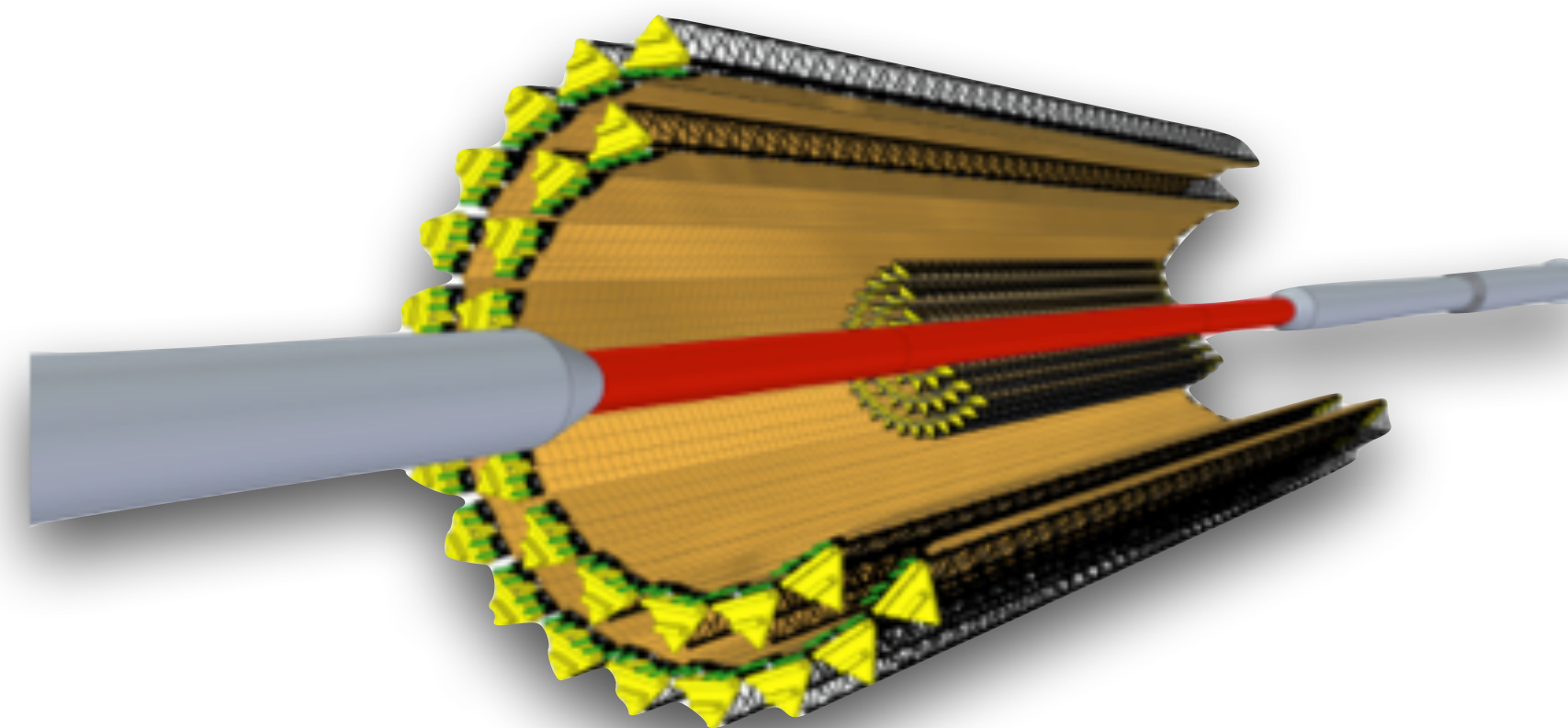





CMIS for the NICA projects of the STS Department.

César Ceballos Sánchez - JINR



JINR - VBLHEP, 06/02/2020


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 Automatizované systémy riadenia

Construction Management Information System

Customer	Joint Institute for Nuclear Research 6 Joliot-Curie St Dubna Moscow Region Russia
Contact person	Yuri Murin
Date	11. 11. 2019
Authors	Ján Jadlovský Henrieta Telepovska Jakub Čerkala Vasil' Vančík

All-around multiple-projects handler.

It is composed of the following base modules:

» **Resources Module**


- » Members
- » Institutes

» **Project Module**

- » Project Definition and Planning
- » Project Management and Resources
- » Construction Data
- » Activities
- » Finances
- » Reports

» **Administration**

» **Help**

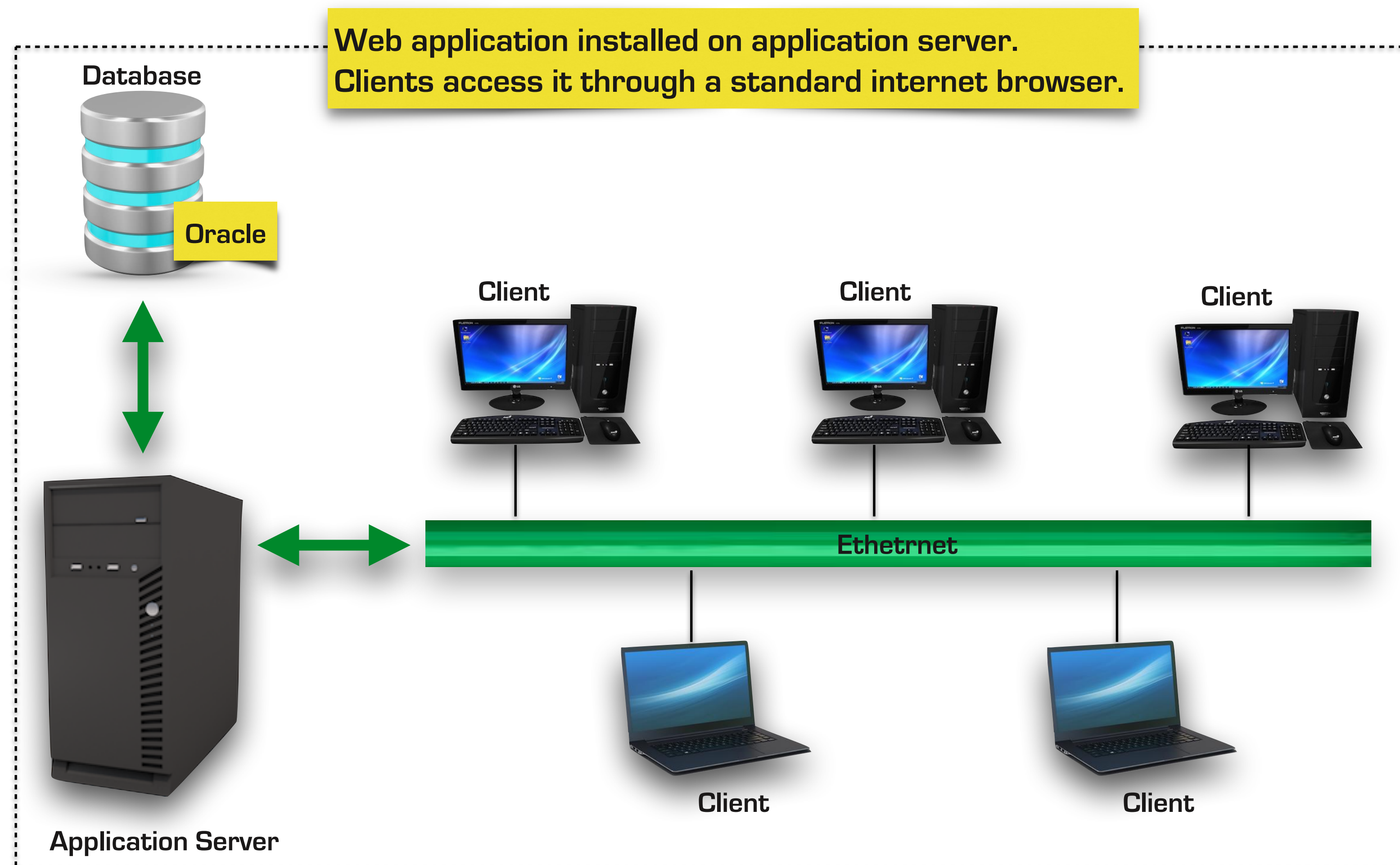


KYBERNETIKA s.r.o.

Automatizované systémy riadenia

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Customer	Joint Institute for Nuclear Research 6 Joliot-Curie St Dubna Moscow Region Russia
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Information System for ALICE Upgrade Construction Management System



ALICE UPGRADE CONSTRUCTION MANAGEMENT SYSTEM

January 2019

Ver. 3

CERN

KYBERNETIKA, s.r.o., Košice

Orgovánová 4

040 11 Košice

Slovak republic



KYBERNETIKA s.r.o.
Automatizované systémy riadenia

Construction Management Information System

Customer

Joint Institute for Nuclear Research
6 Joliot-Curie St
Dubna
Moscow Region
Russia

Contact person

Yuri Murin

Date

11. 11. 2019

Authors

Ján Jadlovský
Henrieta Telepovska
Jakub Čerkala
Vasil' Vančík



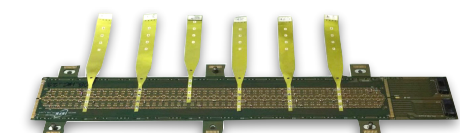
OB Stave Production

Berkely (USA), Daresbury (UK), Frascati (Italy), Nikhef (Netherlands), Turin (Italy)



OB HIC Production

Bari (Italy), Liverpool (UK), Pusan/Inha (Rep. of Korea), Strasbourg (France), Wuhan (China)



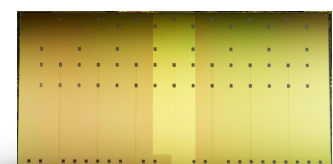
OB FPC Production

SWISS GS, Hybrid SA (Switzerland), Catania, Trieste (Italy)



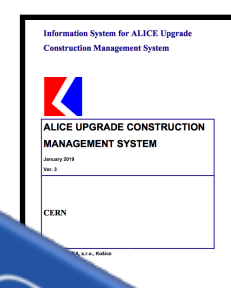
Chip Test

Pusan/Inha, Yonsei (Rep. of Korea)

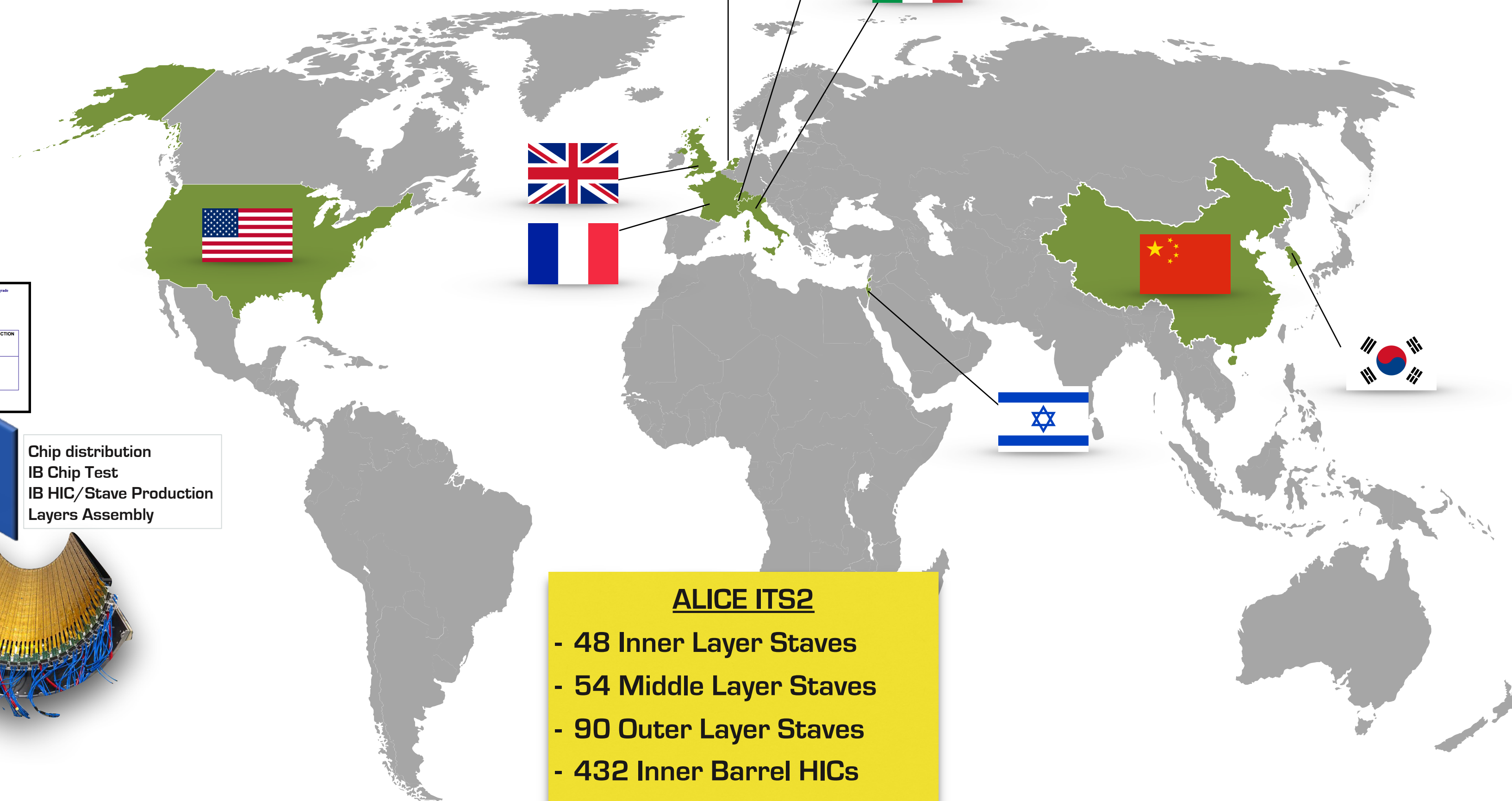
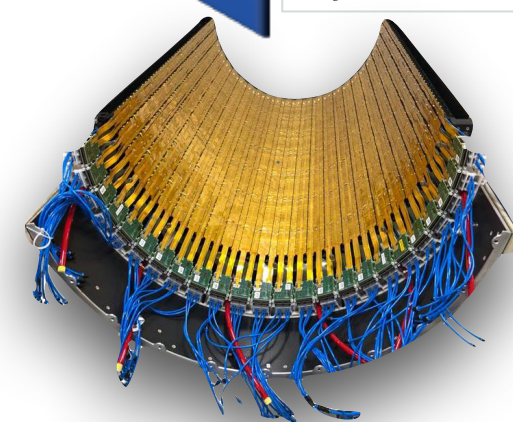


Chip production

MEMC (Italy), TowerJazz (Israel), Furex (Rep. of Korea)

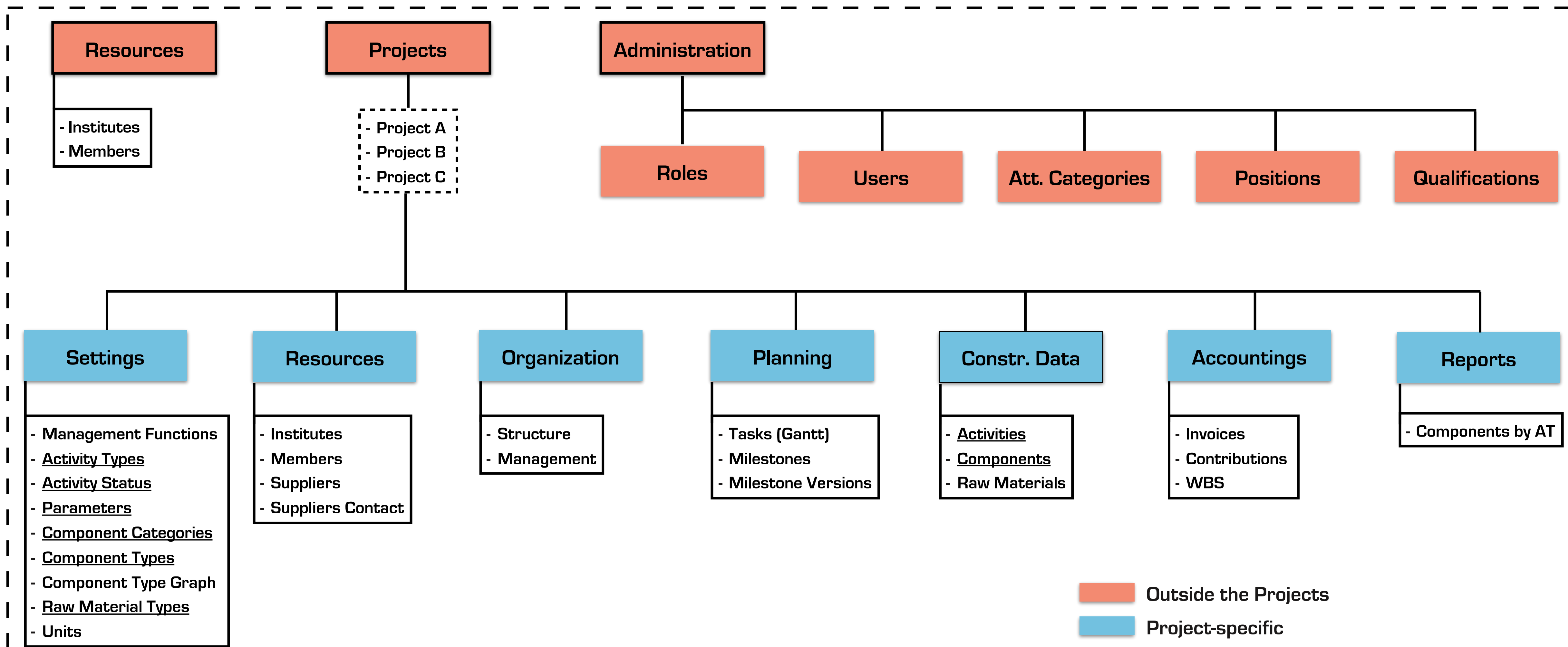


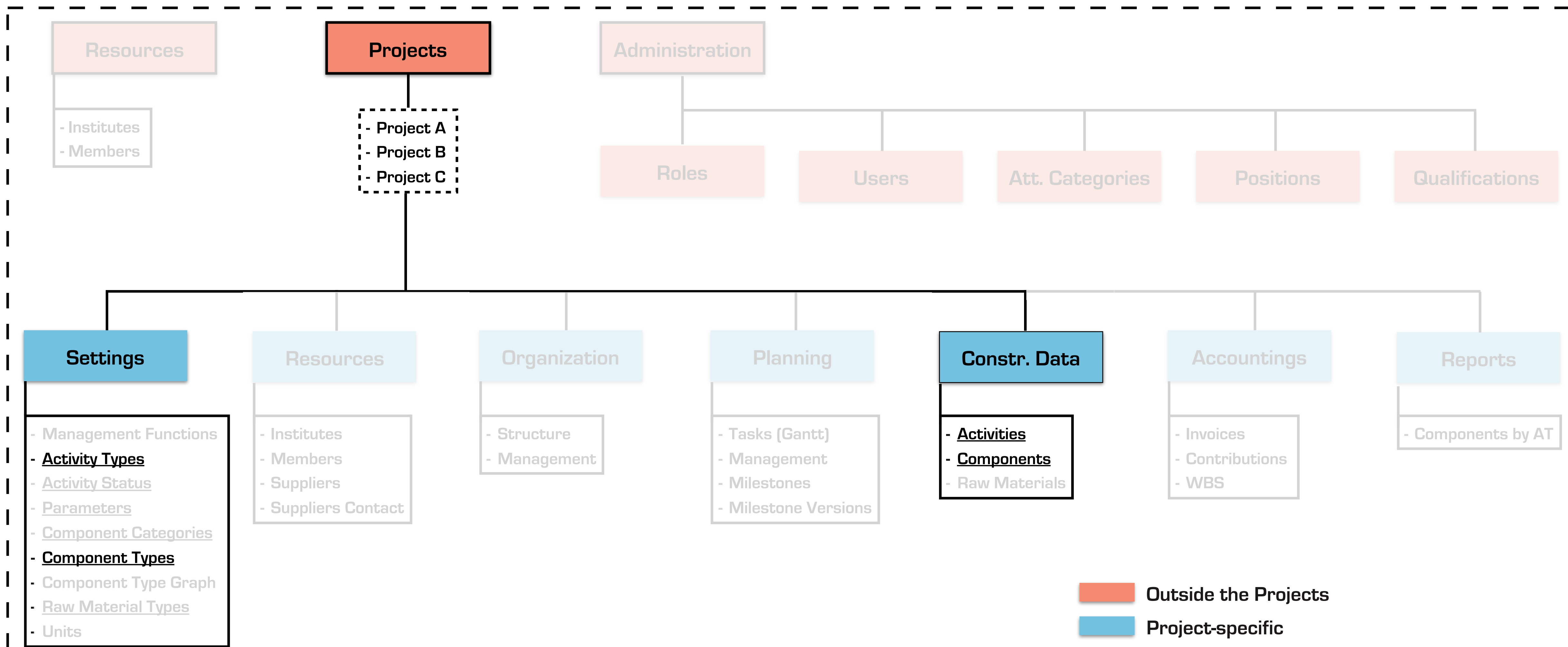
Chip distribution
IB Chip Test
IB HIC/Stave Production
Layers Assembly



ALICE ITS2

- 48 Inner Layer Staves
- 54 Middle Layer Staves
- 90 Outer Layer Staves
- 432 Inner Barrel HICs
- 1692 Outer Barrel HICs
- 27576 Pixel Chips (plus spares)





Activities are actions performed on Components that may change their Physical/Functional^(*) status.

