh	1800	2050		Green
enableWS	true	true		Green
fgEndAddr	4095	4095		Green
testMode	false	false		Green
inOutDelay_min	116	60		Green
pmtResistance	3000000	3000000		Green
fgClockDivScan	1025			Green
fgROMMode	FAST_SCAN	FAST_SCAN		Green
calAdcV	1.221	1.221	1.5	Green
scanMode	NORMAL	NORMAL		Green
hvStep	50			Green

Buttons: Status summary, View (Tree), Operational (Refresh FEC Data), Database (Apply DB Settings), User Custom Data (Custom\_Data.xml, Apply, Open File)

Legend: EQUAL (Green), NOT\_EQUAL (Orange), TO\_BE\_SET (Red), NOT\_COMPARABLE (Grey), INACTIVE (Grey)

BWS Diagnostics

File Configuration Help

RBA: no token

BWS

CPS

- PR.BWS.54.H\_ROT
- PR.BWS.64.V\_ROT
- PR.BWS.65.H\_ROT
- PR.BWS.68.H\_ROT
- PR.BWS.85.V\_ROT

SPS

- SPS.BWS.414TST.H\_ROT
- SPS.BWS.414TST.V\_ROT
- SPS.BWS.41677.H\_ROT
- SPS.BWS.41677.V\_ROT
- TST.BWS.RF.SYNC
- TST.BWS.RL.SYNC
- TST.BWS.RS.SYNC
- SPS.BWS.51731.H\_LIN
- SPS.BWS.51731.V\_LIN
- SPS.BWS.51995.H\_ROT
- SPS.BWS.51995.V\_ROT
- SPS.BWS.52171.H\_LIN
- SPS.BWS.52171.V\_LIN

PSB

- BR1.BWS.2L1.H\_ROT
- BR1.BWS.2L1.V\_ROT
- BR2.BWS.2L1.H\_ROT
- BR2.BWS.2L1.V\_ROT
- BR3.BWS.2L1.H\_ROT
- BR3.BWS.2L1.V\_ROT
- BR4.BWS.2L1.H\_ROT
- BR4.BWS.2L1.V\_ROT

LHC

- LHC.BWS.5L4.82H1
- LHC.BWS.5L4.82H2
- LHC.BWS.5L4.82V1
- LHC.BWS.5L4.82V2
- LHC.BWS.5R4.81H1
- LHC.BWS.5R4.81H2
- LHC.BWS.5R4.81V1
- LHC.BWS.5R4.81V2
- TST.BWS.LIN.CH0
- TST.BWS.LIN.CH1
- TST.BWS.LIN.CH2
- TST.BWS.LIN.CH3

NONE

- CAL.BWS.867.PS
- CAL.BWS.867.PS8
- TST.BWS.867.LIN
- TST.BWS.867.RF
- TST.BWS.867.RL
- TST.BWS.867.RS
- TST.BWS.RF
- TST.BWS.RS
- TST.BWS.867.LIN.LHC

Legend: device\_is\_not\_mapped (Grey), fec\_is\_not\_responding (Grey), server\_is\_not\_responding (Black), status\_ok (Green), status\_error (Red), status\_warning (Yellow), status\_busy (Purple)

Buttons: HOME, IN, READY

13:42:34 - Updating data - 2014/09/26 13:42:34



# BI SPECIFIC APPLICATIONS

The image displays several key components of the BI software interface:

- Performance Check Table (Top Left):** A table with columns for 'Status', 'Settings', and 'Performance check'. It lists various components like LHC3, LHC4, LHCINDIV, LHC2A, LHC2B, LHC3, LHC4, MD1, MD2, MD3, MD4, MD5, MD6, MD7, MD8, MD9, MD10, MD11, MD12, MD13, MD14, MD15, MD16, MD17, MD18, MD19, MD20, MD21, MD22, MD23, MD24, MD25, MD26, MD27, MD28, MD29, MD30, MD31, MD32, MD33, MD34, MD35, MD36, MD37, MD38, MD39, MD40, MD41, MD42, MD43, MD44, MD45, MD46, MD47, MD48, MD49, MD50, MD51, MD52, MD53, MD54, MD55, MD56, MD57, MD58, MD59, MD60, MD61, MD62, MD63, MD64, MD65, MD66, MD67, MD68, MD69, MD70, MD71, MD72, MD73, MD74, MD75, MD76, MD77, MD78, MD79, MD80, MD81, MD82, MD83, MD84, MD85, MD86, MD87, MD88, MD89, MD90, MD91, MD92, MD93, MD94, MD95, MD96, MD97, MD98, MD99, MD100.
- Losstype Graph (Top Right):** A plot titled 'Losstype Graph - Oct 14, 2014 1:36:59 PM'. The y-axis is labeled 'Loss' and ranges from 8 to 16. The x-axis is labeled 'Time' and ranges from 200 to 450. The plot shows a red waveform with significant fluctuations.
- Parameters Table (Middle Left):** A table with columns for 'Parameter' and 'Operational Data'. It lists various acquisition parameters such as 'acqClockDiv', 'potThreshold', 'coarseWireResistance', 'linPotCalib', 'acqGate', 'logAmplIDAC', 'inOutDelay', 'mode', 'acqClockDivValue', 'potHome', 'gateLow', 'linPotOffset', 'homeSpeed', 'calAdcl', 'fgAddrMode', 'fgClockDivHome', 'gateHigh', 'enableWS', and 'fgEndAddr'.
- History of MAX values (Middle Right):** A graph showing the history of maximum values for various channels. The y-axis is logarithmic, ranging from 1 to 10000. The x-axis is labeled 'History for MAX\_VALUES [14/10/14 13:35:05]' and ranges from 0 to 25. Multiple data series are plotted, each representing a different channel.
- Control Panel (Bottom Right):** A panel with buttons for different beamline sections: BR1.BWS.2L1.V\_ROT, BR2.BWS.2L1.H\_ROT, BR2.BWS.2L1.V\_ROT, BR3.BWS.2L1.V\_ROT, BR4.BWS.2L1.H\_ROT, BR4.BWS.2L1.V\_ROT, LHC.BWS.5L4.82H2, LHC.BWS.5L4.82V1, LHC.BWS.5L4.82V2, LHC.BWS.5R4.81H2, LHC.BWS.5R4.81V1, LHC.BWS.5R4.81V2, TST.BWS.LIN.CH1, TST.BWS.LIN.CH2, TST.BWS.LIN.CH3, CAL.BWS.867.PS8, TST.BWS.867.LIN, TST.BWS.867.RF, TST.BWS.867.RS, TST.BWS.RF, TST.BWS.RS. Below the buttons is a status bar with indicators for 'responding', 'server\_is\_not\_responding', 'status\_ok', and 'status\_error'. At the bottom, there is a green bar with the time '6 13 42 34'.