Activity: ALPIDEB Chip Classification of ChipXX



Component: ALPIDEB ChipXX



Result: ALPIDEB ChipXX [Physical Satus] = <physical_status_value>
ALPIDEB ChipXX [Functional Satus] = <functional_status_value>

(*) All possible Physical and Functional statuses of a component are declared on the 'Component Type' definition.
The possible result of an Activity are combinations of Physical and functional statuses and are declared on the 'Activity Type' definition.

Type

Activity Type: ALPIDE Chip Classification

Component Type: ALPIDE Chip

Instance

Activity: Classification T854193W09R41

Component: T854193W09R41

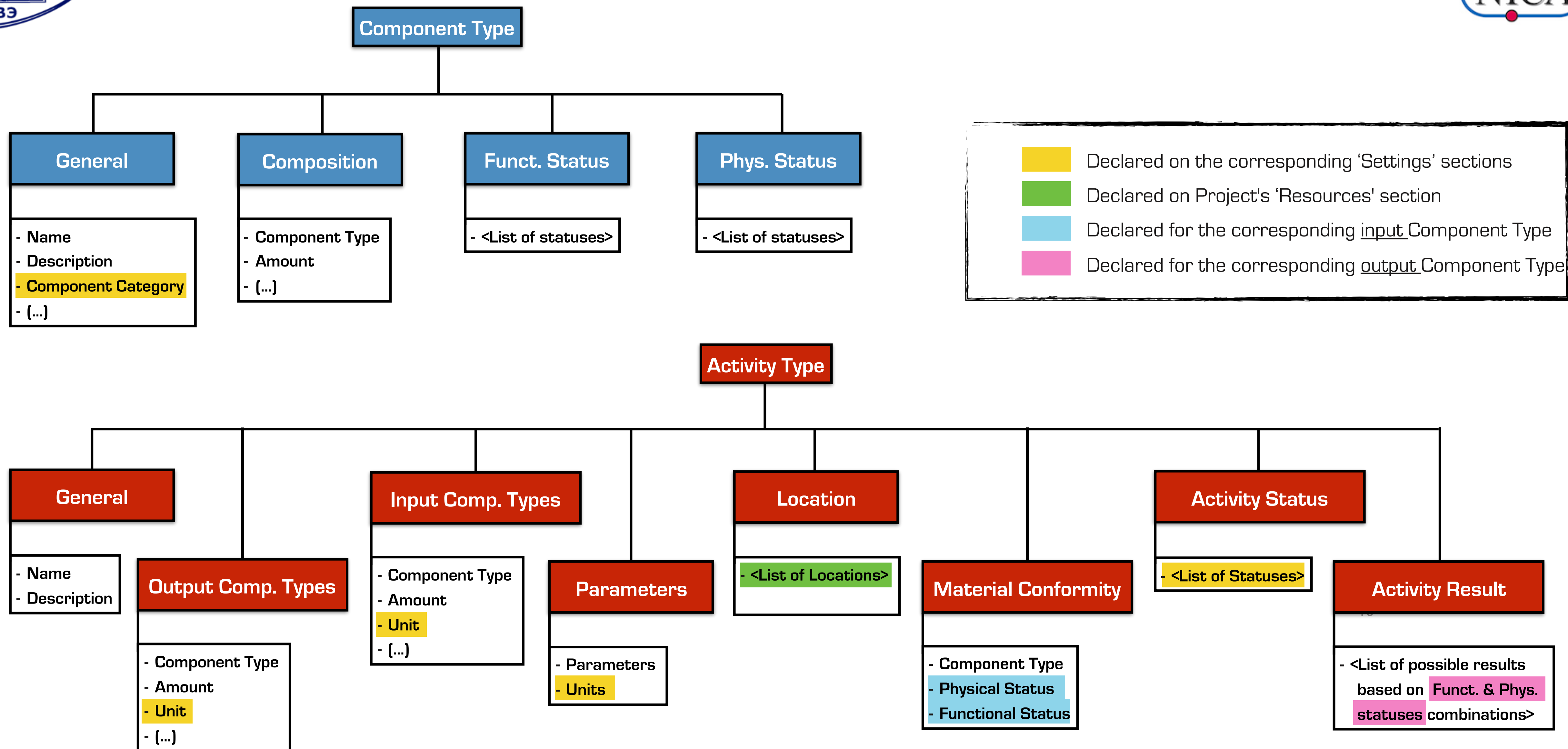
General definitions

Activity Status: Open[default], Close[default],...

Component Category: Carbon support structure, Components container, ...

Parameters: Defect density, DVDD Impedance, ...

Units: spatial density [cm^{-2}], Volts [V], piece(s) [pcs], ...





MPD - ITS



Declared on 'Settings → Component Categories'



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Resources Projects Administration Help

Summary Info Settings

Management Functions Activities

Count: 55

Name	Description	Category	Unit	Estimated Total Unit Cost	Actual Total Unit Cost	Actions		
ALPIDE Chip	ALPIDE Chip	Chip		0				
ALPIDE Circuit	ALPIDE Circuit intended for testing	Circuit		0				
ALPIDE Tray	Tray containing ALPIDE chips	Tray		0				
ALPIDE Tray Box	Box for shipping ALPIDE trays	Tray Box		0				
ALPIDE Wafer	CMOS Wafer with 46 ALPIDE chips	Wafer		0				
ALPIDE Wafer Box	Wafer Box containing up to 25 ALPIDE Wafers	WFRBOX_ALPIDE	0	56	1	56	0	
ALPIDE Wafer Lot	Lot of up to 25 ALPIDE Wafers which can be divided and shipped over up to 5 ALPIDE Wafer Boxes	WFRLOT_ALPIDE	0	56	1	56	0	

Component Type

General

Composition

Functional Status

Physical Status

+

CatA

×

×

CatB

×

×

CatC

×

×

NOK

×

×

OK

×

×

Retest

×

×

Undefined

×

[EMPTY]

Save

Cancel

CERN

Resources Projects Administration Help

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Add

Q

View

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Count: 55

Name	Description	Code	Unit	Quantity	Material	Estimated Unit Cost	Actual Total Unit Cost
ALPIDE Chip	ALPIDE Chip					0	
ALPIDE Circuit	ALPIDE Circuit intended for testing					0	
ALPIDE Tray	Tray containing ALPIDE chips					0	
ALPIDE Tray Box	Box for shipment of ALPIDE Trays	ALPIDE_TRAYBOX	0	100	1	100	0
ALPIDE Wafer	CMOS Wafer containing 46 ALPIDE Circuits	WFR_ALPIDE	0	1400	1	1400	0
ALPIDE Wafer Box	Wafer Box containing up to 25 ALPIDE Wafers	WFRBOX_ALPIDE	0	56	1	56	0
ALPIDE Wafer Lot	Lot of up to 25 ALPIDE Wafers which can be divided and shipped over up to 5 ALPIDE Wafer Boxes	WFRLOT_ALPIDE	0	56	1	56	0

Component Type

General Composition Functional Status Physical Status

Status

+

Chip not found

×

Damaged

×

Not for testing

×

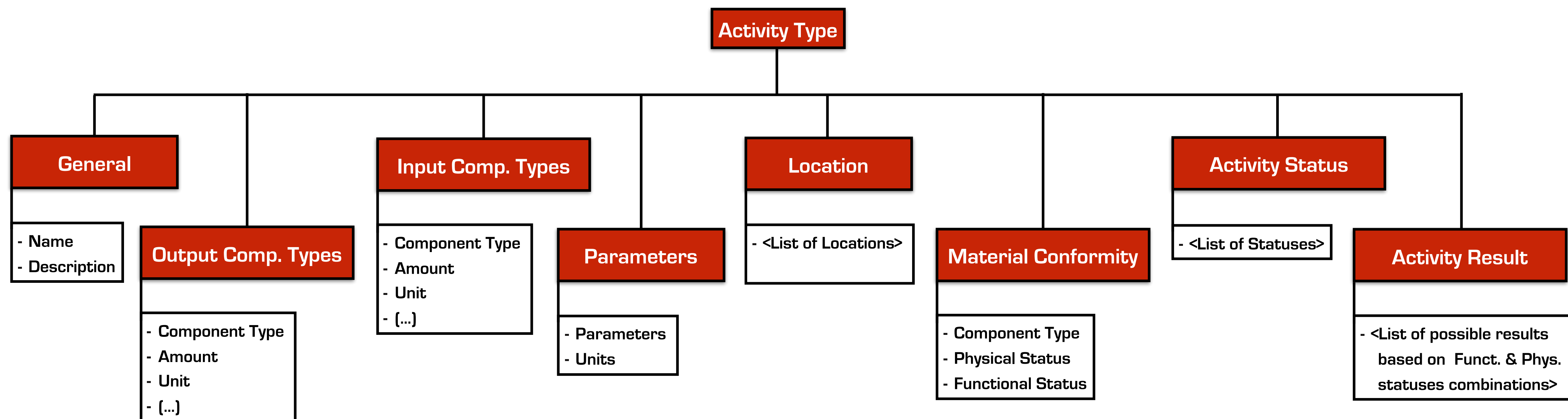
OK


×

[EMPTY]

Save

Cancel





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ALPIDE Chip Testing Analysis	Analysis of Chip testing raw data; parameters are extracted and saved as Activity Parameters	
ALPIDE Circuit Classification	Classification of ALPIDE Circuit based on results of ALPIDE Circuit Testing, similar to ALPIDE Chip Classification	
ALPIDE Circuit Functional Checkup	Manual intervention to change the functional status of an ALPIDE Circuit	
ALPIDE Circuit Physical Checkup	Manual intervention to change physical status of ALPIDE Circuit	
ALPIDE Circuit	Testing of ALPIDE Circuit: results are base for classification of circuit	

Activity Type

General

Output Component Types

Input Component Types

Parameters

Location

Mat. Conformity

Activity Status

Activity Result

* Name

ALPIDE Chip Classification

Description

Classification of ALPIDE Chip based on results of ALPIDE Chip Testing

☐ Activity Type is Assembly

Save

Cancel

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Input Component Types

Parameters

Location

Mat. Conformity

Activity Status

Activity Result

* Component Type	* Amount	* Unit	* Valid From	Valid To	+
ALPIDE Chip	1	pc	19.07.2017		×

Declared on 'Settings → Units'

Save Cancel

Functional Checkup

ALPIDE Chip Physical Checkup

Manual intervention to change physical status of ALPIDE Chip

ALPIDE Chip Shipment and Reception

Shipment and reception of single ALPIDE Chips; to be combined with the activity ALPIDE Tray Shipment and ALPIDE Tray Reception; location of activity should be receiving institute

ALPIDE Chip Testing

Testing of ALPIDE Chip; results are base for chip classification

ALPIDE Chip Testing Analysis

Analysis of Chip testing raw data; parameters are extracted and saved as Activity Parameters

ALPIDE Circuit Classification

Classification of ALPIDE Circuit based on results of ALPIDE Circuit Testing, similar to ALPIDE Chip Classification

ALPIDE Circuit Functional Checkup

Manual intervention to change the functional status of an ALPIDE Circuit

ALPIDE Circuit Physical Checkup


Manual intervention to change physical status of ALPIDE Circuit

ALPIDE Circuit

Testing of ALPIDE Circuit: results are base for classification of circuit

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Activity Type

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Output Component Types
Input Component Types
Parameters
Location

Mat. Conformity
Activity Status
Activity Result

* Component Type	* Amount	* Unit	* Valid From	Valid To	+
ALPIDE Chip	1	pc	19.07.2017		X

Declared on 'Settings → Units'

Save
Cancel

Functional Checkup
ALPIDE Chip Physical Checkup
ALPIDE Chip Shipment and Reception
ALPIDE Chip Testing
ALPIDE Chip Testing Analysis
ALPIDE Circuit Classification
ALPIDE Circuit Functional Checkup
ALPIDE Circuit Physical Checkup
ALPIDE Circuit

Manual intervention to change physical status of ALPIDE Chip
Shipment and reception of single ALPIDE Chips; to be combined with the activity ALPIDE Tray Shipment and ALPIDE Tray Reception; location of activity should be receiving institute
Testing of ALPIDE Chip; results are base for chip classification
Analysis of Chip testing raw data; parameters are extracted and saved as Activity Parameters
Classification of ALPIDE Circuit based on results of ALPIDE Circuit Testing, similar to ALPIDE Chip Classification
Manual intervention to change the functional status of an ALPIDE Circuit
Manual intervention to change physical status of ALPIDE Circuit
Testing of ALPIDE Circuit; results are base for classification of circuit

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Activity Type

General

Output Component Types

Input Component Types

Parameters

Location

Mat. Conformity

Activity Status

Activity Result

Parameter

Unit

+

UNIX Timestamp	N/A	✕
Time	N/A	✕
Classification Category	N/A	✕
Classification Version	N/A	✕

Save


Cancel

Declared on 'Settings → Units'

Reception

receiving institute

ALPIDE Chip Testing	Testing of ALPIDE Chip; results are base for chip classification	⚙
ALPIDE Chip Testing Analysis	Analysis of Chip testing raw data; parameters are extracted and saved as Activity Parameters	⚙
ALPIDE Circuit Classification	Classification of ALPIDE Circuit based on results of ALPIDE Circuit Testing, similar to ALPIDE Chip Classification	⚙
ALPIDE Circuit Functional Checkup	Manual intervention to change the functional status of an ALPIDE Circuit	⚙
ALPIDE Circuit Physical Checkup	Manual intervention to change physical status of ALPIDE Circuit	⚙
ALPIDE Circuit	Testing of ALPIDE Circuit; results are base for classification of circuit	⚙



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Location

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Activity Result

Location

+
European Organization for Nuclear Research (CERN), Geneva

Declared on 'Projects → Resources → Institutes'

Save
Cancel

Functional Checkup	
ALPIDE Chip Physical Checkup	Manual intervention to change physical status of ALPIDE Chip
ALPIDE Chip Shipment and Reception	Shipment and reception of single ALPIDE Chips; to be combined with the activity ALPIDE Tray Shipment and ALPIDE Tray Reception; location of activity should be receiving institute
ALPIDE Chip Testing	Testing of ALPIDE Chip; results are base for chip classification
ALPIDE Chip Testing Analysis	Analysis of Chip testing raw data; parameters are extracted and saved as Activity Parameters
ALPIDE Circuit Classification	Classification of ALPIDE Circuit based on results of ALPIDE Circuit Testing, similar to ALPIDE Chip Classification
ALPIDE Circuit Functional Checkup	Manual intervention to change the functional status of an ALPIDE Circuit
ALPIDE Circuit Physical Checkup	Manual intervention to change physical status of ALPIDE Circuit
ALPIDE Circuit	Testing of ALPIDE Circuit; results are base for classification of circuit

CMIS for the NICA projects of the STS Department | JINR - VBLHEP, 06/02/2020 | César Ceballos Sánchez 20

CERN

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Activity Type

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Parameters

Location

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Activity Status

Activity Result

* Component Type	* Functional Status	* Physical Status	+
ALPIDE Chip	OK	OK	✕
ALPIDE Chip	Undefined	OK	✕
ALPIDE Chip	Retest	OK	✕
ALPIDE Chip	NOK	OK	✕

Save

Cancel

Reception

receiving institute

ALPIDE Chip Testing

Testing of ALPIDE Chip; results are base for chip classification

ALPIDE Chip Testing Analysis

Analysis of Chip testing raw data; parameters are extracted and saved as Activity Parameters

ALPIDE Circuit Classification

Classification of ALPIDE Circuit based on results of ALPIDE Circuit Testing, similar to ALPIDE Chip Classification

ALPIDE Circuit Functional Checkup

Manual intervention to change the functional status of an ALPIDE Circuit

ALPIDE Circuit Physical Checkup

Manual intervention to change physical status of ALPIDE Circuit

ALPIDE Circuit

Testing of ALPIDE Circuit: results are base for classification of circuit

Type Graph

Raw Material Types

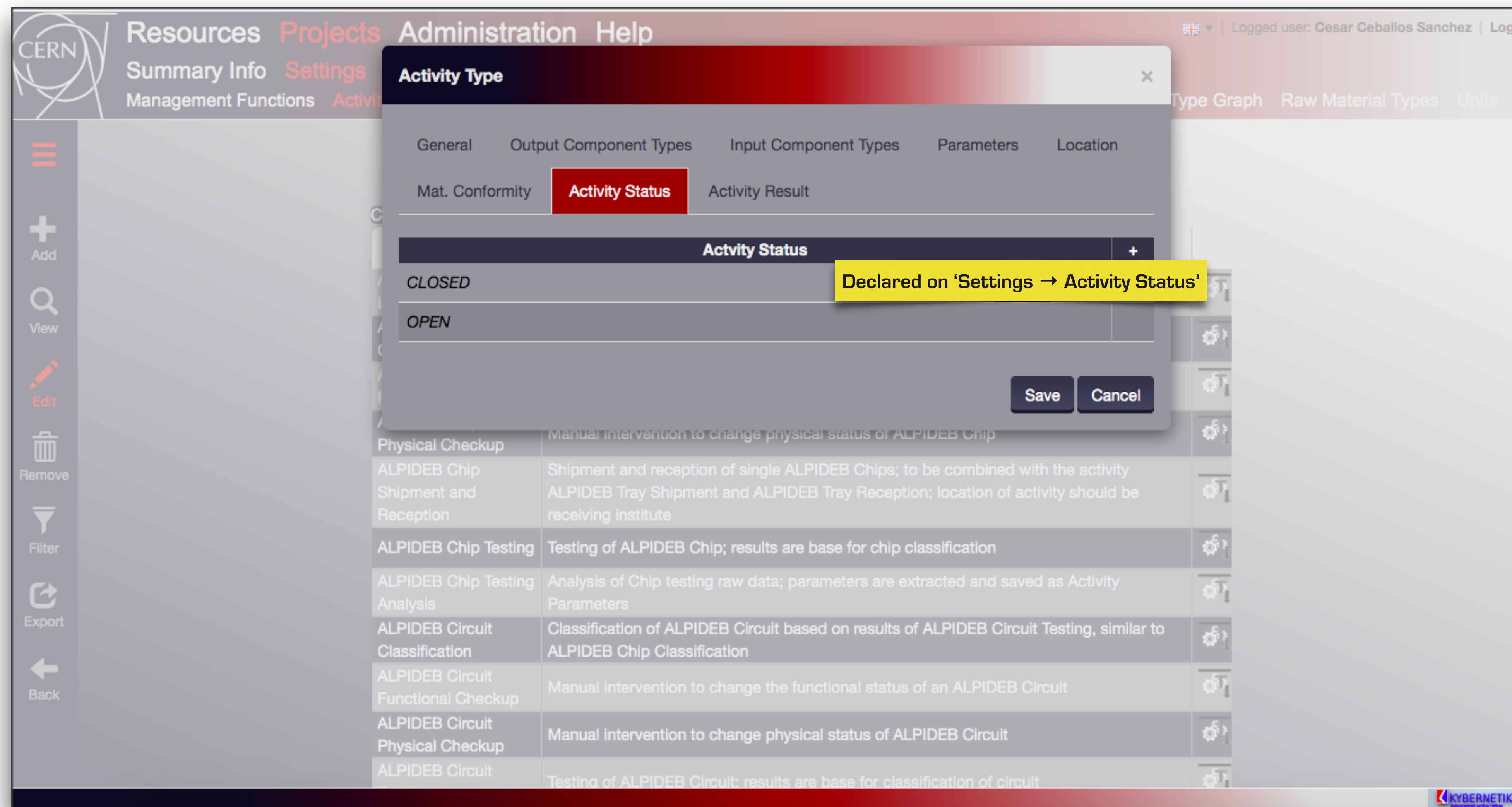
Units

Logged user: Cesar Ceballos Sanchez

Log Out

KYBERNETIKA

Declared on 'Fuctional/Physical Satus' section of the 'Input Component Types'



Activity Type

General Output Component Types Input Component Types Parameters Location

Mat. Conformity **Activity Status** Activity Result


Activity Status +

CLOSED Declared on 'Settings -> Activity Status'

OPEN

Save Cancel

Activity Type	Description
Physical Checkup	Manual intervention to change physical status of ALPIDE Chip
ALPIDE Chip Shipment and Reception	Shipment and reception of single ALPIDE Chips; to be combined with the activity ALPIDE Tray Shipment and ALPIDE Tray Reception; location of activity should be receiving institute
ALPIDE Chip Testing	Testing of ALPIDE Chip; results are base for chip classification
ALPIDE Chip Testing Analysis	Analysis of Chip testing raw data; parameters are extracted and saved as Activity Parameters
ALPIDE Circuit Classification	Classification of ALPIDE Circuit based on results of ALPIDE Circuit Testing, similar to ALPIDE Chip Classification
ALPIDE Circuit Functional Checkup	Manual intervention to change the functional status of an ALPIDE Circuit
ALPIDE Circuit Physical Checkup	Manual intervention to change physical status of ALPIDE Circuit
ALPIDE Circuit	Testing of ALPIDE Circuit; results are base for classification of circuit



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Activity Type

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Parameters

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Mat. Conformity

Activity Status

Activity Result

* Name

NOK

+

⬆

⬇

⬇

⬆

⬇

⬆

⬇

⬆

⬇

Component Type	Direction	* Functional Status	* Physical Status
ALPIDE Chip	out	NOK	OK

OK

Component Type	Direction	* Functional Status	* Physical Status
ALPIDE Chip	out	OK	OK


Declared on 'Fuctional/Physical Satus' section of the 'Output Component Types'

Save

Cancel

ALPIDEB Circuit Classification	Classification of ALPIDEB Circuit based on results of ALPIDEB Circuit Testing, similar to ALPIDEB Chip Classification
ALPIDEB Circuit Functional Checkup	Manual intervention to change the functional status of an ALPIDEB Circuit
ALPIDEB Circuit Physical Checkup	Manual intervention to change physical status of ALPIDEB Circuit
ALPIDEB Circuit	Testing of ALPIDEB Circuit: results are base for classification of circuit

Activity 'Classification T854193W09R41'



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Activity Name	Activity Type	Start Date	End Date	Location	Activity Status	Activity Result	
Classification T854193W09R41	ALPIDE Chip Classification	14.01.2020	14.01.2020	European Organization for Nuclear Research (CERN), Geneva	Closed	OK	

Output Components

Component Type	Component ID	Functional Status	Physical Status
ALPIDE Chip	T854193W09R41	OK	OK

Input Components

Component Type	Component ID	Functional Status	Physical Status
ALPIDE Chip	T854193W09R41	Undefined	OK

Parameters

Name	Description	Value	Unit
Classification Category	Result of the chip classification: Gold, Silver, Bronze, Bad	1	N/A
Classification Version	Version number of classification threshold applied	45	N/A
Time	Time	123206	N/A
UNIX Timestamp	UNIX timestamp defining the testing time.	1579001357	N/A

Attachments

None


Uri

URI	Description
/eos/project/a/alice-its/ALICIA-1/1579001357/CHDO/Chips/532ZU09B/532ZU09BC2	raw data directory on eos

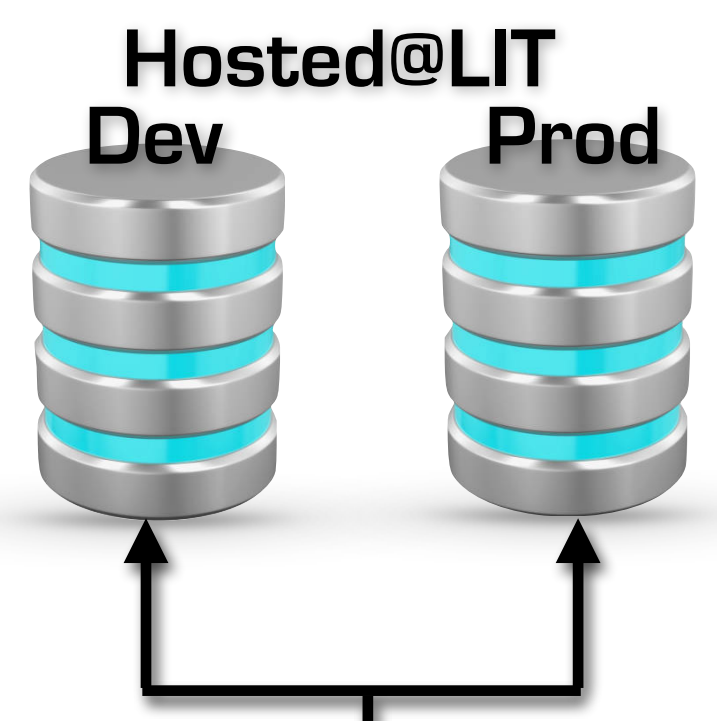
🇬🇧

Logged user: Cesar Ceballos Sanchez

Log Out



WebApp



API functions

AlucmsWebAPI

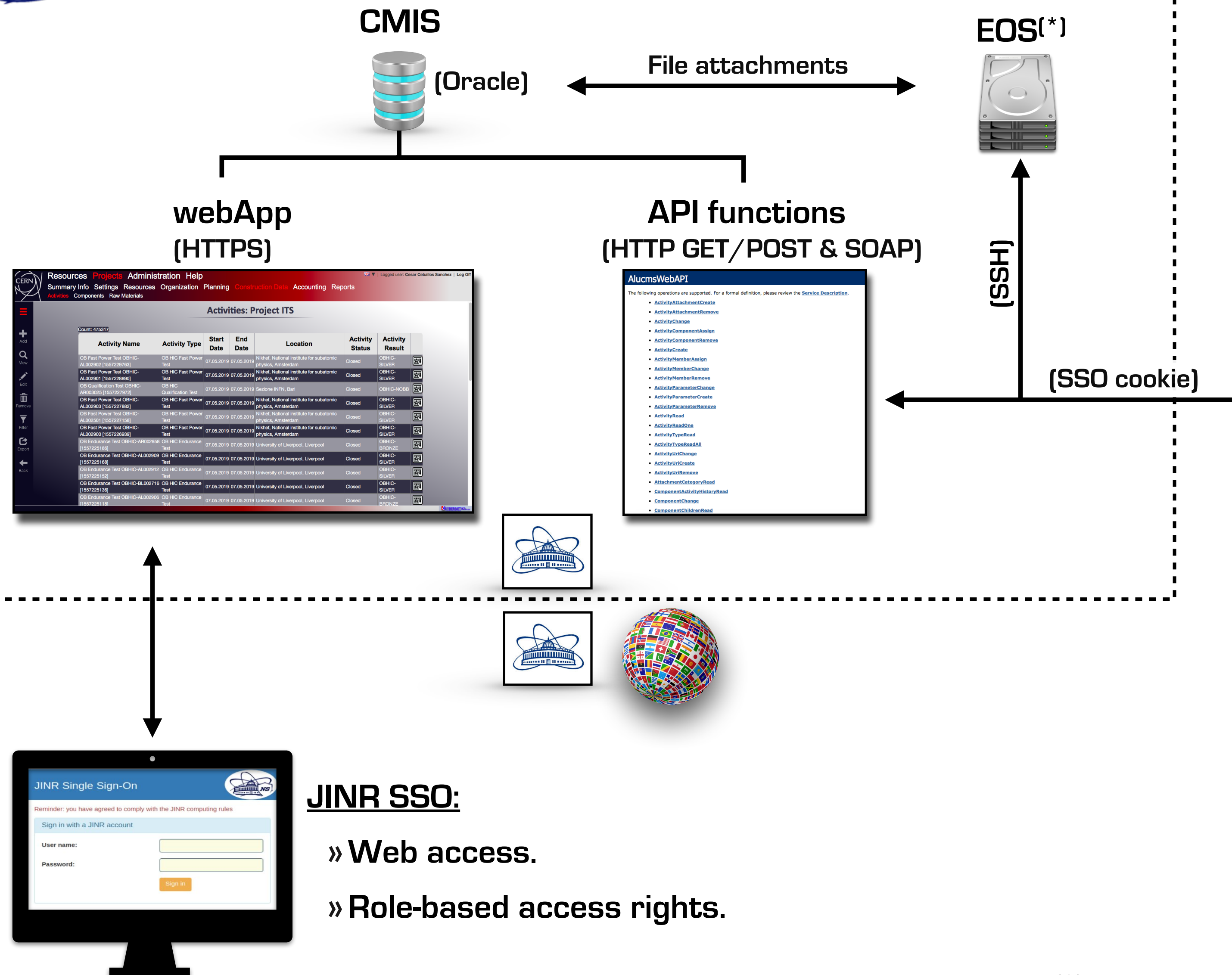
The following operations are supported. For a formal definition, please review the [Service Description](#).

- [ActivityAttachmentCreate](#)
- [ActivityAttachmentRemove](#)
- [ActivityChange](#)
- [ActivityComponentAssign](#)
- [ActivityComponentRemove](#)
- [ActivityCreate](#)
- [ActivityMemberAssign](#)
- [ActivityMemberChange](#)
- [ActivityMemberRemove](#)
- [ActivityParameterChange](#)
- [ActivityParameterCreate](#)
- [ActivityParameterRemove](#)
- [ActivityRead](#)
- [ActivityReadOne](#)
- [ActivityTypeRead](#)
- [ActivityTypeReadAll](#)
- [ActivityUriChange](#)
- [ActivityUriCreate](#)
- [ActivityUriRemove](#)
- [AttachmentCategoryRead](#)
- [ComponentActivityHistoryRead](#)
- [ComponentChange](#)
- [ComponentChildrenRead](#)

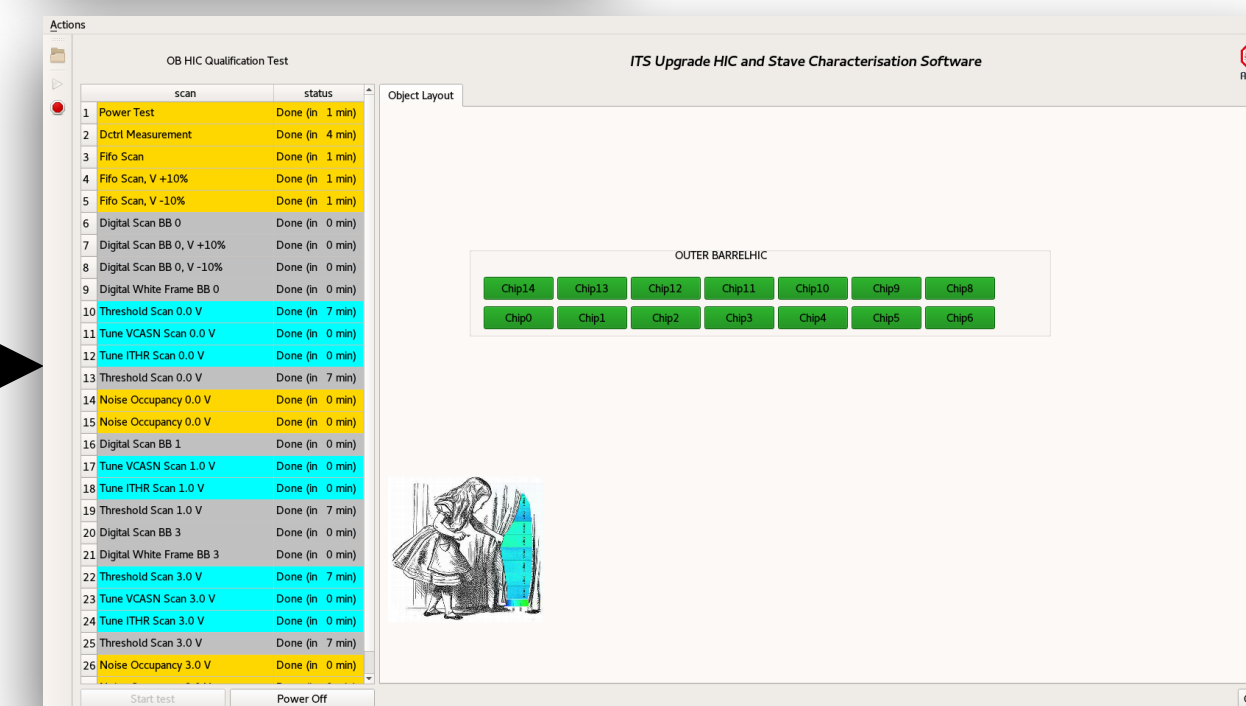
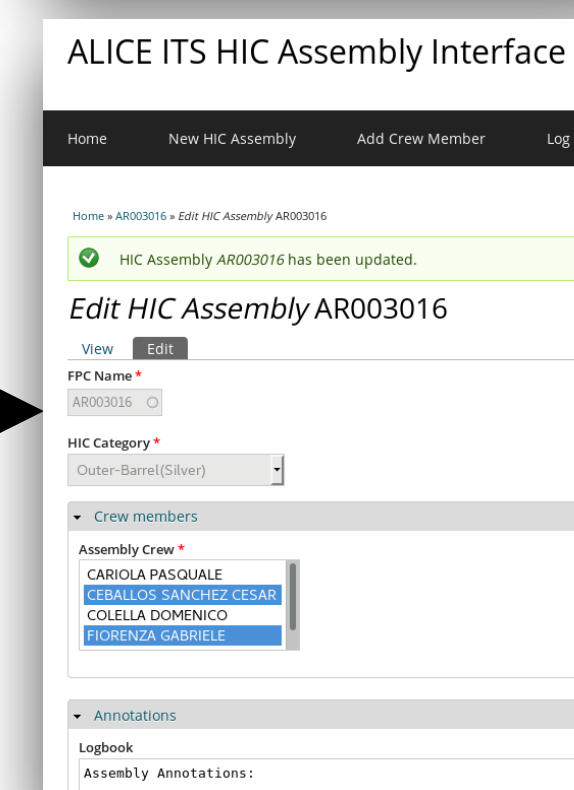
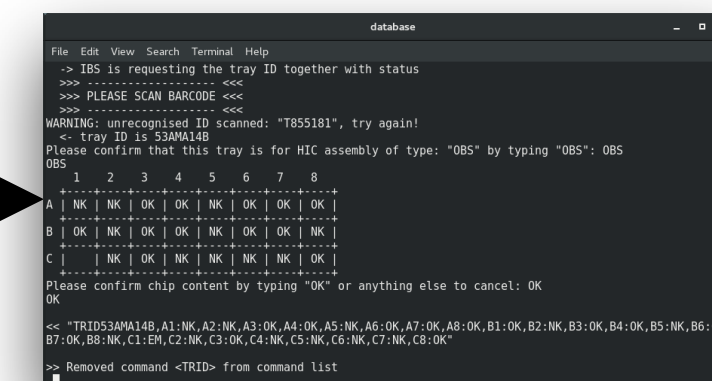
Web interface to be used by registered users for reading/writing data from/to the DB.

Activity and Component Types definitions are always done via WebApp

API function collection meant to be used by the construction and test hardware to read/write data from/to the DB.