# BI SPECIFIC APPLICATIONS

The screenshot displays the BLMHCUUnifiedThresholdTool interface, which is used for monitoring and managing hardware families. The main window is titled "BLMHCUUnifiedThresholdTool (on cs-ccr-abbi4.cern.ch)".

**Family List:** A list of families is shown on the left, including blaze22, blaze, blaze33, and blaze4.

**Parameterization:** The "Testing" tab is active, showing a table of parameters for the "blaze" family. The table has columns for POS (1-4) and RS01-RS12. The values are consistent across all rows.

POS	RS01	RS02	RS03	RS04	RS05	RS06	RS07	RS08	RS09	RS10	RS11	RS12
1	256000.0	512000.0	2048000.0	4096000.0	1.6384E7	6.5536E7	5.24288E8	4.194304E9	8.388608E9	3.355443...	1.342177...	1.342177...
2	256000.0	512000.0	2048000.0	4096000.0	1.6384E7	6.5536E7	5.24288E8	4.194304E9	8.388608E9	3.355443...	1.342177...	1.342177...
3	256000.0	512000.0	2048000.0	4096000.0	1.6384E7	6.5536E7	5.24288E8	4.194304E9	8.388608E9	3.355443...	1.342177...	1.342177...
4	256000.0	512000.0	2048000.0	4096000.0	1.6384E7	6.5536E7	5.24288E8	4.194304E9	8.388608E9	3.355443...	1.342177...	1.342177...

**Final and Stage-Final:** Below the parameterization table, there are sections for "Final", "Stage - Final", and "Stage/Final", each with a table that currently contains "No content in table".

**Monitoring and Settings:** The bottom left panel shows various settings, including "Presets" (Factor 1-12), "Apply averaging" (NO\_AVERAGING), "Local data logging" (No Logging), and "Cards present" (8 cards). The "History" section shows a graph of "History for MAX\_VALUES" with a y-axis from 1 to 10000 and an x-axis from 0 to 10. The "Max value selection" section shows a grid of checkboxes for positions 1-32, with Pos 1, Pos 17, and Pos 32 checked.

**Graphs:** The bottom right panel shows a large graph with a y-axis from 0 to 140,000,000,000 and an x-axis from 0 to 13. The graph shows a green line representing "Pos 32" which starts near zero and rises sharply to approximately 130,000,000,000 at position 11. Other positions (Pos 1 and Pos 17) are shown as flat lines near zero. A legend on the right identifies the lines: Pos 1 (red), Pos 17 (orange), and Pos 32 (green).

**Additional Windows:** A small window on the top right shows a table with columns 13-24 and a "cycleName" field set to "PSB.USER.TOF". Another window below it shows a red line graph with a y-axis from 0 to 1000 and an x-axis from 0 to 10.

# BI GENERIC APPLICATIONS

# BI GENERIC APPLICATIONS

The screenshot displays the 'Settings Manager' application window, titled 'Settings Manager (on cs-ccr-abbi5.cern.ch)'. The interface is divided into two main sections: 'Source Settings' and 'Target Settings'. Both sections feature a 'FESA Version' dropdown (set to 'FESA 3') and a 'Privileges' dropdown (set to 'Full-access'). The 'Source Settings' panel includes a 'FESA Class' dropdown (set to 'BPMBE'), a 'Version' dropdown (set to '212'), a 'Property' dropdown (set to 'ExpertSetting'), and a 'User' dropdown (set to 'PSB.USER.AD'). The 'Target Settings' panel includes a 'FESA Class' dropdown (set to 'BPMBE'), a 'Version' dropdown (set to '212'), a 'Property' dropdown (set to 'ExpertSetting'), and a 'User' dropdown (set to 'PSB.USER.LHC3'). Both panels have buttons for 'GET', 'Promote to Target Panel', 'GET Target', 'Single SET', 'SET to All Devices', and 'SET to All USERS'. Below these panels are two 'FIELDS' sections, each with a 'Select All' checkbox and a list of settings with checkboxes and values. The 'Source Settings' fields include: bunchCropping (0), calGain (GAIN\_0), calibrationRequest (false), defaultScalingFactorHorizontal (-25.0), defaultScalingFactorVertical (25.0), eligibleSigmaVoltage (1.2), gainAutoMax (GAIN\_2), gainAutoMin (GAIN\_0), minBunchLength (10), and sensitivityHorizontal (96.93). The 'Target Settings' fields include: bunchCropping, calGain (GAIN\_0), calibrationRequest (false), defaultScalingFactorHorizontal (-25.0), defaultScalingFactorVertical (25.0), eligibleSigmaVoltage (1.2), gainAutoMax (GAIN\_2), gainAutoMin (GAIN\_0), minBunchLength, and sensitivityHorizontal. The bottom left corner shows 'Display: 1'.

# BI GENERIC APPLICATIONS

The screenshot displays the Settings Manager application interface, titled "Settings Manager (on cs-ccr-abbi5.cern.ch)". The interface is divided into several sections:

- Source Settings:** Includes fields for FESA Version (set to FESA 3), Privileges (set to Full-access), FESA Class, Version, and Property, with a GET button.
- Target Settings:** Includes fields for FESA Class, Version, and Property, with a GET Target button.
- Window Manager:** Shows a "Display 1" window with tabs for Timing, Navigation, and Data Import.
- Timing Table:** A table with columns for timing parameters and values. The table is as follows:

Timing	Value	Property	Value	Property	Value	Property	Value			
0 ALL	13	FL_IN_SU	1	AMDNON	2	7	AMDNON	14	13	19
1 ZERO	14	FL_NO_SU	2	AMDNON	4	8	AMDNON	15	14	20
2 EARLY	15	FL_SP_SU	3	ANONINAL	6	9	AMDNON	18	15	21
3 NOMINAL	16	FL_OU_SU	4	AMDNON	7	10	AMDNON	20	16	22
4 MODF	17	FL_IN_MO	5	AMDNON	10	11	AMDNON	22	17	23
5			6	AMDNON	12	12		18		24
- Selection Table:** A table with columns for Field, Property, Device, Triggering, and Start. The table is as follows:

Field	Property	Device	Triggering	Start
integrationData	Acquisition	LEI.BGI.V	subscription	STOP
integrationData	Acquisition	LEI.BGI.H	subscription	STOP
- Data Display:** Two side-by-side plots showing data acquisition results. The left plot is titled "0 - integrationData - LEI.BGLV - Acquisition - ALL" and the right plot is titled "1 - integrationData - LEI.BGLH - Acquisition - ALL". Both plots show a vertical axis from 0 to 1800 and a horizontal axis from 0 to 60. The plots display a yellow background with a magenta vertical band and a magenta horizontal band at the bottom.
- Data Export:** A section with a "Path" field (set to none) and a table for data export options. The table is as follows:

Name	Save on event	Save now	Full DataMap
0 - integrationData - LEI.BGI.V - Acquisition - ALL	<input type="checkbox"/>	SAVE	<input type="checkbox"/>
1 - integrationData - LEI.BGI.H - Acquisition - ALL	<input type="checkbox"/>	SAVE	<input type="checkbox"/>