Custom Assembly & Testing programs



(Kerberos credentials automatically renewed)

JINR SSO:

» Registered Service accounts

» Kerberos credentials

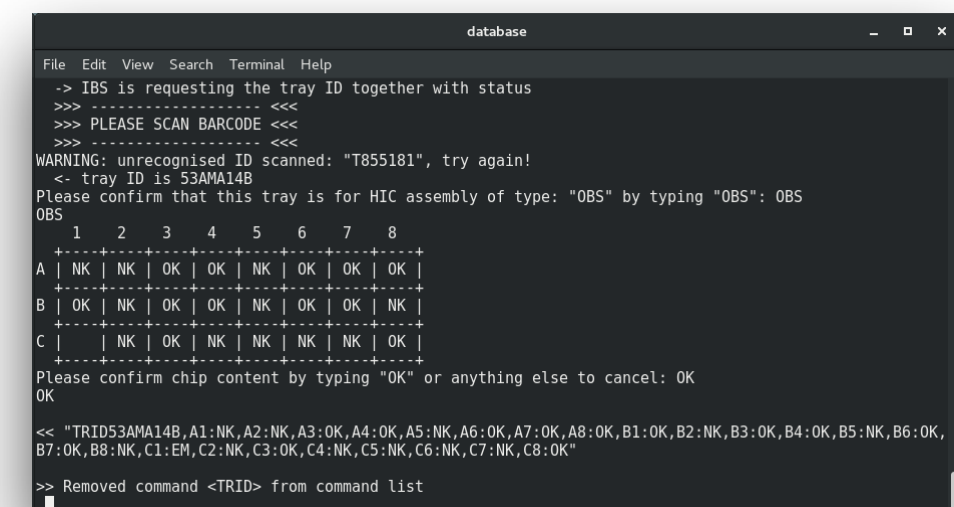
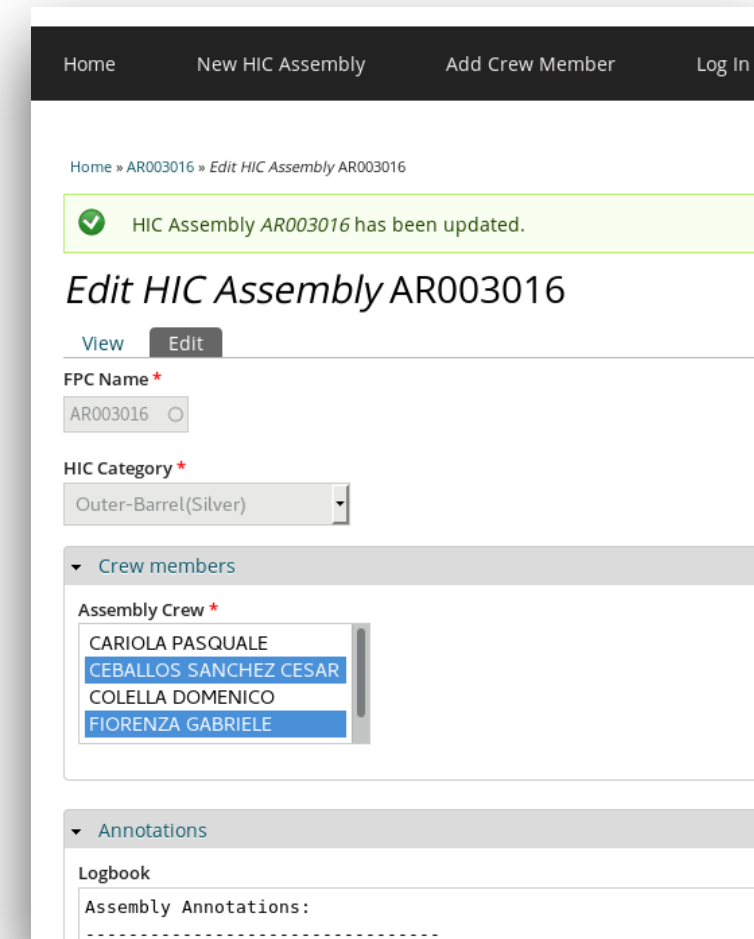
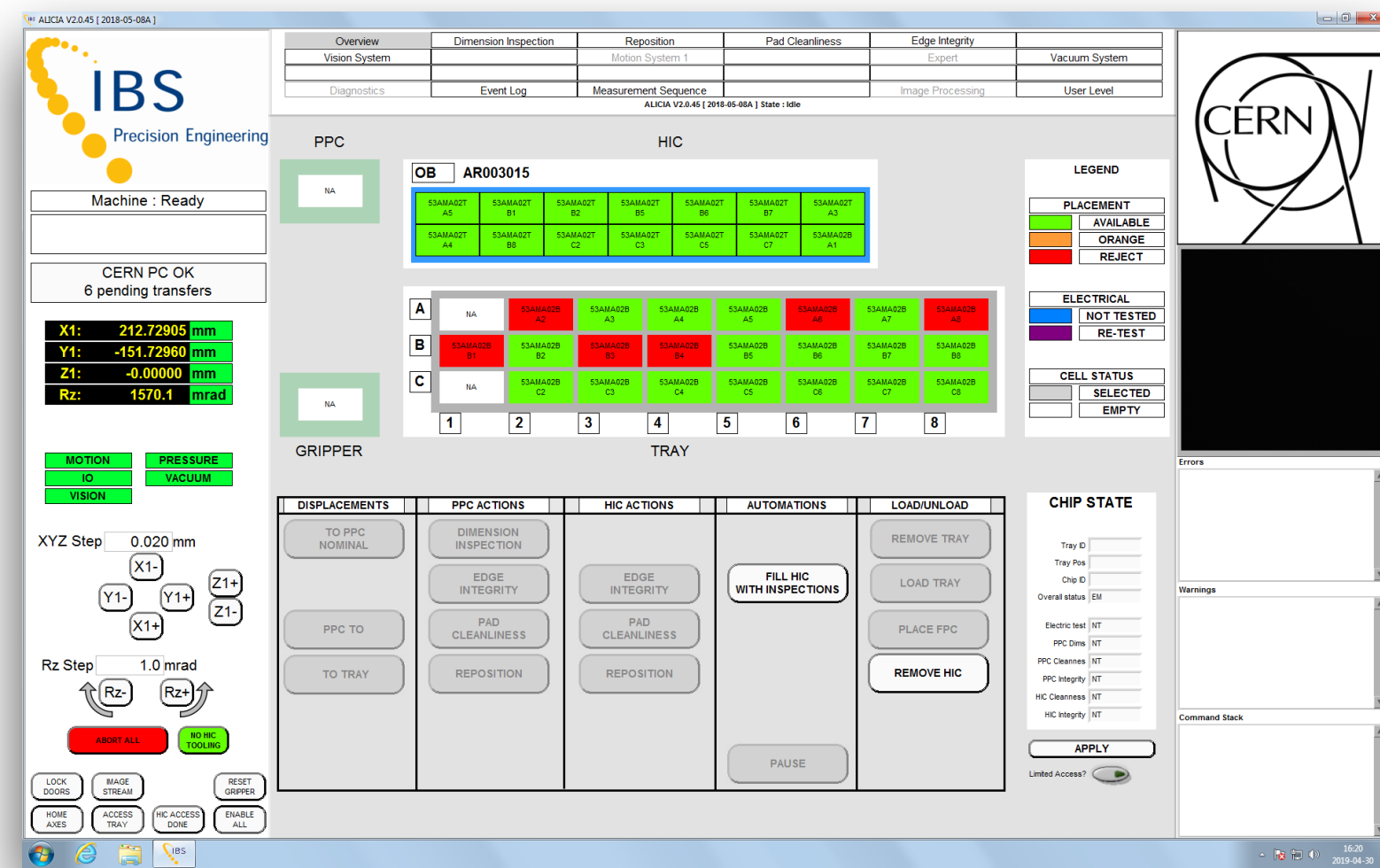
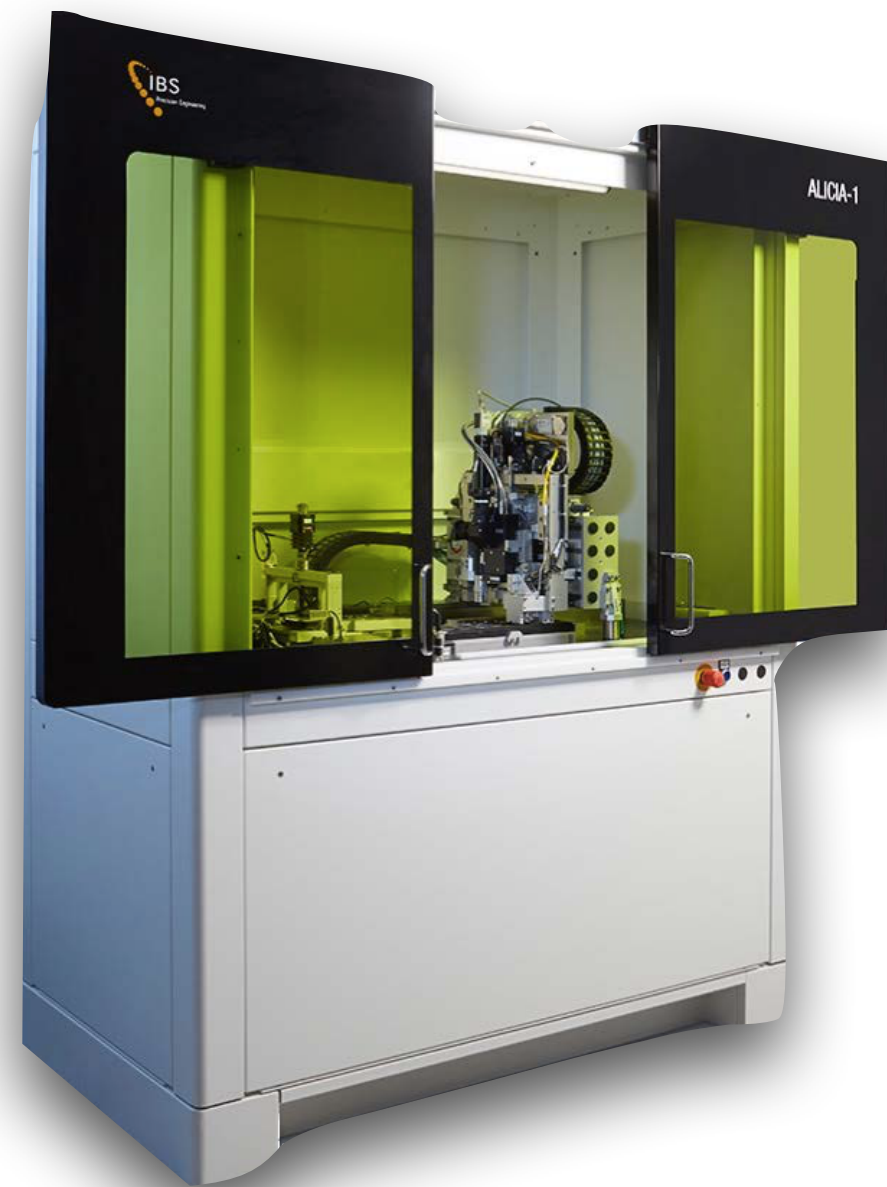
» Access cookies

JINR SSO:

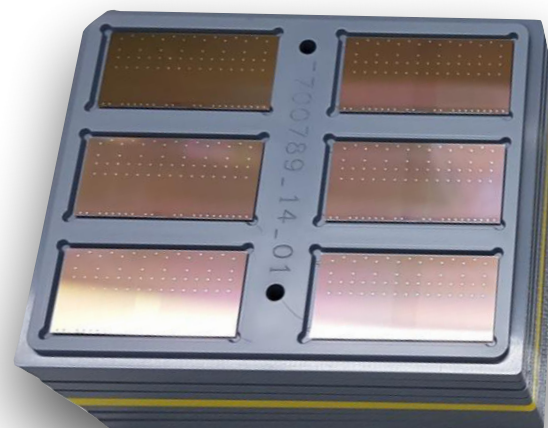
» **Web access.**

» Role-based access rights.

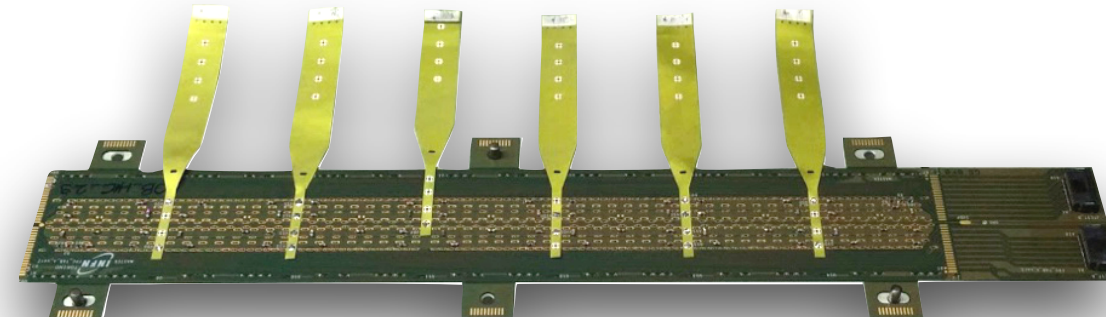
^(*)Network File System



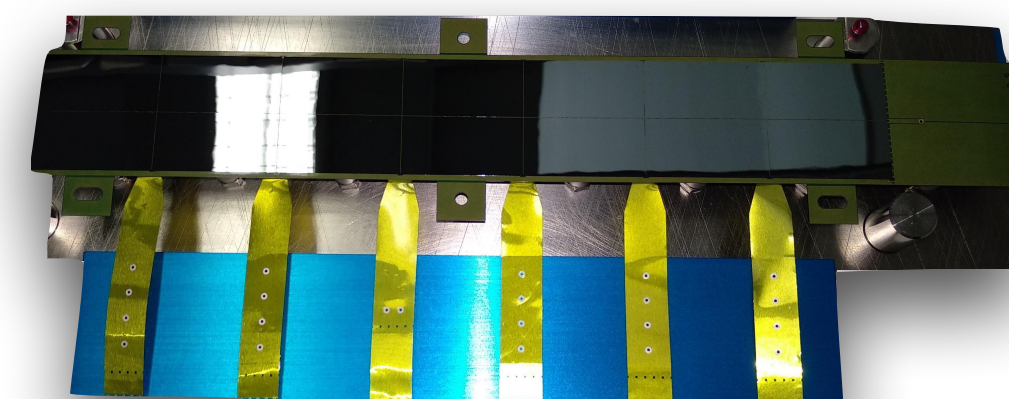
2 x 7 Chips



1 FPC



1 OBHIC



Parameters			
Name	Description	Value	Unit
Analog Current	Analog Current consumption of e.g. ALPIDE	11.6233333333	mA
Analogue Scan 3V Broken Pixels		4	N/A
Analogue Scan 3V Dead Pixels		4274	N/A
Analogue Scan 3V Noisy Pixels		30	N/A
BackBias 3V PWELL/SUB Current		2.56843	mA
BackBias Avg Analog Current		16.5051851852	A
BackBias Avg Digital Current		57.1281481481	A
BackBias Avg PWELL/SUB Current		2.63092111111	A
BackBias Max Analog Current		115.66	mA
BackBias Max Digital Current		61.46	mA
BackBias Max PWELL/SUB Current		3.55672	mA
BackBias Max Voltage	Maximum value of back bias possible to be applied to ALPIDE	-5.2	V
Broken Pixels	Number of broken pixels in matrix	4	N/A

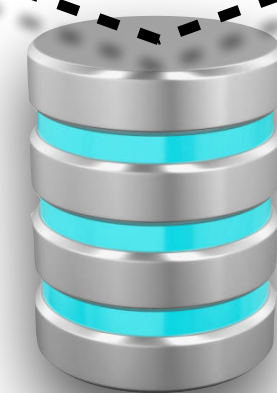
```

database
File Edit View Search Terminal Help
-> IBS is requesting the tray ID together with status
>>> ----- <<<
>>> PLEASE SCAN BARCODE <<<
>>> ----- <<<
WARNING: unrecognised ID scanned: "T855181", try again!
<- tray ID is 53AMA14B
Please confirm that this tray is for HIC assembly of type: "OBS" by typing "OBS": OBS
OBS
  1  2  3  4  5  6  7  8
+---+---+---+---+---+---+---+---+
A | NK | NK | OK | OK | NK | OK | OK |
+---+---+---+---+---+---+---+---+
B | OK | NK | OK | OK | NK | OK | OK |
+---+---+---+---+---+---+---+---+
C |   | NK | OK | NK | NK | NK | NK |
+---+---+---+---+---+---+---+---+
Please confirm chip content by typing "OK" or anything else to cancel: OK
OK

<< "TRID53AMA14B,A1:NK,A2:NK,A3:OK,A4:OK,A5:NK,A6:OK,A7:OK,A8:OK,B1:OK,B2:NK,B3:OK,B4:OK,B5:NK,B6:OK,
B7:OK,B8:NK,C1:EM,C2:NK,C3:OK,C4:NK,C5:NK,C6:NK,C7:NK,C8:OK"

>> Removed command <TRID> from command list

```



1. Scan tray's QR code

2. Read test results

3. Get tray map

4. Load chips

2. Chips are categorized on-the-fly as “SILVER” or “BRONZE” according to cuts applied to 47 parameters (Dead pixels, Fake Hit Rate, BackBias Max Voltage, ...).

3. The tray map shows “OK/NK” for each chip according to the selected category.



Outer Barrel HIC assembly - HIC Assembly Interface

MPD - ITS



HIC Assembly Interface

[Home](#) [New HIC Assembly](#) [Add Crew Member](#) [Log In](#)

Assemblies in progress

FPC name
AL003035
AL003034
AL003033
AL003032
AL003031
AL003030
BR000305
AR000412
AL002663
BR001221

1 2 next > last >>

Last Assembly Created:
AL003035 (OBS)

Navigation

- List of all assemblies
- List of crew members

Assemblies waiting to be sent to the database

FPC name
AL000232
AL000238

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View mode

[Home](#) [New HIC Assembly](#) [Add Crew Member](#) [Log In](#)

Home > AR003017

AR003017

[View](#) [Edit](#)

Created on: 9 May 2019

HIC Category: Outer-Barrel(Bronze)


Crew members


CEBALLOS SANCHEZ CESAR
FIORENZA GABRIELE




Annotations

Assembly Annotations:

Gluing Preparation

Assembly start: 09.05.2019 - 16:20
FPC inspection picture(s):


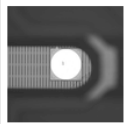
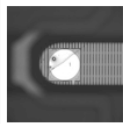
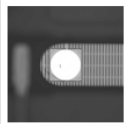
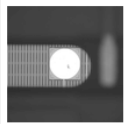
Glue Tube Picture:


Pictures after mask removal:
  

Start of pre-curing

Time: 09.05.2019 - 17:23 Temperature (C): 22 Humidity(%): 46




End of pre-curing

Time: 10.05.2019 - 08:30 Temperature (C): 22 Humidity(%): 42
PADs alignment pictures were taken?: Yes
PADs alignment pictures:
   

End of curing

Time: 10.05.2019 - 08:30 Temperature (C): 22 Humidity(%): 42
HIC inspection drawing: drawingok.pdf

Wire-bonding results

Wire-bonding inspection drawing : hicdrawing.pdf
wire-bonding inspection pictures (OPTIONAL):
  

Assembly end: 10.05.2019 - 11:09

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Edit mode

[Home](#) [New HIC Assembly](#) [Add Crew Member](#) [Log In](#)

Home > AR003017 > Edit HIC Assembly AR003017

Submit to the DB

Edit HIC Assembly AR003017

[View](#) [Edit](#)

FPC Name **AR003017**

HIC Category **Outer-Barrel(Bronze)**

Crew members

Assembly Crew **CARIOLA PASQUALE
CEBALLOS SANCHEZ CESAR
COLELLA DOMENICO
FIORENZA GABRIELE**

Annotations

Logbook
Assembly Annotations:

Lines and paragraphs break automatically. [More information about text formats](#)

Gluing Preparation (Completed)

Start of pre-curing (Completed)

End of pre-curing (Completed)

End of curing (Completed) - HIC inspection pictures (OPTIONAL) not present

Fields for entering the date/time, room temperature and humidity at curing end.

Time

Date
10.05.2019
E.g., 12.06.2019
Time
08:30
E.g., 17:41

Temperature (C)
22

Humidity(%)
42

HIC inspection drawing
drawingok.pdf (138.44 KB) [Remove](#)
Field for uploading a HIC sketch with annotations and red marks, highlighting any defect spotted during the HIC inspection. In case of no defects please upload the default 'No Defects' image. You should 'Choose File', then 'Upload' and finally 'Save' (at this page's bottom) before continue.

HIC inspection pictures (OPTIONAL)
Field for uploading HICs picture(s) for documenting problems, if any, spotted during visual inspection. You should 'Choose File', then 'Upload' and finally 'Save' (at this page's bottom) before continue.

Add a new file

Browse...

No files selected.

Upload

Files must be less than 50 MB.
Allowed file types: png gif jpg jpeg.

Wire-bonding results (Completed)

☐ HIC is damaged
ONLY check this box if the HIC gets physically damaged.

Save

Delete

Copyright © 2019, ALICE ITS HIC Assembly Interface

It allows to:

- » Collect the assembly information.
- » Keep track of all assemblies on site at different stages.
- » Register the new HIC component and assembly activity into the project's DB and to send the assembly data to EOS (offline).