# OTHER TOOLS

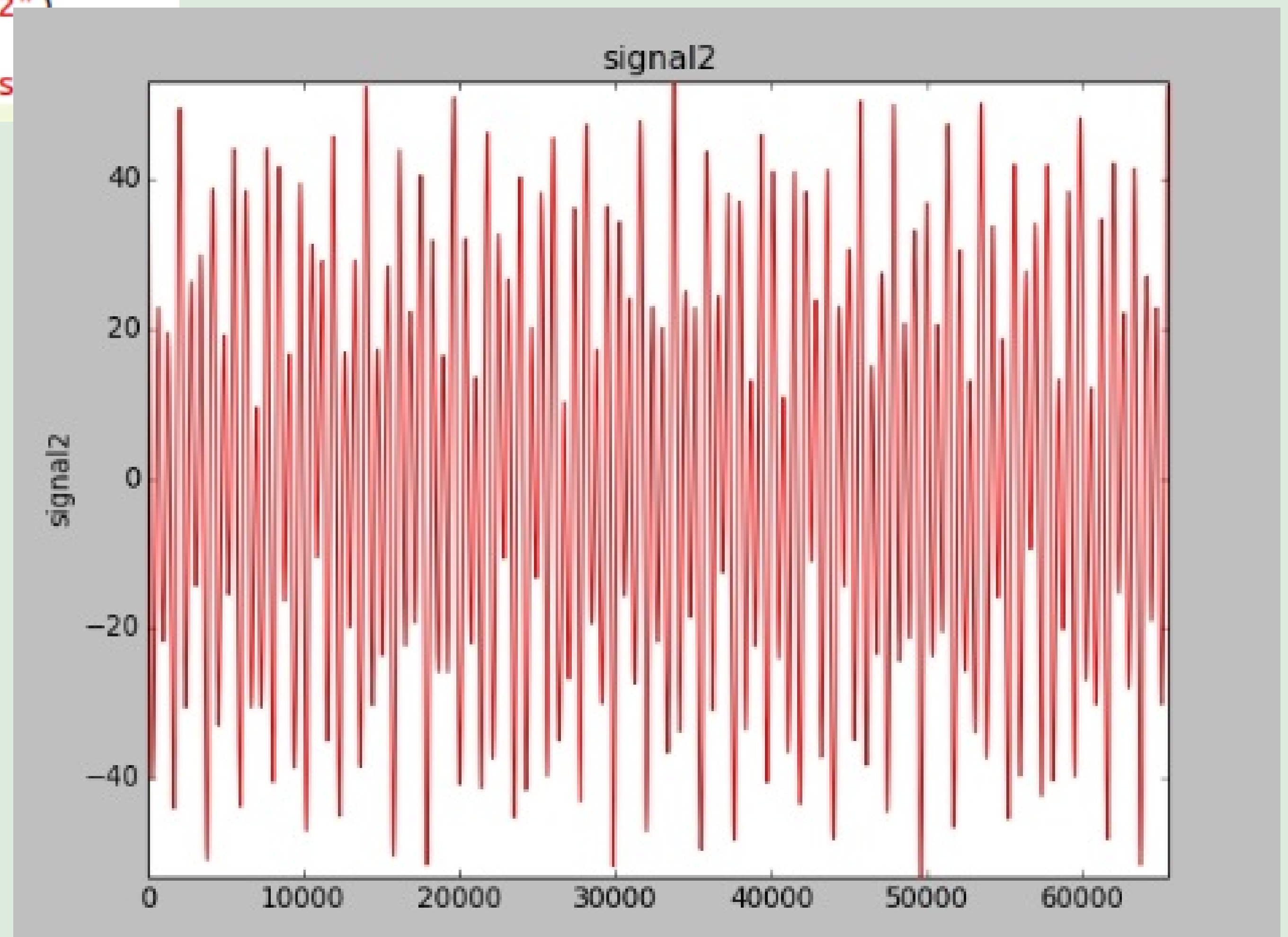
# OTHER TOOLS

```
import pica

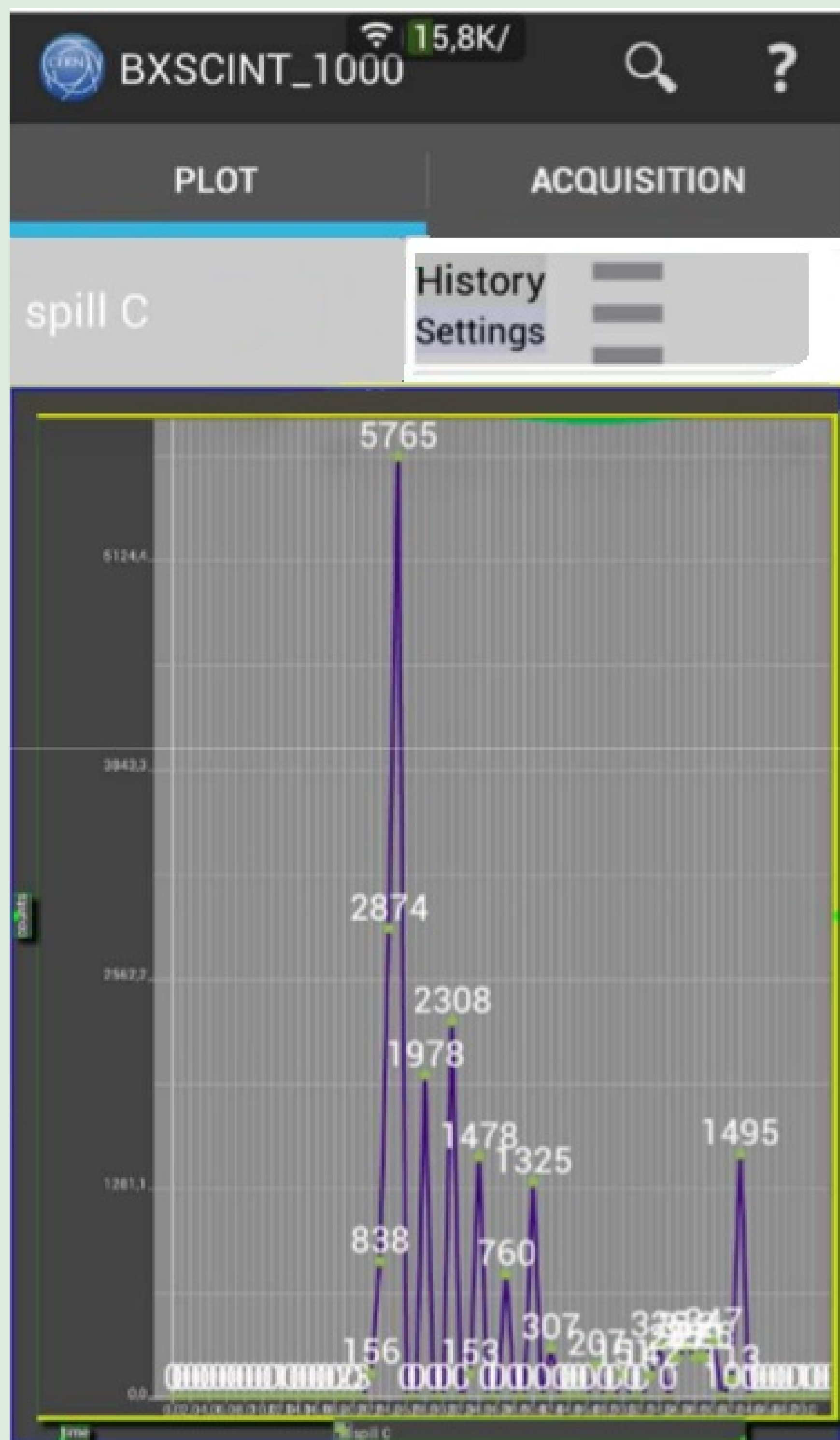
api = pica.Pica()
id_sub = api.subscribe(device_name="ADEMLTest1",
                      property_name="SignalAcquisition",
                      cycle_name="ADE.USER.ADE")

init_fig = pica.initiate_figure()
while True:
    delta_ms1 = api.getFreshData(0, id_sub)
    api.print_data(id_sub)
    signal2 = api.get_field_data(id_sub, "signal2")
    pica.update_figure(init_fig, signal2,
                      ylabel="signal2", title="s
```

## MathStub



# OTHER TOOLS



BXSCINTS.xml	
Data	File
BXSCINT_1000	hv: -2,00    counts: 000866
BXSCINT_1001	hv: -1,74    counts: 000591
BXSCINT_1002	hv: -1,80    counts: 001938
BXSCINT_1003	hv: -1,80    counts: 000000
BXSCINT_0100	hv: -1,76    counts: 000000
BXSCINT_0101	hv: -1,96    counts: 000000
BXSCINT_0102	hv: -1,75    counts: 000000
BXSCINT_0103	hv: -1,82    counts: 000001
BXSCINT_0104	hv: -1,92    counts: 000000
BXSCINT_0200	hv: -1,99    counts: 000031
BXSCINT_0201	hv: -1,75    counts: 000000
BXSCINT_0202	hv: -0,11    counts: 000000
BXSCINT_0203	hv: -1,81    counts: 000001
BXSCINT_0204	hv: -0,11    counts: 000000



# OTHER TOOLS

LUN 0    Driver : bi\_adcstep | Host : cfv-865-bidev6 hexadecimal

Module 0 | Module 1 | Module 2 | Module 3 | Module 4 | Module 5

channelStatus1	0x128	<input type="button" value="get"/>	
channelReset1	0	<input type="button" value="set"/>	
stpPosCounter1	0x0	<input type="button" value="get"/>	
stpResetCount1	0	<input type="button" value="set"/>	
stpStepToMove1	0xa	<input type="button" value="get"/>	0
stpMovDirection1	0x0	<input type="button" value="get"/>	0
stpStartSpeed1	0x0	<input type="button" value="get"/>	0
stpCruiseSpeed1	0x0	<input type="button" value="get"/>	0
stpAcceleration1	0x0	<input type="button" value="get"/>	0
stpTriggerMode1	0x0	<input type="button" value="get"/>	0
stpTrail1	0x0	<input type="button" value="get"/>	0
stpStartMove1	0	<input type="button" value="set"/>	
stpStopMove1	0	<input type="button" value="set"/>	
stpEndSwichConf1	0x0	<input type="button" value="get"/>	0 <input type="button" value="set"/>
stpPowerConf1	0x0	<input type="button" value="get"/>	0 <input type="button" value="set"/>
adcNofSamples1	0x1	<input type="button" value="get"/>	0 <input type="button" value="set"/>
adcStartIndex1	0xc1	<input type="button" value="get"/>	0 <input type="button" value="set"/>
adcFreeRun1	0x0	<input type="button" value="get"/>	0 <input type="button" value="set"/>
adcTriggerMode1	0x0	<input type="button" value="get"/>	0 <input type="button" value="set"/>
adcStartAcc1	0	<input type="button" value="set"/>	