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Outer Barrel HIC assembly - HIC Assembly Interface

MPD - ITS



All data have been collected

Submit to the DB

New HIC Assembly Activity

New HIC Component

Component ID	Component Type	Supplier Component ID	Description	Lot ID	Package ID	Phys. Status	Func. Status		
OBHIC-AR003017	Outer Barrel HIC Module	-	-	-	-	OK	OBHIC-BRONZE		
Parents				Children					
Component Type	Component ID	Position in this Component	Description	Component Type	Component ID	Position	Description		
None				ALPIDEB Chip	T847782W11R26	HA1			
				ALPIDEB Chip	T847782W11R40	HA2			
				ALPIDEB Chip	T847782W11R03	HA3			
				ALPIDEB Chip	T854192W11R14	HA4			
				ALPIDEB Chip	T854192W11R03	HA5			
				ALPIDEB Chip	T854192W11R08	HA6			
				ALPIDEB Chip	T847782W11R30	HA7			
				ALPIDEB Chip	T847782W11R36	HB1			
				ALPIDEB Chip	T854192W11R00	HB2			
				ALPIDEB Chip	T854186W19R45	HB3			
				ALPIDEB Chip	T854186W19R38	HB4			
				ALPIDEB Chip	T854186W19R27	HB5			
				ALPIDEB Chip	T854186W19R33	HB6			
				ALPIDEB Chip	T854186W19R19	HB7			
				Outer Barrel FPC	AR003017	N/A	Outer Barrel FPC		

Assembly data on EOS

[Home](#) [New HIC Assembly](#) [Add Crew Member](#) [Log In](#)

Submit to the DB

Home » AR003017 » Edit HIC Assembly AR003017

Edit HIC Assembly AR003017

[View](#) [Edit](#)

FPC Name *
AR003017

HIC Category *
Outer-Barrel(Bronze)

Crew members

Assembly Crew *
CAROLA PASQUALE
CEBALLOS SANCHEZ CESAR
COLELLA DOMENICO
FIORENZA GABRIELE

Annotations

Logbook
Assembly Annotations:

Lines and paragraphs break automatically.

Gluing Preparation (Completed)

Start of pre-curing (Completed)

End of pre-curing (Completed)

End of curing (Completed) - HIC inspection pictures (OPTIONAL) not p
Fields for entering the date/time, room temperature and humidity at cu

Time

Temperature (C)
22

Date
10.05.2019
E.g., 12.06.2019
Time
08:30
E.g., 17:41

HIC inspection drawing
drawingok.pdf (138.44 KB) [Remove](#)
Field for uploading a HIC sketch with annotations and red marks, highlighting any de
default: "No Defects" image. You should "Choose File", then "Upload" and finally "Save"

HIC inspection pictures (OPTIONAL)

Field for uploading HICs picture(s) for documenting problems, if any, s
'Upload' and finally 'Save' (at this page's bottom) before continue.

Add a new file
[Browse...](#) No files selected. [Upload](#)
Files must be less than 50 MB.
Allowed file types: png gif jpeg

Wire-bonding results (Completed)

☐ HIC is da
ONLY chec

Save

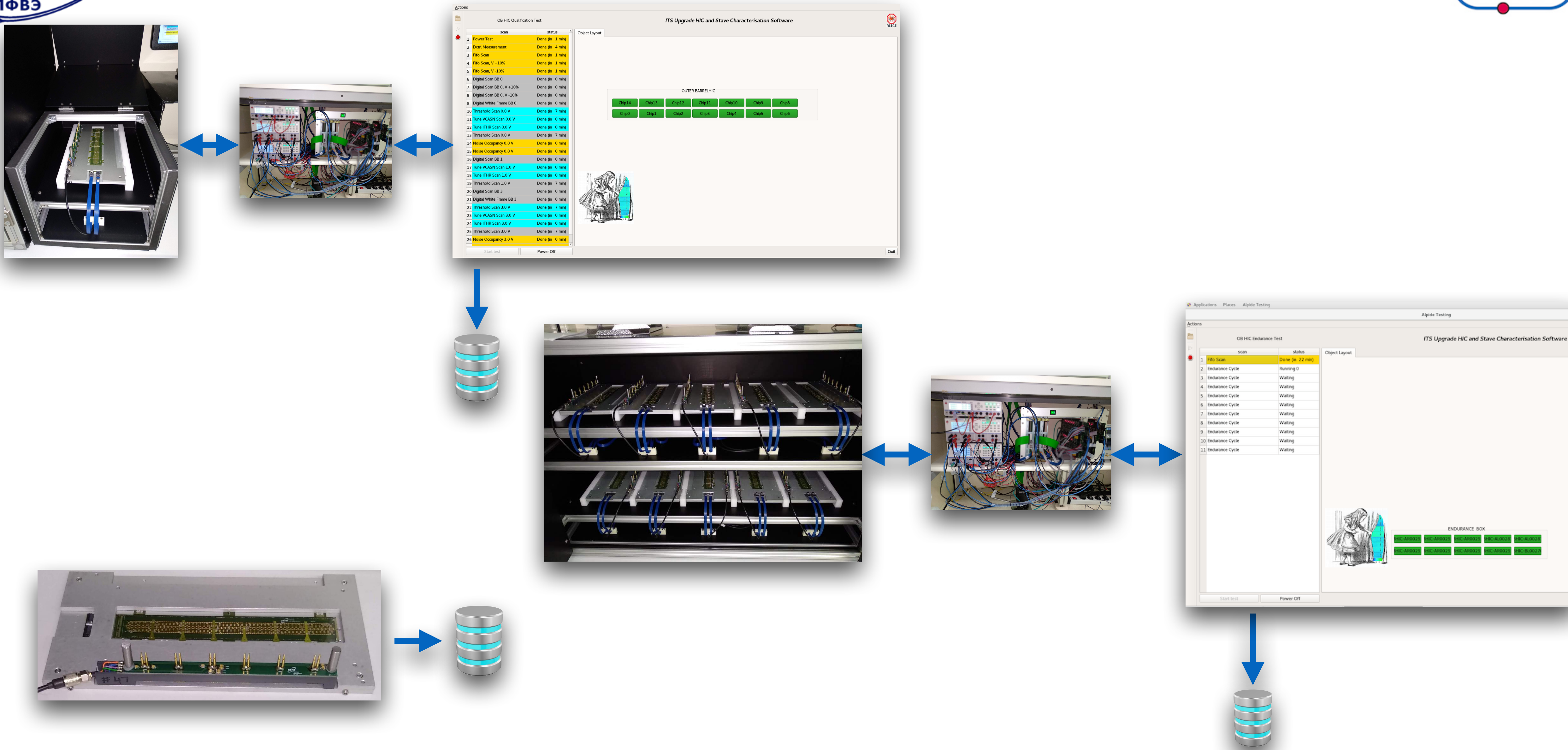
Copyright © 2019, ALICE ITS

Assembly of OBHIC-AR003017	OB HIC Assembly	09.05.2019	10.05.2019	Sezione INFN, Bari	Closed	OBHIC BRONZE Assembled					
Output Components											
Component Type	Component ID	Functional Status	Physical Status								
Outer Barrel HIC Module	OBHIC-AR003017	unknown	OK								
Input Components											
Component Type	Component ID	Functional Status	Physical Status								
ALPIDEB Chip	T854186W19R45	OK	OK								
ALPIDEB Chip	T854186W19R33	OK	OK								
ALPIDEB Chip	T847782W11R26	OK	OK								
ALPIDEB Chip	T847782W11R40	OK	OK								
ALPIDEB Chip	T854192W11R14	OK	OK								
ALPIDEB Chip	T847782W11R30	OK	OK								
ALPIDEB Chip	T854192W11R08	OK	OK								
ALPIDEB Chip	T847782W11R03	OK	OK								
ALPIDEB Chip	T854186W19R38	OK	OK								
ALPIDEB Chip	T854186W19R19	OK	OK								
ALPIDEB Chip	T847782W11R36	OK	OK								
ALPIDEB Chip	T854192W11R03	OK	OK								
ALPIDEB Chip	T854192W11R00	OK	OK								
ALPIDEB Chip	T854186W19R27	OK	OK								
Outer Barrel FPC	AR003017	OK	OK								
Parameters											
Name	Description			Value	Unit						
Chip Classification Version	The version of the classification used by the ALPIDE-mass-testing-software			45	N/A						
Attachments											
Attachment Type		File									
HIC Assembly Data		Results.html									
Uri											
URI		Description									
/eos/project/a/alice-its/hic/ALICIA-3/AR003017/chipclassinfo.tar.gz		path to chip classification info on EOS									
http://cern.ch/hicassembly/ALICIA-3/AR003017/chipclassinfo.tar.gz		link to chip classification info on EOS									
Members											
Name											
CEBALLOS SANCHEZ CESAR											
FIORENZA GABRIELE											

__myprojects	alice-its	www	hic	ALICIA-3	AR003017
Name					
1557469891					
pictures					
thumbnail					
css					
change_file_format_to_png					
media_thumbnail					
chipclassinfo					
AR003017.html					

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Similar procedure for testing at all levels



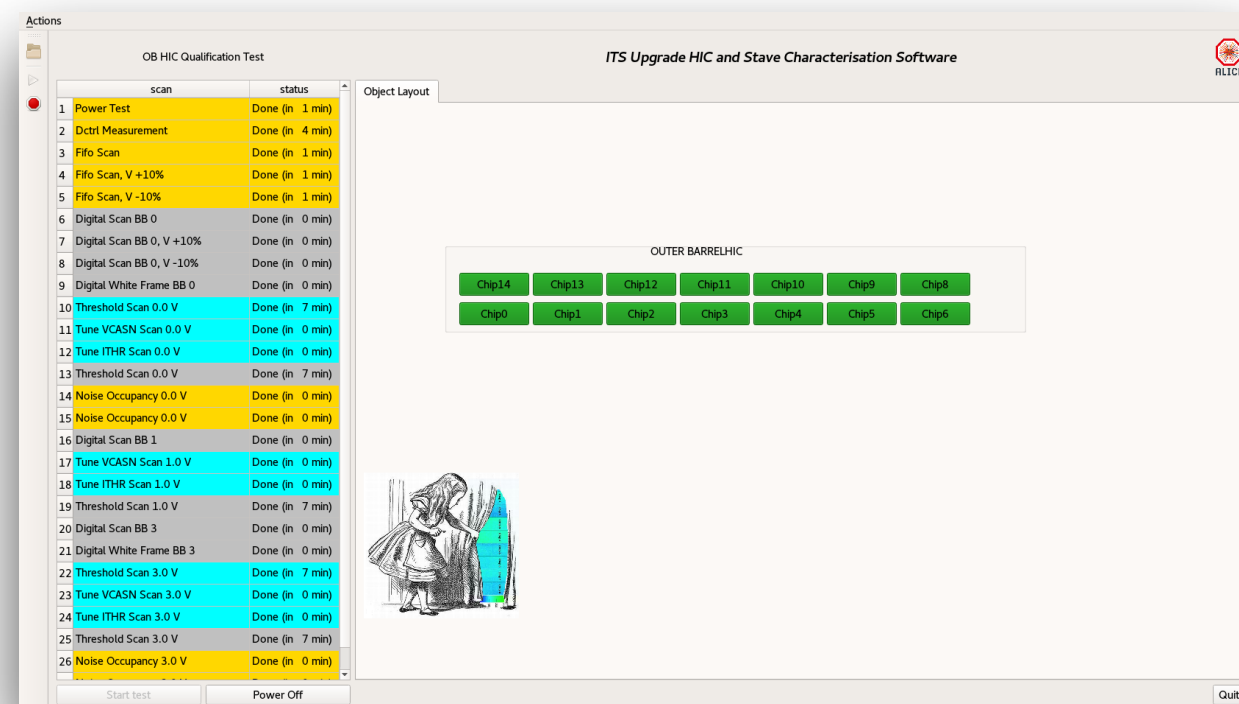
Thank you for your attention



Backup



Test



Test scans

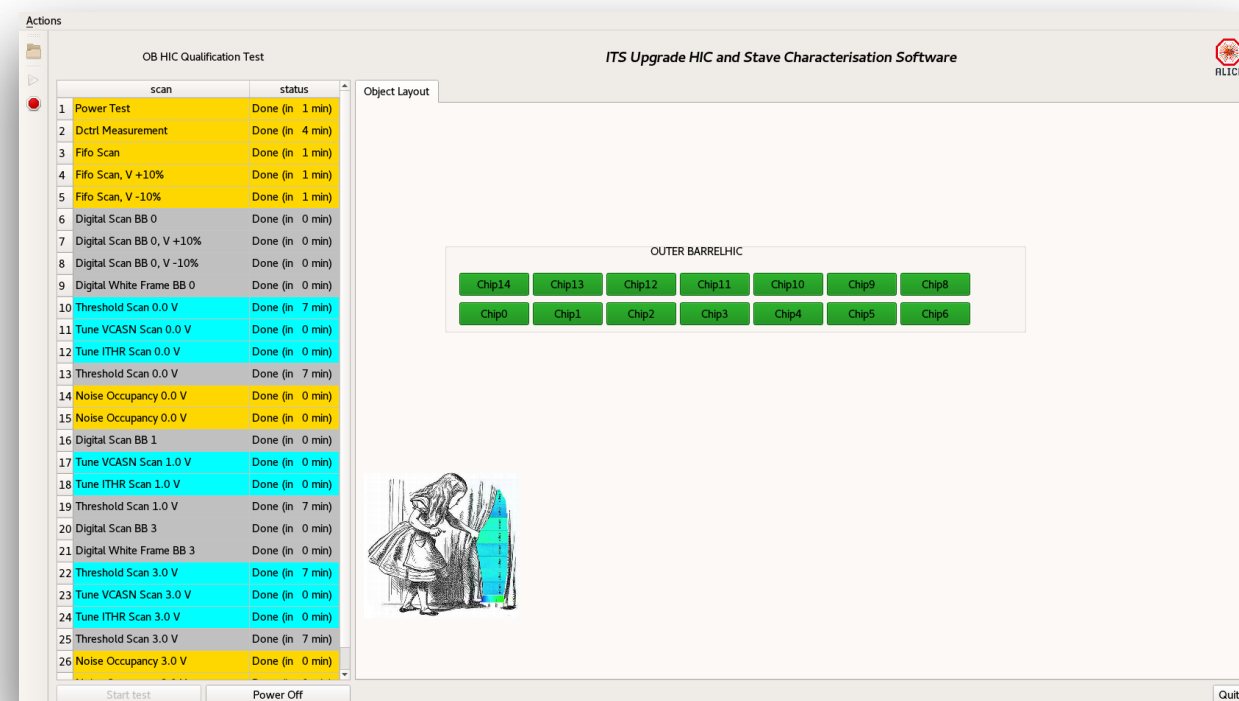
- Power Test.
- DCTRL Measurement.
- Fifo scan.
- Digital scan.
- Digital white frame.
- Threshold scan at 0V
- Threshold scan at -3V
- Threshold tuning at 0V
- Threshold tuning at -3V
- Noise occupancy at 0V
- Noise occupancy at -3V

Scans parameters for HIC classification

'Number of Working Chips',
'IDDA clocked',
'IDDD clocked',
'Maximum bias voltage',
'Back bias current 3V',
'FIFO errors (nominal)',
'FIFO errors (lower)',
'FIFO errors (upper)',
'FIFO exceptions (nominal)',
'FIFO exceptions (lower)',
'FIFO exceptions (upper)',
'Timeouts digital (nominal)',
'Timeouts digital (lower)',
'Timeouts digital (upper)',
'Corrupt events digital (nominal)',
'Corrupt events digital (lower)',
'Corrupt events digital (upper)',
'Bad pixels digital (nominal)',
'Bad pixels digital, worst chip (nominal)',
'Bad pixels digital (lower)',
'Bad pixels digital, worst chip (lower)',
'Bad pixels digital (upper)',
'Bad pixels digital, worst chip (upper)',
'Timeouts digital (nominal) BB 3V',
'Corrupt events digital (nominal) BB 3V',
'Bad pixels digital (nominal) BB 3V',
'Bad pixels digital, worst chip (nominal) BB 3V',
'Pixels without threshold tuned 0V',
'Pixels without thresh, worst, threshold tuned 0V',

'Pixels without threshold tuned 3V',
'Pixels without thresh, worst, threshold tuned 3V',
'Dead pixels threshold tuned 0V',
'Dead pixels, worst chip, threshold tuned 0V',
'Dead pixels threshold tuned 3V',
'Dead pixels, worst chip, threshold tuned 3V',
'Average noise threshold tuned 0V',
'Average noise threshold tuned 3V',
isy pixels 0V',
'Noisy pixels 3V',
'Noisy pixels masked 0V',
'Noisy pixels masked 3V',
'DCTRL worst max amplitude',
'DCTRL worst slope',
'DCTRL worst chi square',
'DCTRL worst rise time',
'DCTRL worst fall time',

Test



Test scans

- Power Test.
- DCTRL Measurement.
- Fifo scan. (& Fifo scan $\pm 10\%$)
- Digital scan.
- Digital white frame.
- **Threshold scan at 0V**
- Threshold scan at -3V
- Threshold tuning at 0V
- Threshold tuning at -3V
- Noise occupancy at 0V
- Noise occupancy at -3V

Scans parameters for HIC classification

'Number of Working Chips',
 'IDDA clocked',
 'IDDD clocked',
 'Maximum bias voltage',
 'Back bias current 3V',
 'FIFO errors (nominal)',
 'FIFO errors (lower)',
 'FIFO errors (upper)',
 'FIFO exceptions (nominal)',
 'FIFO exceptions (lower)',
 'FIFO exceptions (upper)',
 'Timeouts digital (nominal)',
 'Timeouts digital (lower)',
 'Timeouts digital (upper)',
 'Corrupt events digital (nominal)',
 'Corrupt events digital (lower)',
 'Corrupt events digital (upper)',
 'Bad pixels digital (nominal)',
 'Bad pixels digital, worst chip (nominal)',
 'Bad pixels digital (lower)',
 'Bad pixels digital, worst chip (lower)',
 'Bad pixels digital (upper)',
 'Bad pixels digital, worst chip (upper)',
 'Timeouts digital (nominal) BB 3V',
 'Corrupt events digital (nominal) BB 3V',
 'Bad pixels digital (nominal) BB 3V',
 'Bad pixels digital, worst chip (nominal) BB 3V',
 'Pixels without threshold tuned 3V',
'Pixels without thresh, worst, threshold tuned 0V',

'Pixels without threshold tuned 3V',
 'Pixels without thresh, worst, threshold tuned 3V',
 'Dead pixels threshold tuned 0V',
'Dead pixels, worst chip, threshold tuned 0V',
 'Dead pixels threshold tuned 3V',
 'Dead pixels, worst chip, threshold tuned 3V',
'Average noise threshold tuned 0V',
 'Average noise threshold tuned 3V',
 'Noisy pixels 0V',
 'Noisy pixels 3V',
 'Noisy pixels masked 0V',
 'Noisy pixels masked 3V',
 'DCTRL worst max amplitude',
 'DCTRL worst slope',
 'DCTRL worst chi square',
 'DCTRL worst rise time',
 'DCTRL worst fall time',