Array Viewer - Mozilla Firefox

cfv-865-bidev6:9999/array

### Array Plot

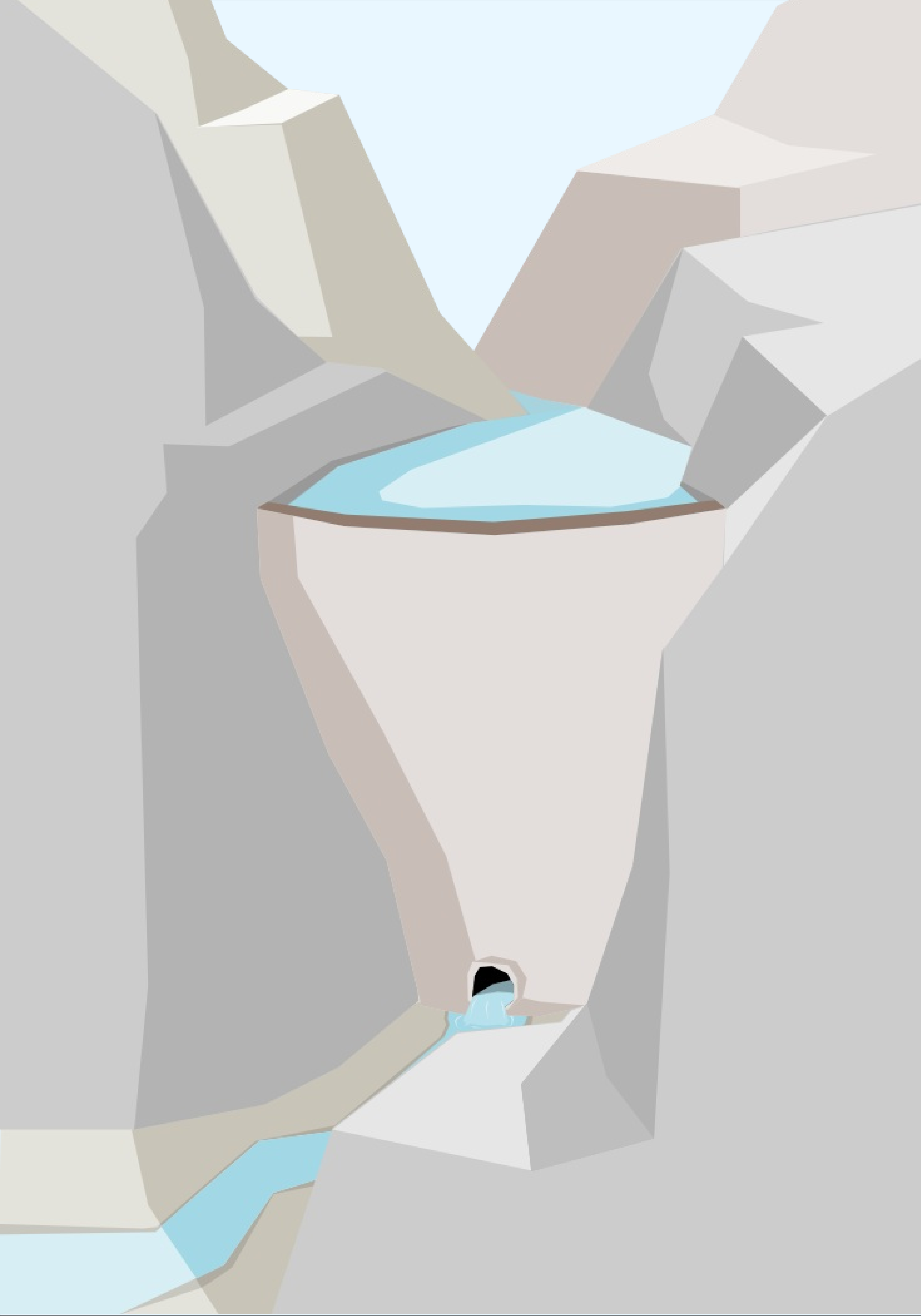
Value

Index

Y1

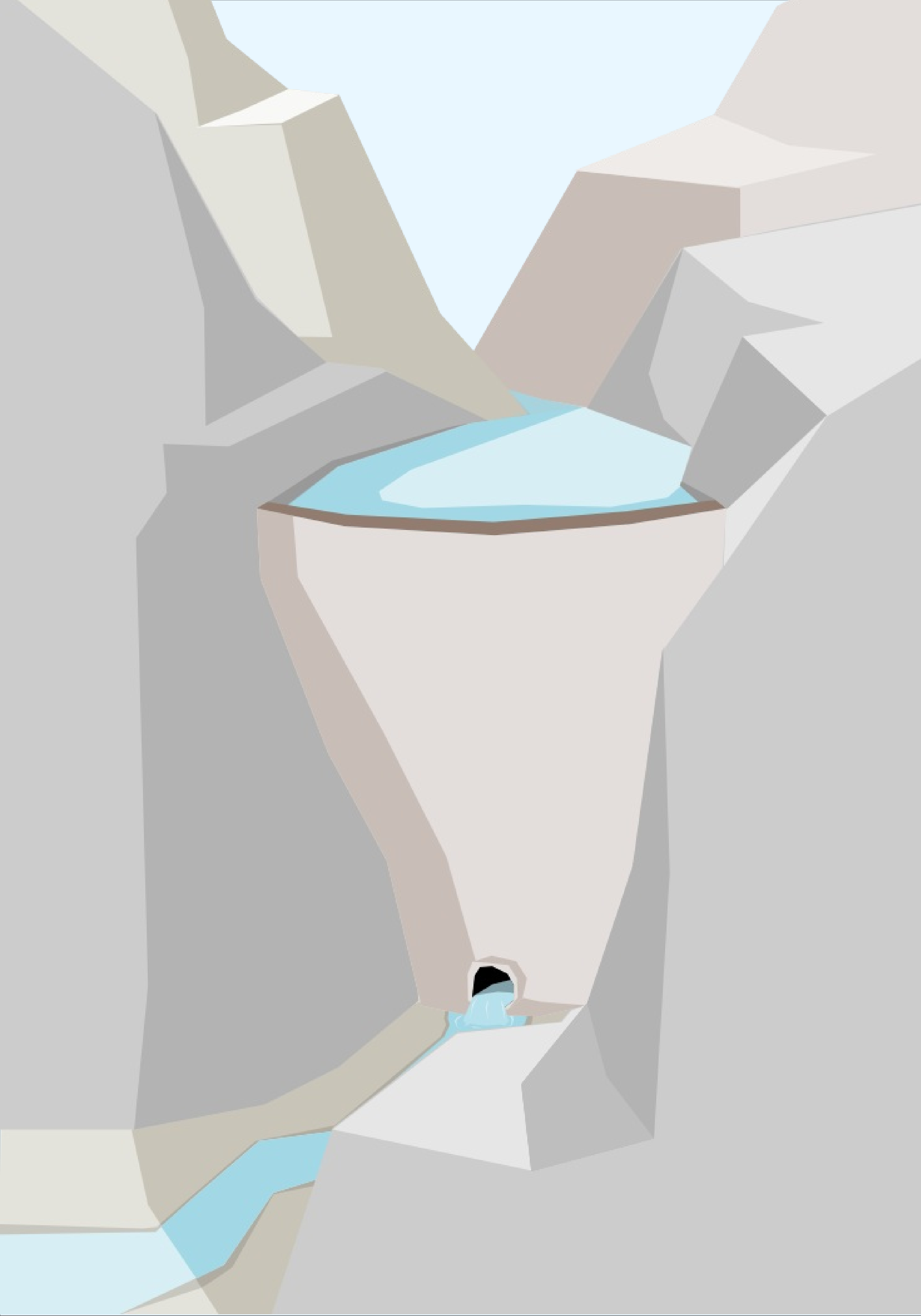
Index	Value
350	300
400	400
450	500
500	600
550	700
600	800
650	900