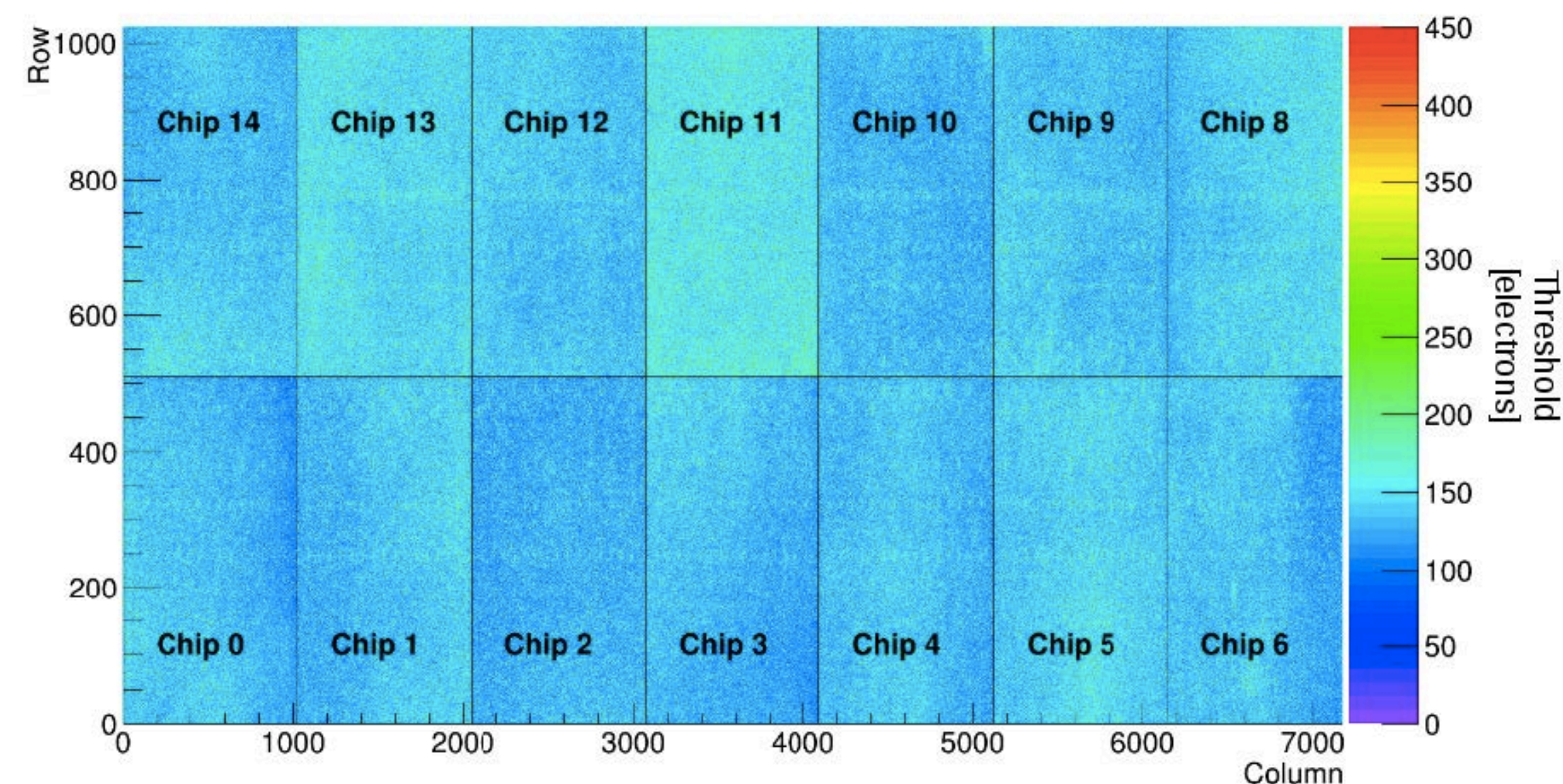
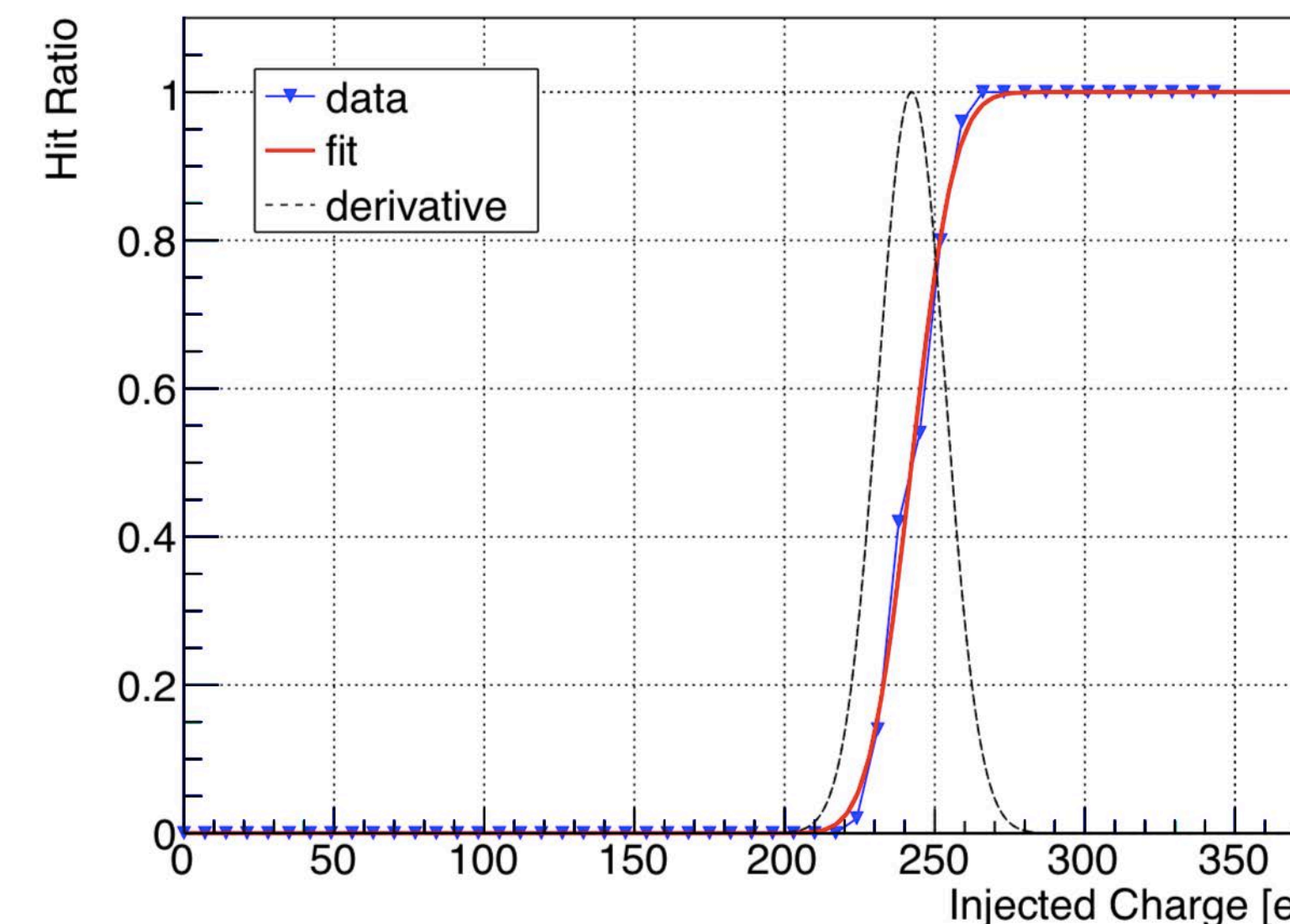
Treshold Scan:

- » It determines the threshold and noise of each pixel in units of electrons.
- » Checks out the analog performance of the chip.
- » Chip by chip threshold tuning

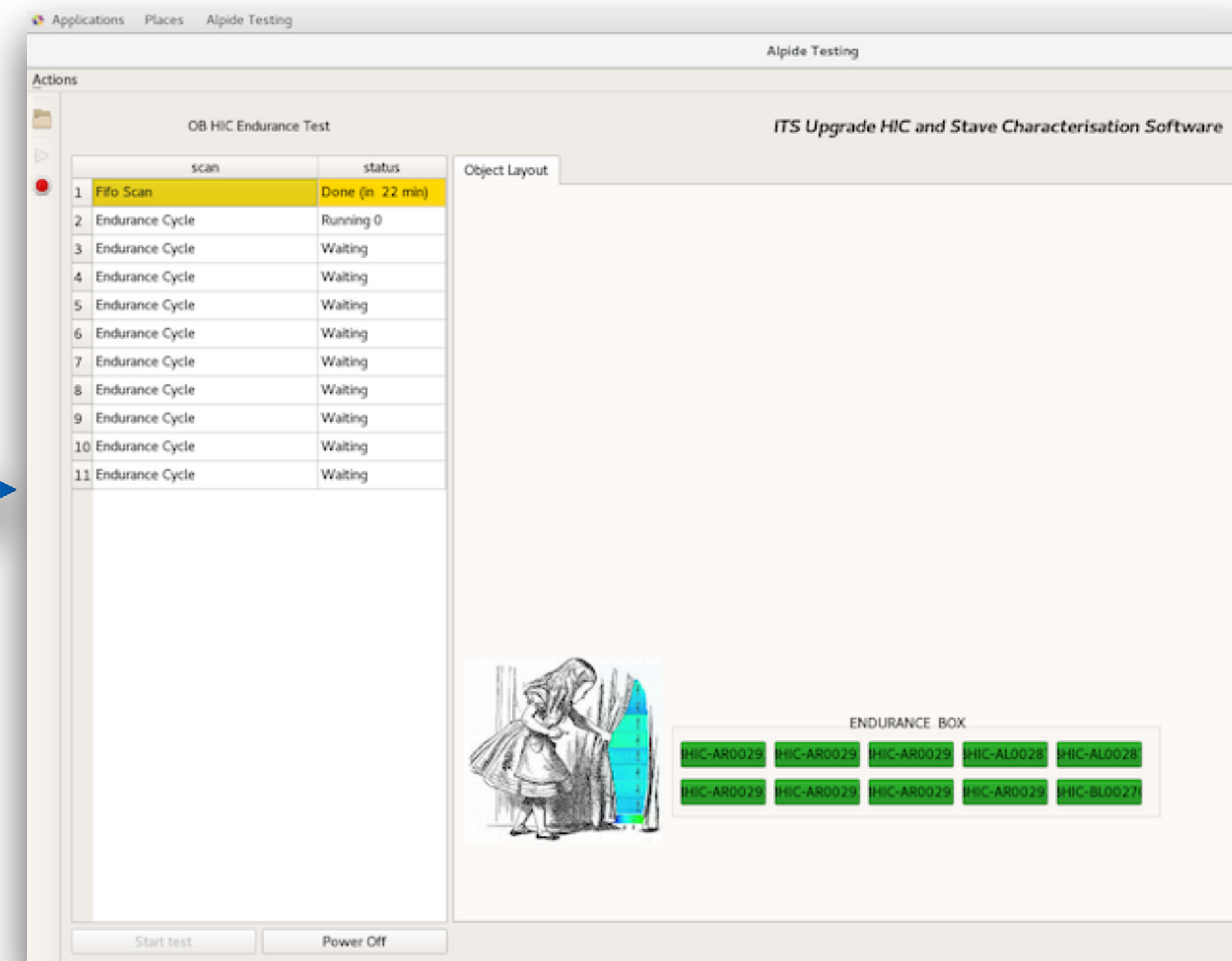
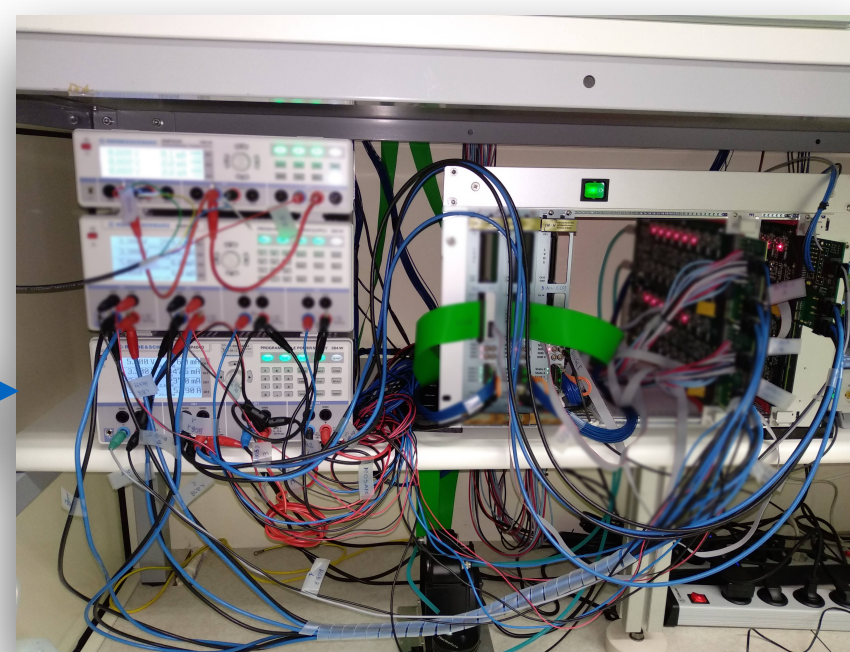
Parameter cuts for HIC classification. (Gold otherwise)

Parameter	SILVER	BRONZE	NOT WORKING
Dead pixels, worst chip, threshold tuned OV	> 50	> 2100	> 5243
Pixels without thresh, worst, threshold tuned OV	> 5243	> 26214	> 52429
Average noise threshold tuned OV	> 10 el	-	-

- At the end of each **scan**, the cuts on the related parameters are applied and the scan gets the classification of the **worst-ranking parameter**.
- At the end of the test, the **HIC** is classified as the **worst-ranking scan**.



A series of power cycles and FIFO scans (writing and reading back registers) for testing the chips control interface.



Test characteristics

- Number of slices: 10
- Cycles per slice: 13
- Slice time limit: 8h
- Uptime: 1600s
- Down time: 200s
- Number of triggers: 100000

Impedance, Qualification and Endurance tests are performed on all HICs.



AlucmsWebAPI

Click [here](#) for a complete list of operations.

ActivityCreate

Test

To test the operation using the HTTP POST protocol, click the 'Invoke' button.

Parameter	Value
activityTypeID:	<input type="text"/>
locationID:	<input type="text"/>
lotID:	<input type="text"/>
activityName:	<input type="text"/>
startDate:	<input type="text"/>
endDate:	<input type="text"/>
position:	<input type="text"/>
resultID:	<input type="text"/>
statusID:	<input type="text"/>
userID:	<input type="text"/>

SOAP 1.1

The following is a sample SOAP 1.1 request and response. The [placeholders](#) shown need to be replaced with actual values.

```
POST /AlucmswebAPI.asmx HTTP/1.1
Host: alucmsapi.web.cern.ch
Content-Type: text/xml; charset=utf-8
Content-Length: length
SOAPAction: "http://tempuri.org/ActivityCreate"

<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
```

```
<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ActivityCreate xmlns="http://tempuri.org/">
      <activityTypeID>int</activityTypeID>
      <locationID>int</locationID>
      <lotID>string</lotID>
      <activityName>string</activityName>
      <startDate>string</startDate>
      <endDate>string</endDate>
      <position>string</position>
      <resultID>int</resultID>
      <statusID>int</statusID>
      <userID>int</userID>
    </ActivityCreate>
  </soap:Body>
</soap:Envelope>
```

HTTP/1.1 200 OK

Content-Type: text/xml; charset=utf-8

Content-Length: length

```
<?xml version="1.0" encoding="utf-8"?>
<soap:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ActivityCreateResponse xmlns="http://tempuri.org/">
      <ActivityCreateResult>
        <ErrorCode>int</ErrorCode>
        <ErrorMessage>string</ErrorMessage>
        <ID>int</ID>
      </ActivityCreateResult>
    </ActivityCreateResponse>
  </soap:Body>
</soap:Envelope>
```

SOAP 1.2

The following is a sample SOAP 1.2 request and response. The [placeholders](#) shown need to be replaced with actual values.

```
POST /AlucmswebAPI.asmx HTTP/1.1
Host: alucmsapi.web.cern.ch
Content-Type: application/soap+xml; charset=utf-8
Content-Length: length

<?xml version="1.0" encoding="utf-8"?>
<soap12:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:soap12="http://www.w3.org/2003/05/soap-envelope">
  <soap12:Body>
    <ActivityCreate xmlns="http://tempuri.org/">
      <activityTypeID>int</activityTypeID>
      <locationID>int</locationID>
      <lotID>string</lotID>
      <activityName>string</activityName>
      <startDate>string</startDate>
```



```
<startDate>string</startDate>
<endDate>string</endDate>
<position>string</position>
<resultID>int</resultID>
<statusID>int</statusID>
<userID>int</userID>
</ActivityCreate>
</soap12:Body>
</soap12:Envelope>

HTTP/1.1 200 OK
Content-Type: application/soap+xml; charset=utf-8
Content-Length: length

<?xml version="1.0" encoding="utf-8"?>
<soap12:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:soap12="http://www.w3.org/2003/05/soap-envelope">
  <soap12:Body>
    <ActivityCreateResponse xmlns="http://tempuri.org/">
      <ActivityCreateResult>
        <ErrorCode>int</ErrorCode>
        <ErrorMessage>string</ErrorMessage>
        <ID>int</ID>
      </ActivityCreateResult>
    </ActivityCreateResponse>
  </soap12:Body>
</soap12:Envelope>
```

HTTP GET

The following is a sample HTTP GET request and response. The [placeholders](#) shown need to be replaced with actual values.

```
GET /AlucmswebAPI.asmx/ActivityCreate?activityTypeID=string&locationID=string&lotID=string&activityName=string&startDate=string&endDate=string&position=string&resultID=string&statusID=s
Host: alucmsapi.web.cern.ch
```

```
HTTP/1.1 200 OK
Content-Type: text/xml; charset=utf-8
Content-Length: length

<?xml version="1.0" encoding="utf-8"?>
<FunctionResult xmlns="http://tempuri.org/">
  <ErrorCode>int</ErrorCode>
  <ErrorMessage>string</ErrorMessage>
  <ID>int</ID>
</FunctionResult>
```

HTTP POST

The following is a sample HTTP POST request and response. The [placeholders](#) shown need to be replaced with actual values.

```
POST /AlucmswebAPI.asmx/ActivityCreate HTTP/1.1
Host: alucmsapi.web.cern.ch
Content-Type: application/x-www-form-urlencoded
```

```
<?xml version="1.0" encoding="utf-8"?>
<ActivityCreateResult>
  <ErrorCode>int</ErrorCode>
  <ErrorMessage>string</ErrorMessage>
  <ID>int</ID>
</ActivityCreateResult>
</ActivityCreateResponse>
</soap12:Body>
</soap12:Envelope>
```

HTTP GET

The following is a sample HTTP GET request and response. The [placeholders](#) shown need to be replaced with actual values.

```
GET /AlucmswebAPI.asmx/ActivityCreate?activityTypeID=string&locationID=string&lotID=string&activityName=string&startDate=string&endDate=string&position=string&resultID=string&statusID=string HTTP/1.1
Host: alucmsapi.web.cern.ch
```

```
HTTP/1.1 200 OK
Content-Type: text/xml; charset=utf-8
Content-Length: length

<?xml version="1.0" encoding="utf-8"?>
<FunctionResult xmlns="http://tempuri.org/">
  <ErrorCode>int</ErrorCode>
  <ErrorMessage>string</ErrorMessage>
  <ID>int</ID>
</FunctionResult>
```

HTTP POST

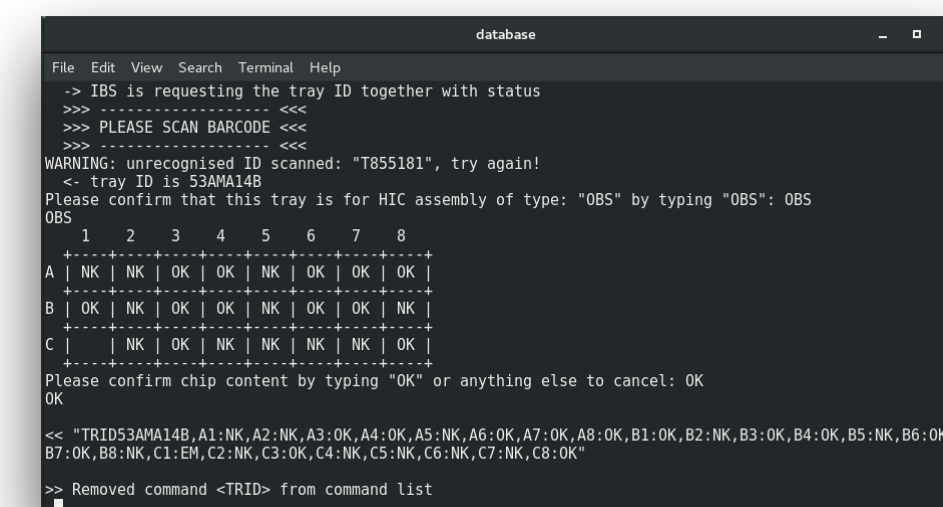
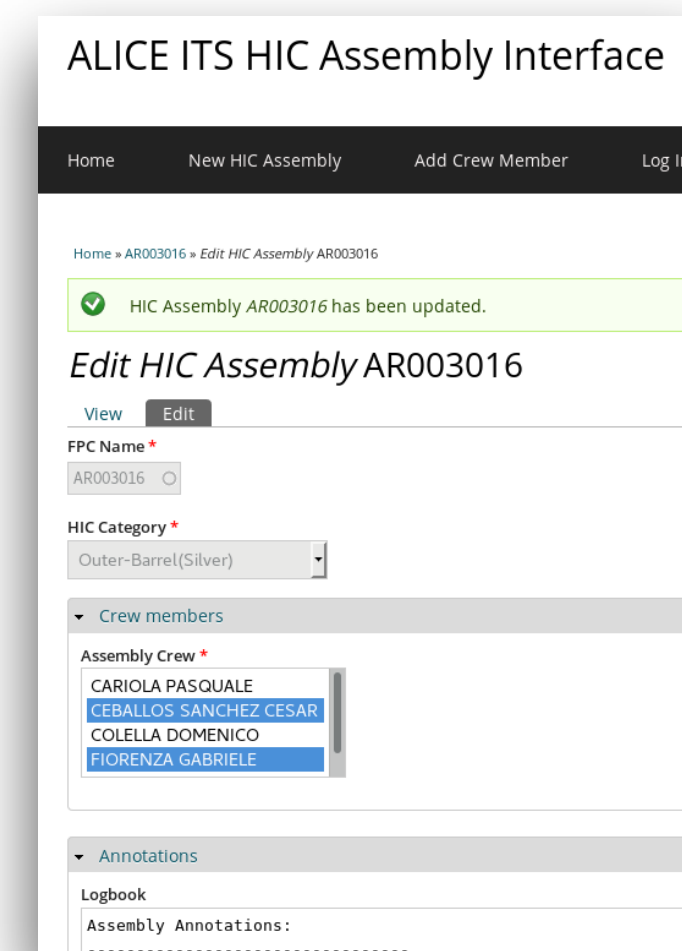
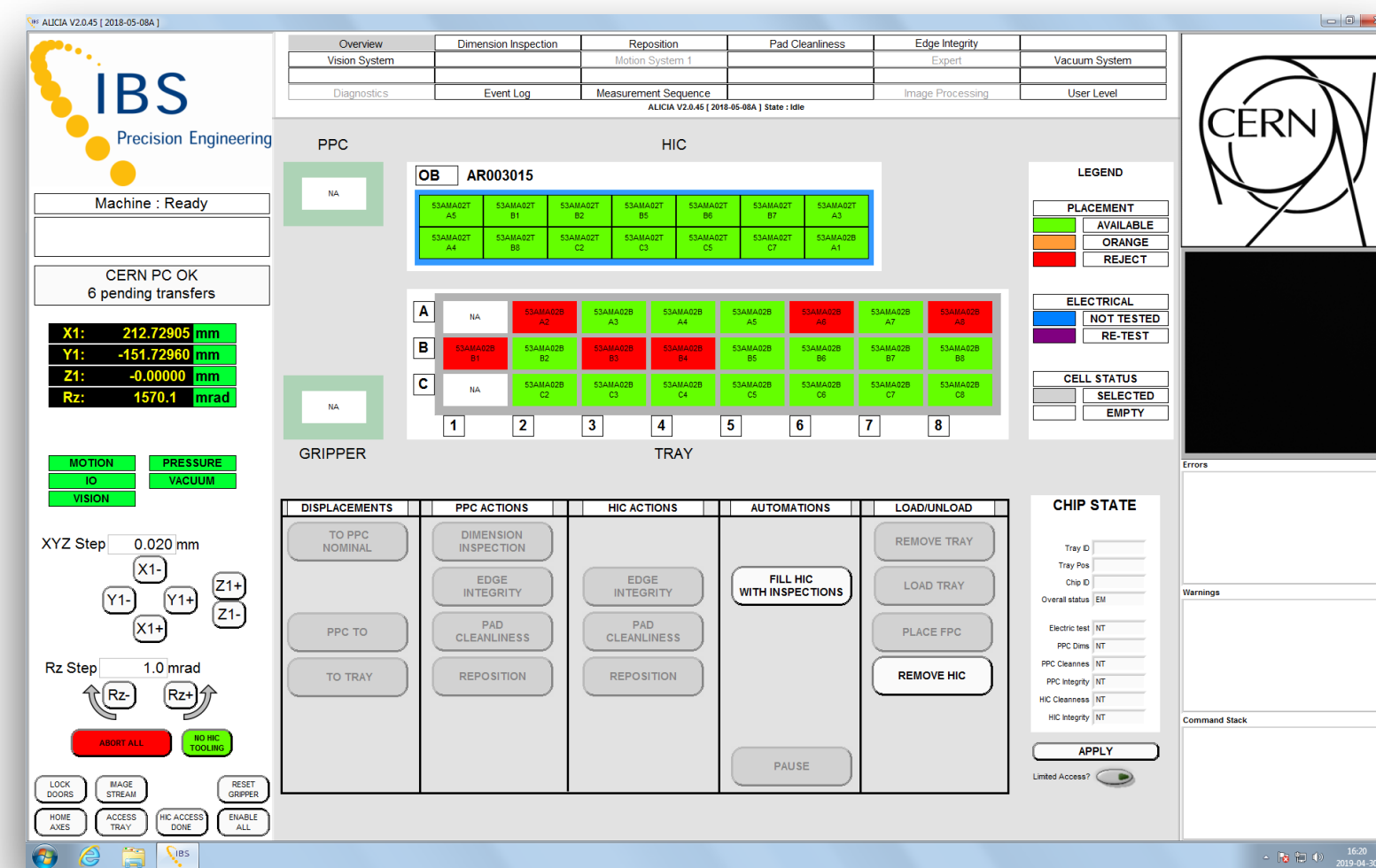
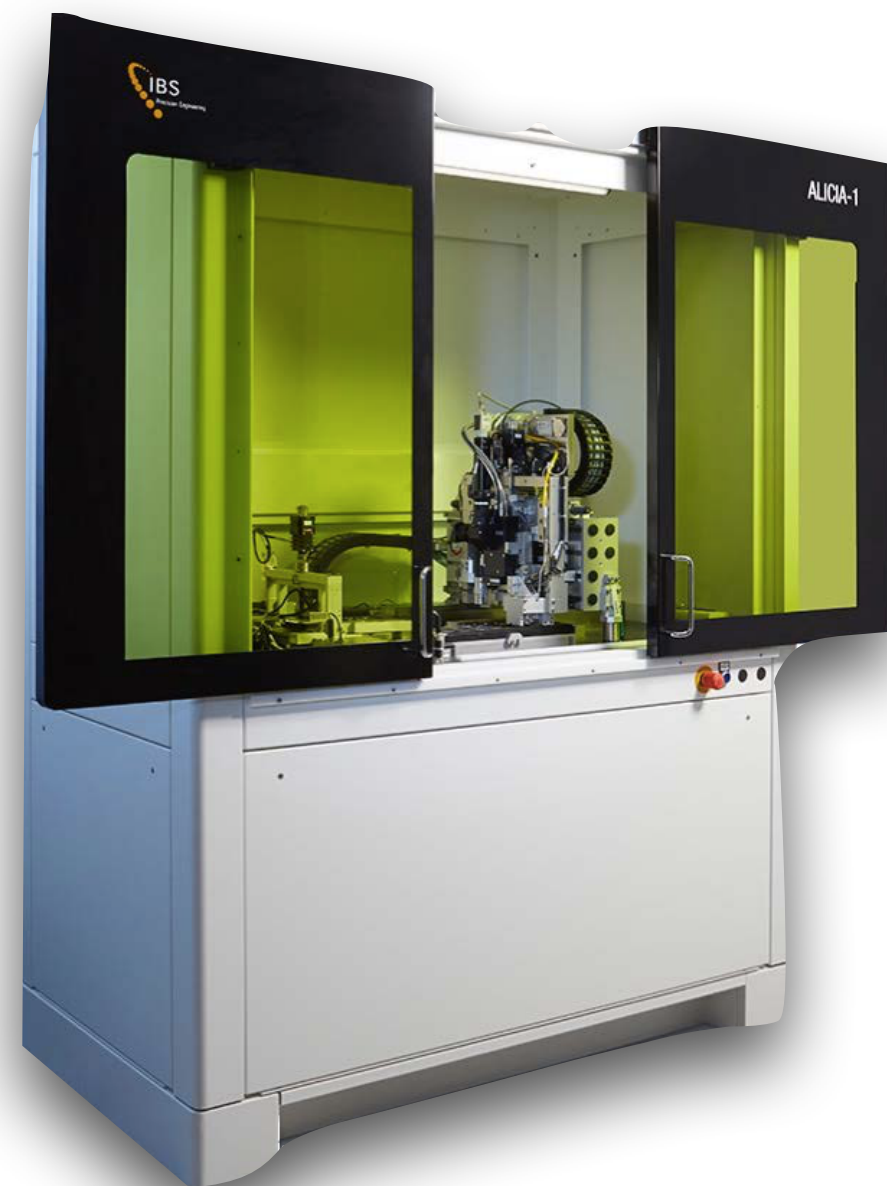
The following is a sample HTTP POST request and response. The [placeholders](#) shown need to be replaced with actual values.

```
POST /AlucmswebAPI.asmx/ActivityCreate HTTP/1.1
Host: alucmsapi.web.cern.ch
Content-Type: application/x-www-form-urlencoded
Content-Length: length

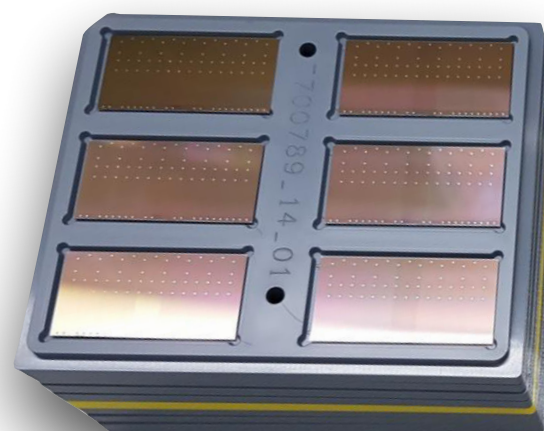
activityTypeID=string&locationID=string&lotID=string&activityName=string&startDate=string&endDate=string&position=string&resultID=string&statusID=string&userID=string

HTTP/1.1 200 OK
Content-Type: text/xml; charset=utf-8
Content-Length: length

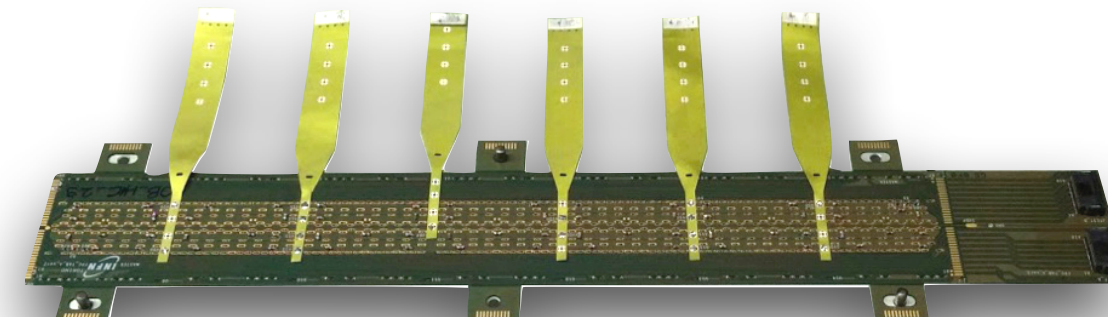
<?xml version="1.0" encoding="utf-8"?>
<FunctionResult xmlns="http://tempuri.org/">
  <ErrorCode>int</ErrorCode>
  <ErrorMessage>string</ErrorMessage>
  <ID>int</ID>
</FunctionResult>
```

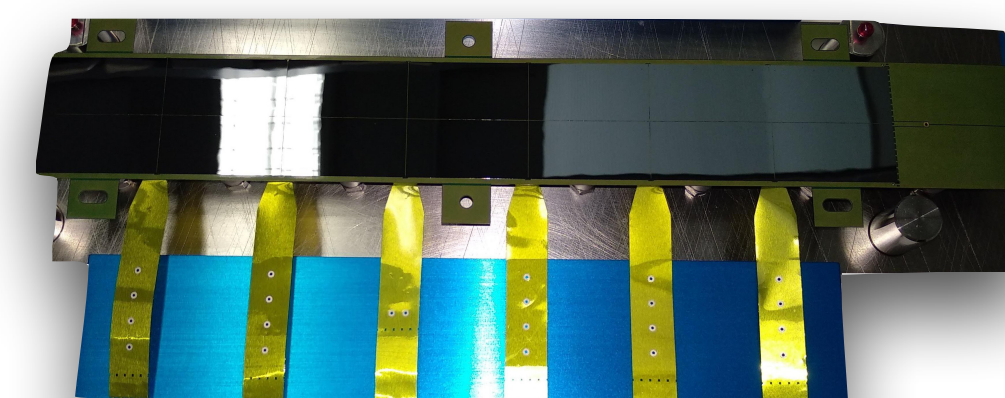
2 x 7 Chips



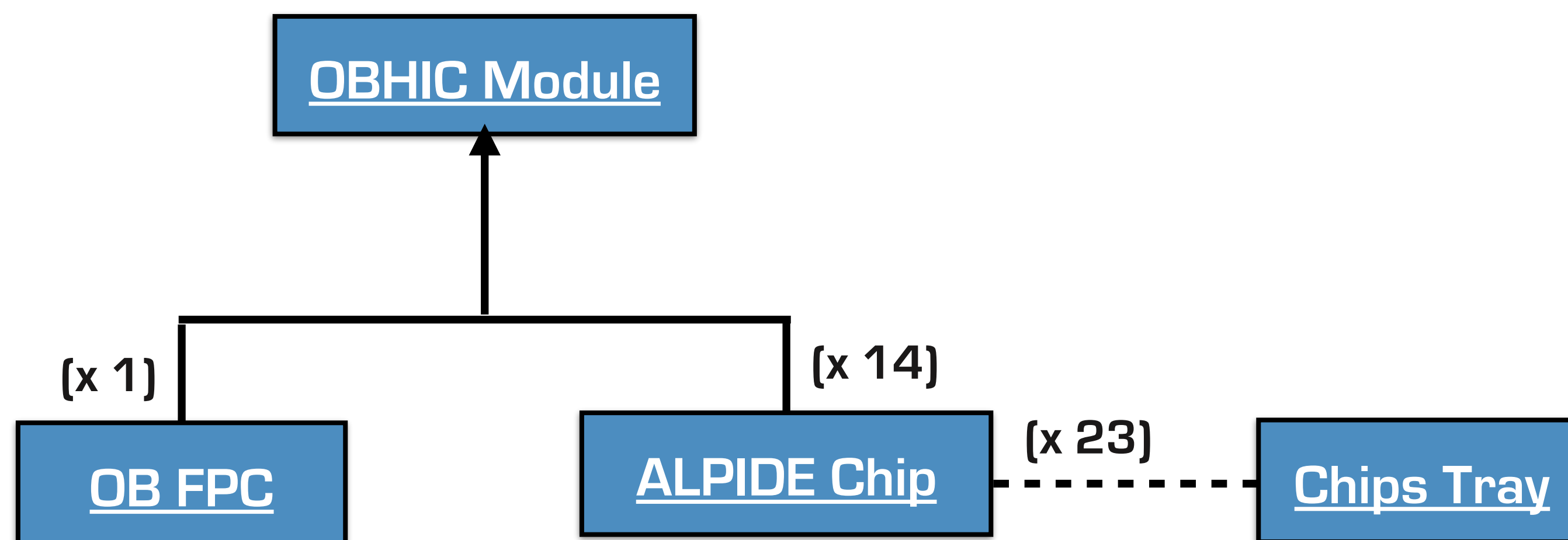
1 FPC



1 OBHIC



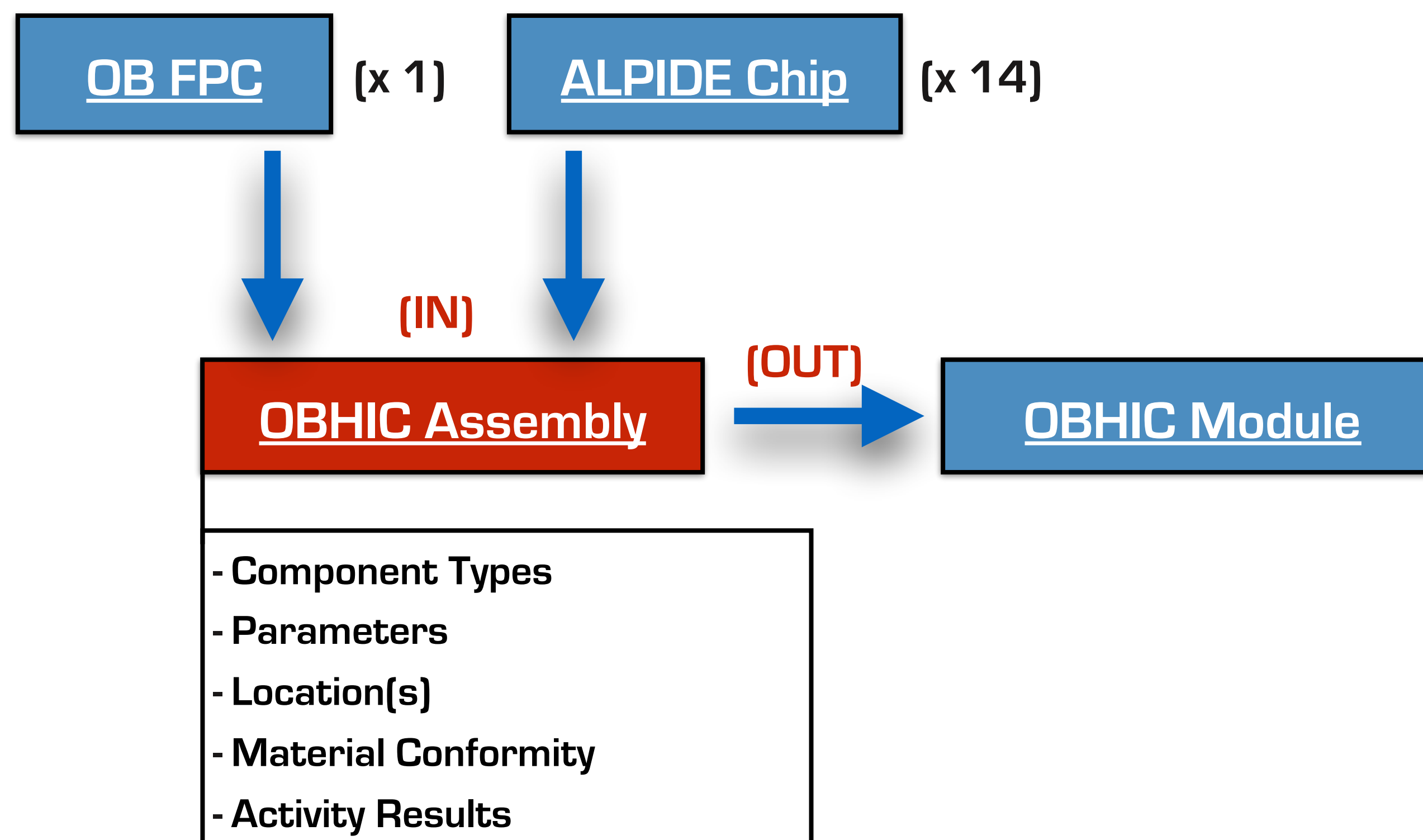
1. Defining the **Component Type** (Web Interface)