# CONSTRAINTS



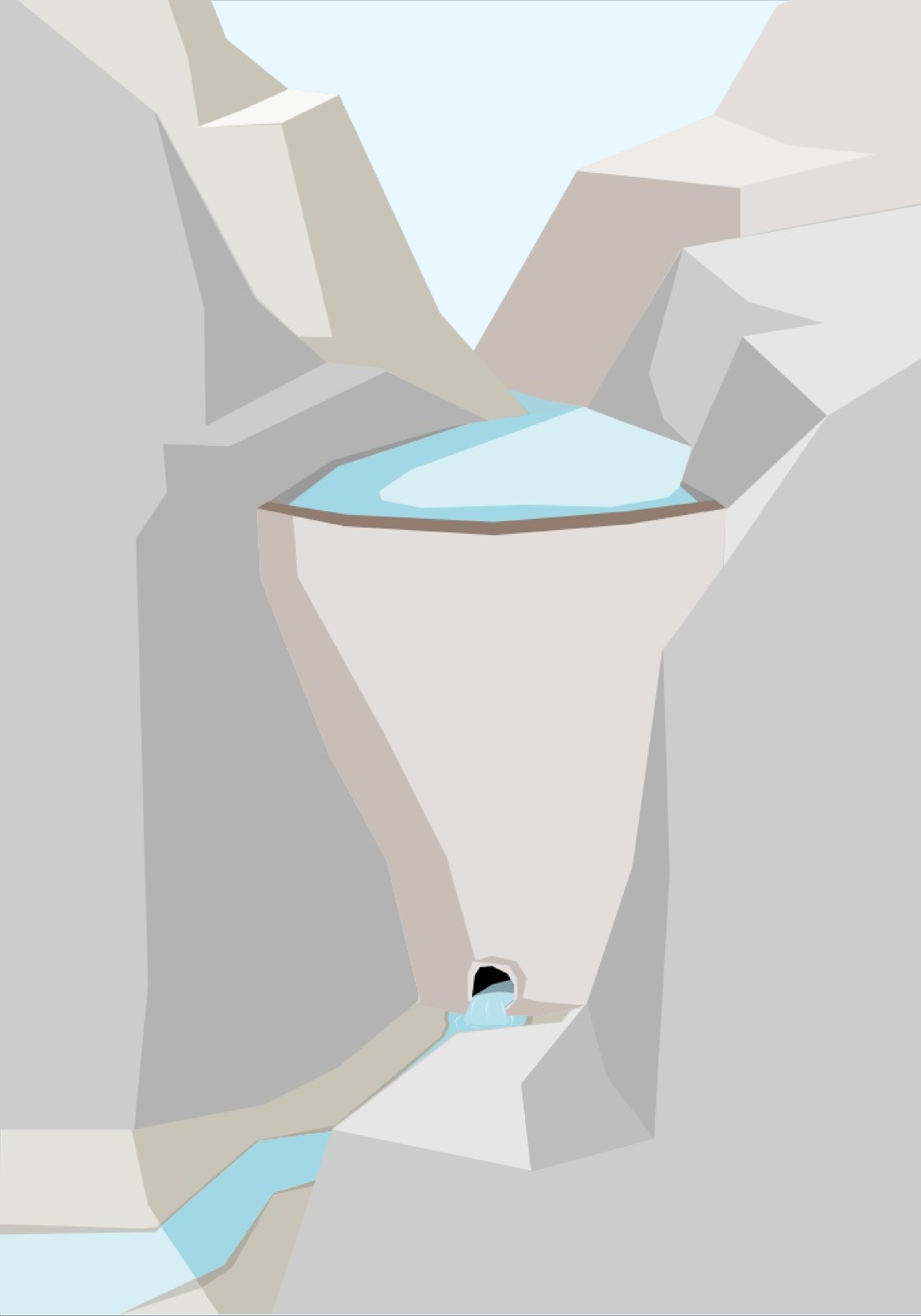
# CONSTRAINTS

- Tools and languages



# CONSTRAINTS

- Tools and languages
- Version and updates



# CONSTRAINTS

- Tools and languages
- Version and updates
- Hardware platforms

# CONSTRAINTS

- Tools and languages
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- Dependence on the ACS

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- Tools and languages
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- Hardware platform
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We can not do whatever we want (or you want)