Component Categories

- Pixel Chip
- Chip Container
- Flexible Printed Circuit
- HIC Module

2. Defining the **Activity Type** (Web Interface)



3. Creating the **specific OBHIC Component**

(Components already existing on the DB)



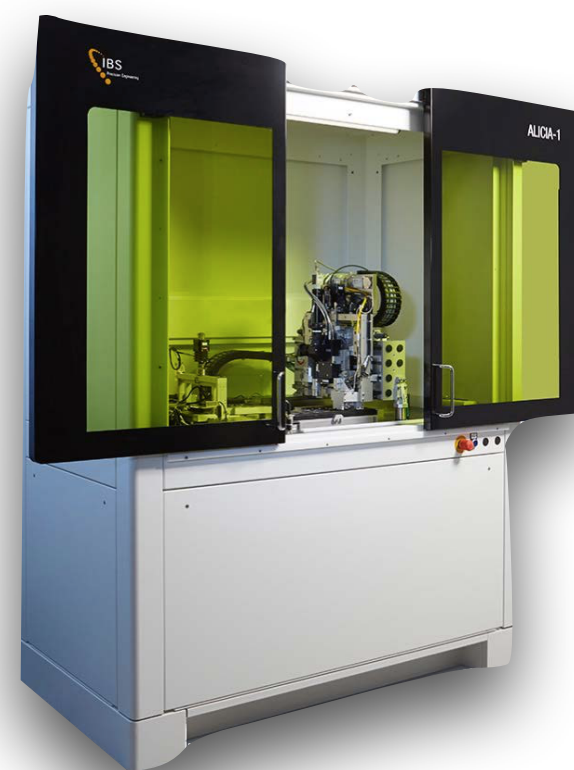
3. Creating the **specific OBHIC Component**

1. Scan tray's barcode and load the tray into the MAM

The following information is retrieved:

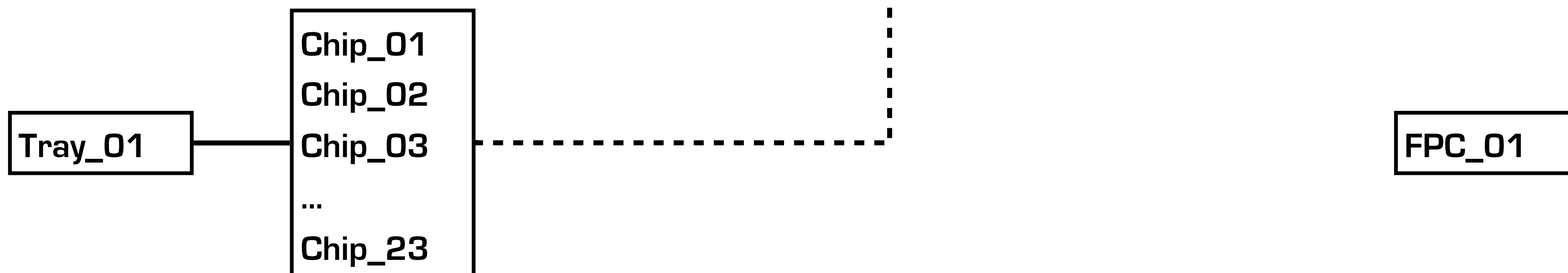
- The **Component ID** of all chips belonging to that tray.
- The **Position of each chip** in the tray.
- The **Physical Status and Functional Status** of each chip.
- The tray map shows **“OK/NK”** for each chip

The chip alignment starts



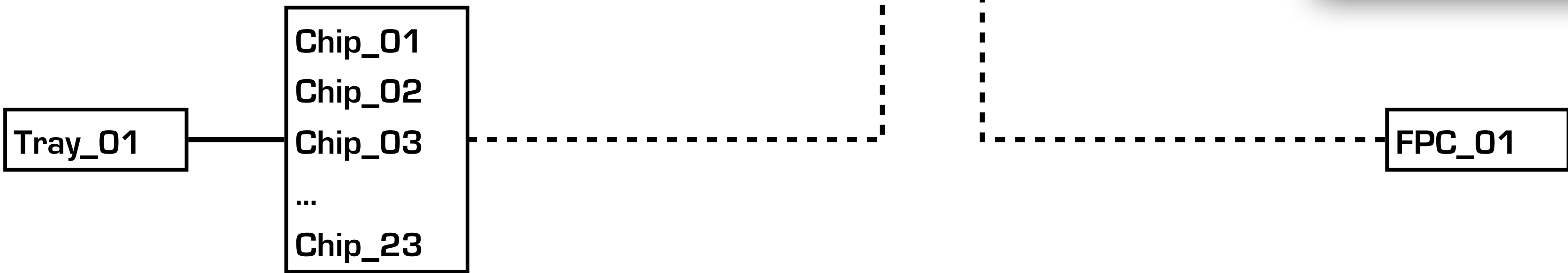
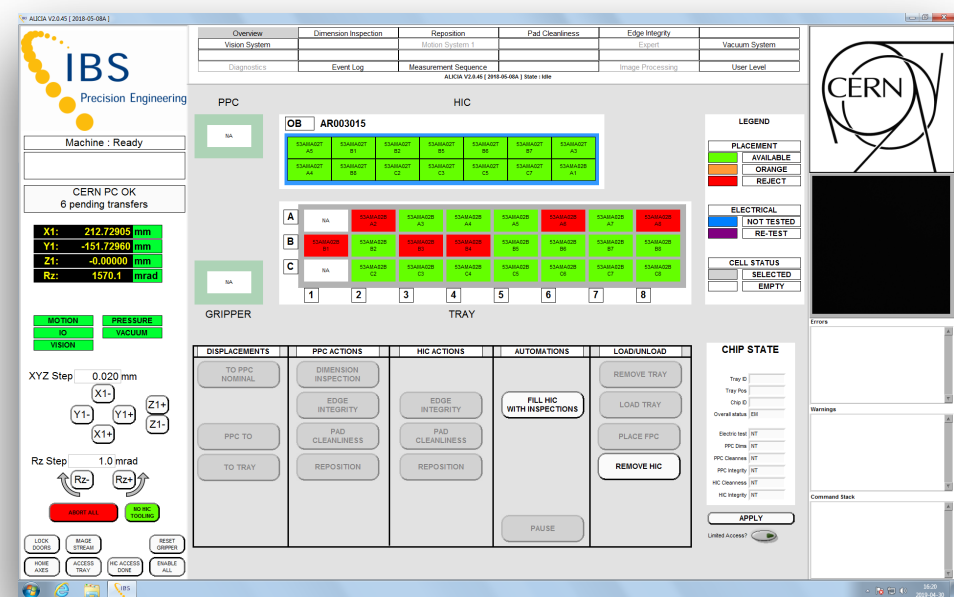
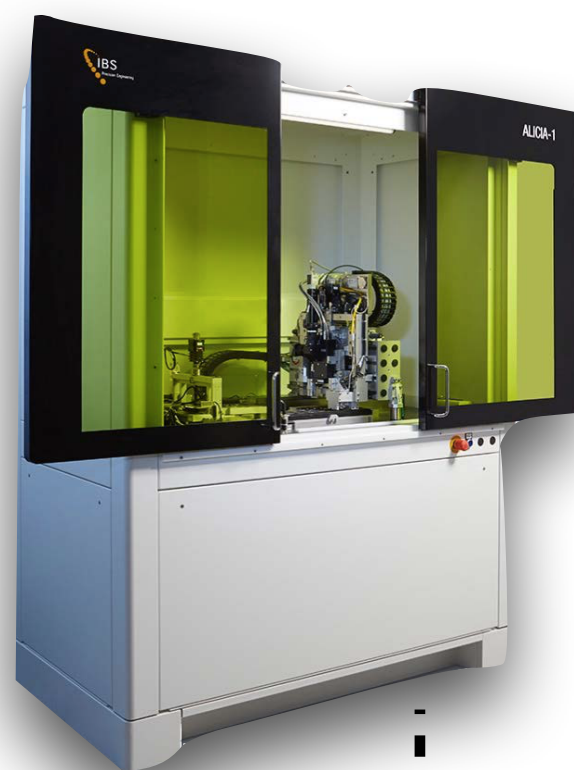
```

database
File Edit View Search Terminal Help
-> IBS is requesting the tray ID together with status
>>> PLEASE SCAN BARCODE <<<
>>> PLEASE SCAN BARCODE <<<
WARNING: unrecognised ID scanned: "T855181", try again!
<- tray ID is 53AMA14B
Please confirm that this tray is for HIC assembly of type: "OBS" by typing "OBS": OBS
OBS
  1  2  3  4  5  6  7  8
A | NK | NK | OK | OK | NK | OK | OK |
B | OK | NK | OK | OK | NK | OK | OK |
C |  | NK | OK | NK | NK | NK | NK | OK |
Please confirm chip content by typing "OK" or anything else to cancel: OK
OK
<< "TRID53AMA14B,A1:NK,A2:NK,A3:OK,A4:OK,A5:NK,A6:OK,A7:OK,A8:OK,B1:OK,B2:NK,B3:OK,B4:OK,B5:NK,B6:OK,
B7:OK,B8:NK,C1:EM,C2:NK,C3:OK,C4:NK,C5:NK,C6:NK,C7:NK,C8:OK"
>> Removed command <TRID> from command list
  
```



3. Creating the **specific OBHIC Component**

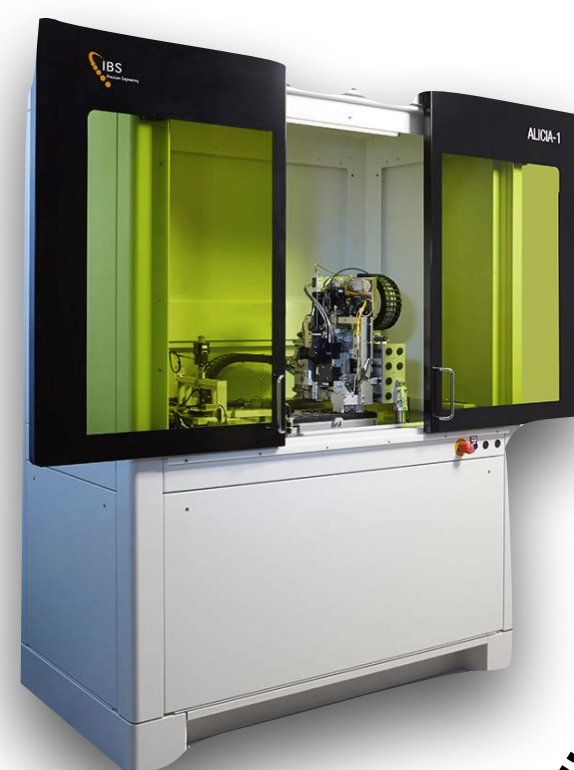
2. 'Place FPC' on the MAM (Interface and Physically)



3. Creating the **specific OBHIC Component**

3. Submit the assembly to the DB

A **new component** of type OB HIC Module is created in the DB with a unique Component ID, composed by the **specific FPC and Chips** used in the assembly process.



ALICE ITS HIC Assembly Interface

Home New HIC Assembly Add Crew Member Log In

Home » AR003016 » Edit HIC Assembly AR003016

✓ HIC Assembly AR003016 has been updated.

Edit HIC Assembly AR003016

View Edit

FPC Name *
AR003016

HIC Category *
Outer-Barrel(Silver)

▼ Crew members

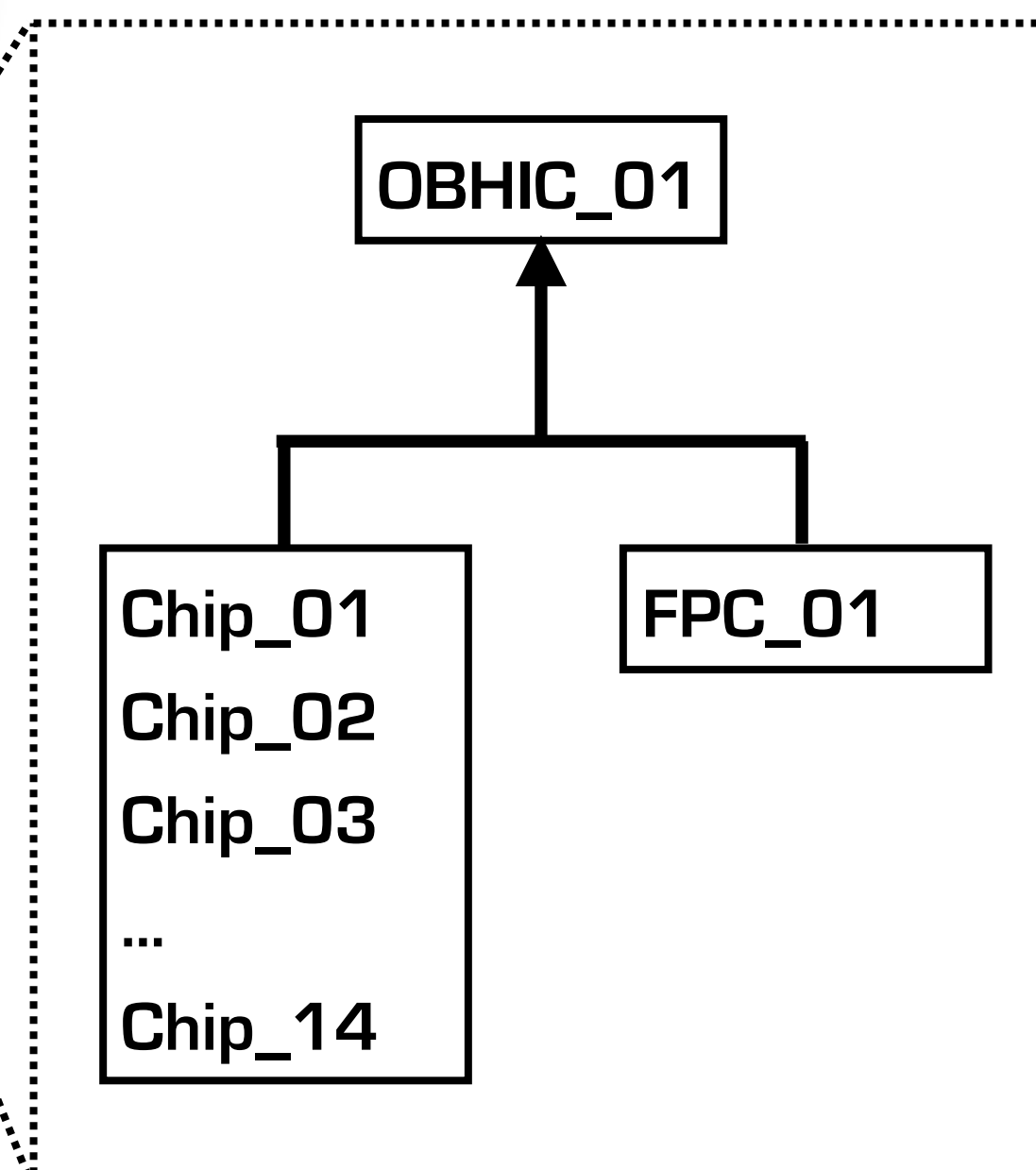
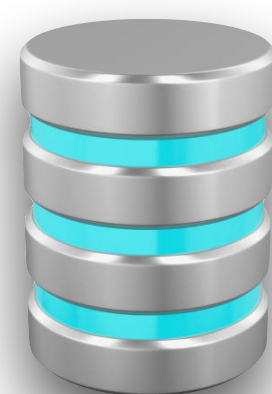
Assembly Crew *

CARLO PASQUALE
CEBALLOS SANCHEZ CESAR
COLELLA DOMENICO
FIORENZA GABRIELE

▼ Annotations

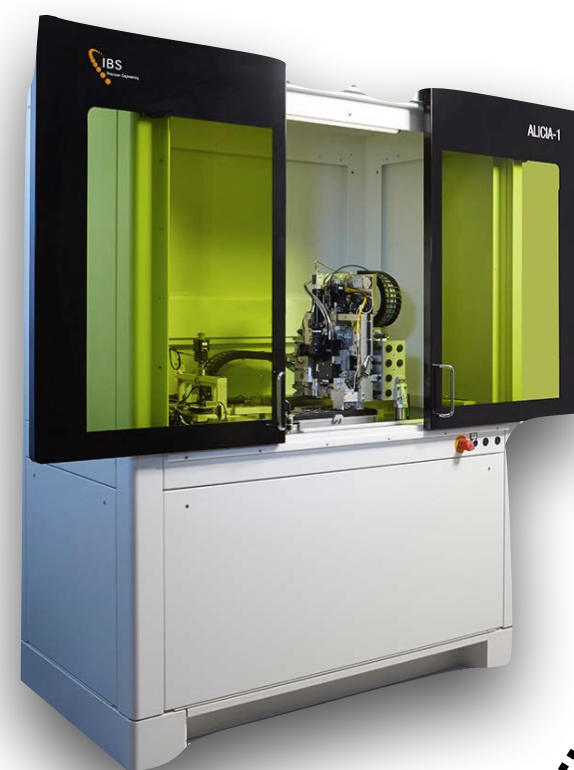
Logbook

Assembly Annotations:



4. Creating the **specific OBHIC Assembly Activity**

A new activity of type **OB HIC Assembly** will be created on the DB [with a unique Activity Name] using as **Output Component** the OB HIC created on step 3 and as **Input Components** those already related to it in the same step 3.



ALICE ITS HIC Assembly Interface

Home New HIC Assembly Add Crew Member Log In

Home » AR003016 » Edit HIC Assembly AR003016

✓ HIC Assembly AR003016 has been updated.

Edit HIC Assembly AR003016

View Edit

FPC Name *
AR003016

HIC Category *
Outer-Barrel(Silver)

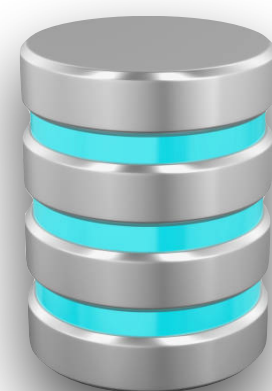
▼ Crew members

Assembly Crew *

CARLOLA PASQUALE
CEBALLOS SANCHEZ CESAR
COLELLA DOMENICO
FIORENZA GABRIELE

▼ Annotations

Logbook
Assembly Annotations:
.....



Assembly of OBHIC_01

Output Component
Input Components
Location
Parameters Value
Attachments
Result
Members

And then the OBHIC tests begin...