# SOME NUMBERS FOR BI FESA CLASSES

More than 100 FESA classes

All FESA 2 classes under updating to FESA 3

~ 250 FECs under our responsibility

more than 100 Expert Applications and Tools





# Challenges

Multitude of devices

Multiple infrastructures

Under developing specifications

Operational and Expert needs

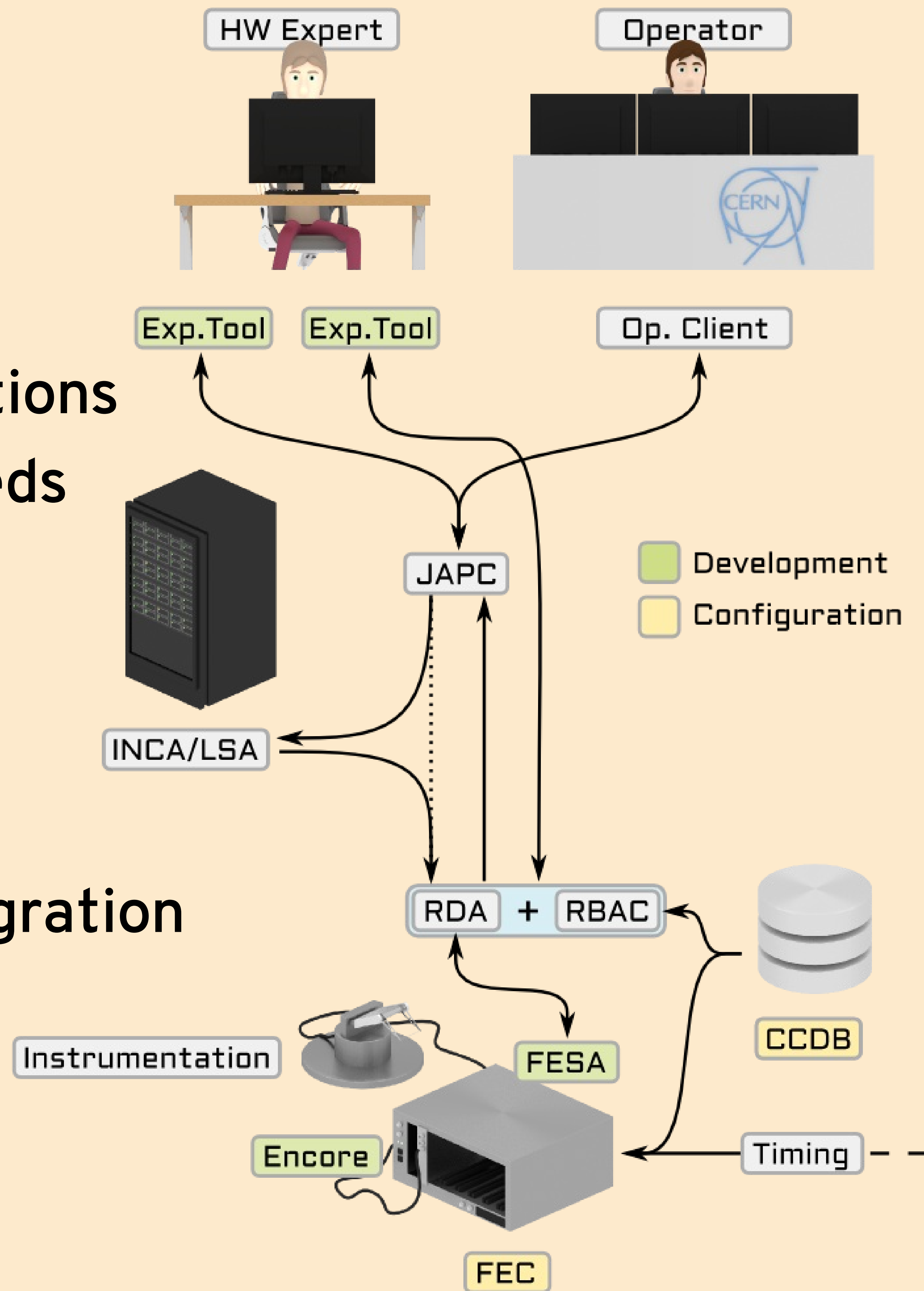
# Constraints

Hardware maintenance

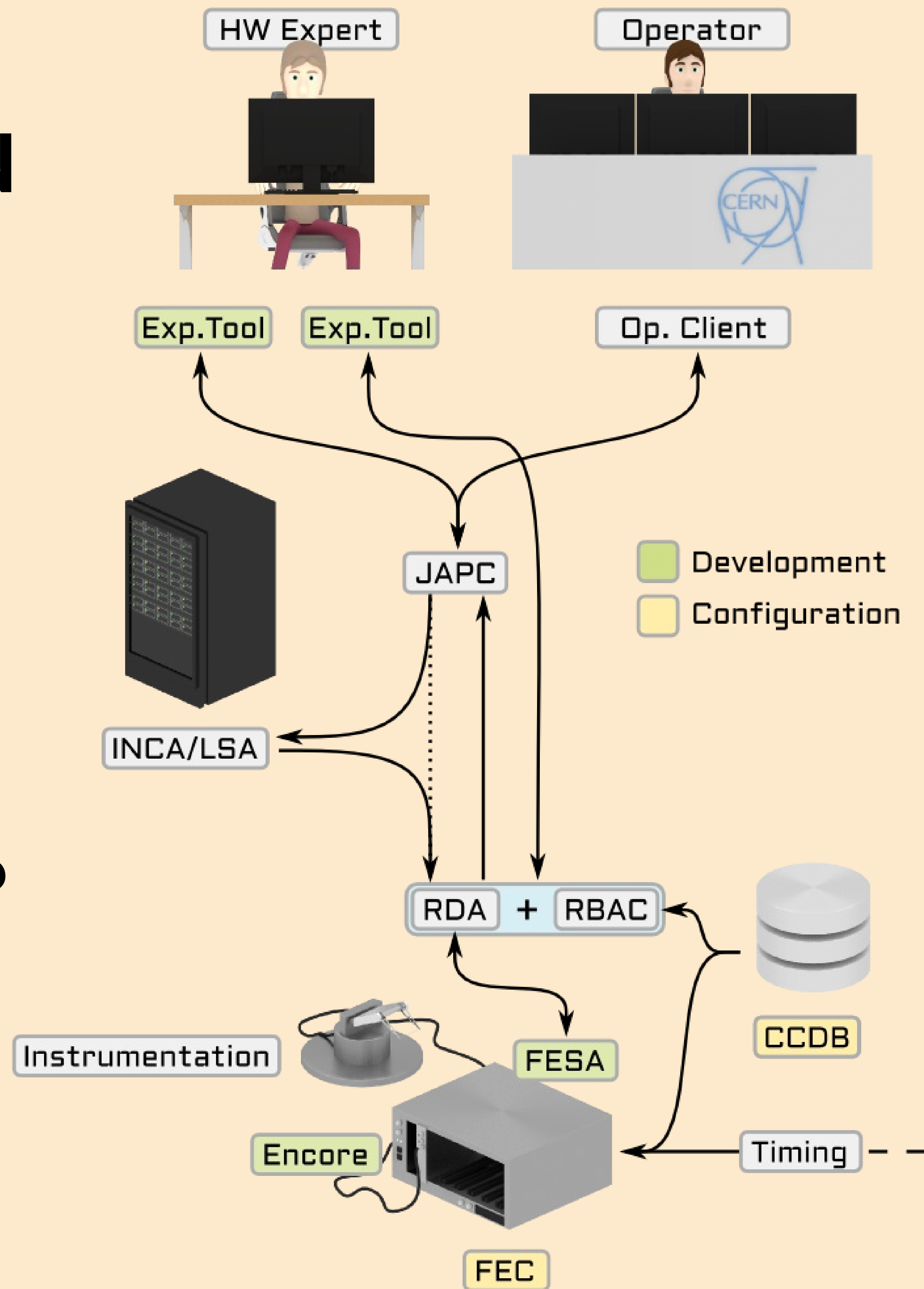
Software maintenance

Software and Hardware migration

Tools and dependencies



# THANK YOU FOR YOUR ATTENTION



# ANY QUESTIONS?