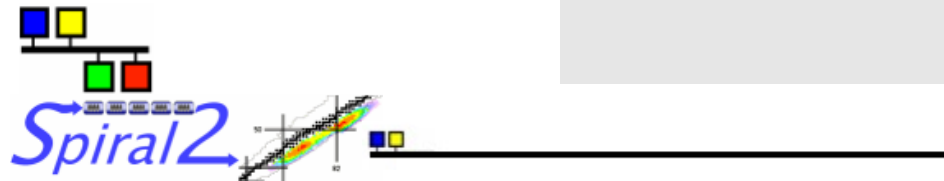




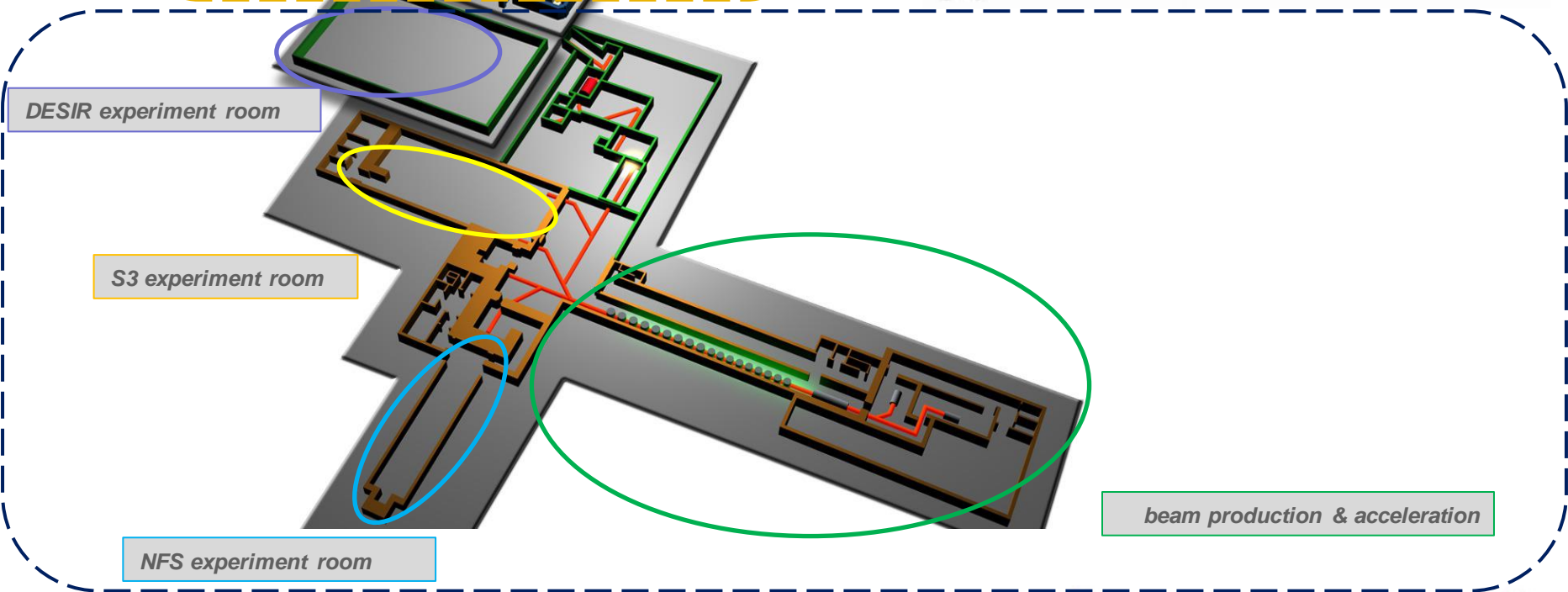
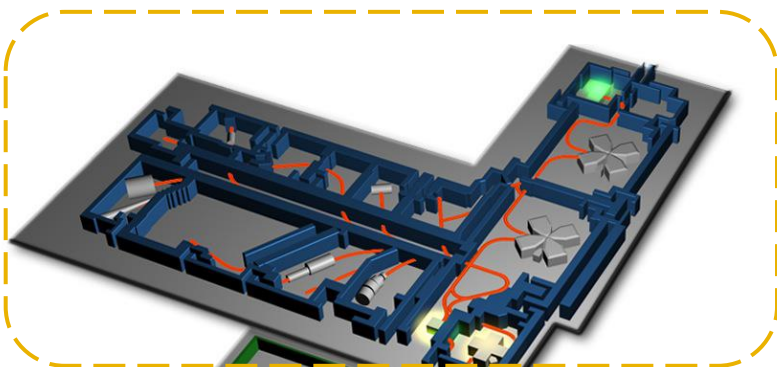
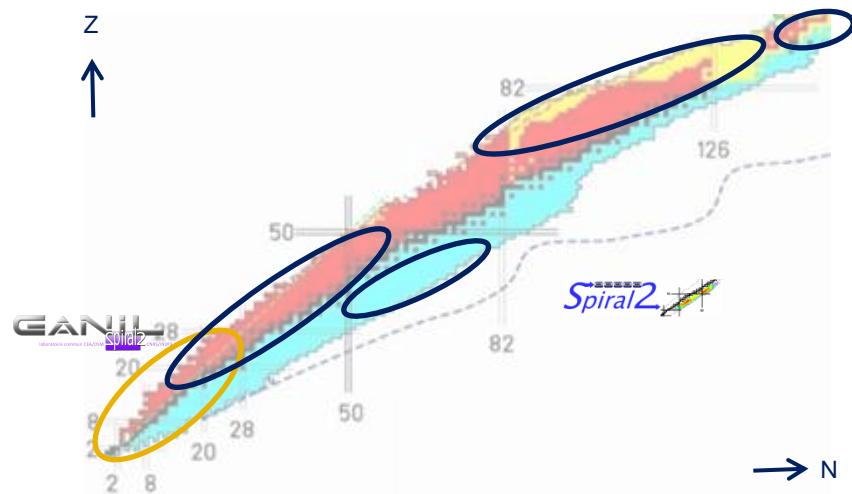
# Setting the Spiral2 control system for the on-going commissioning





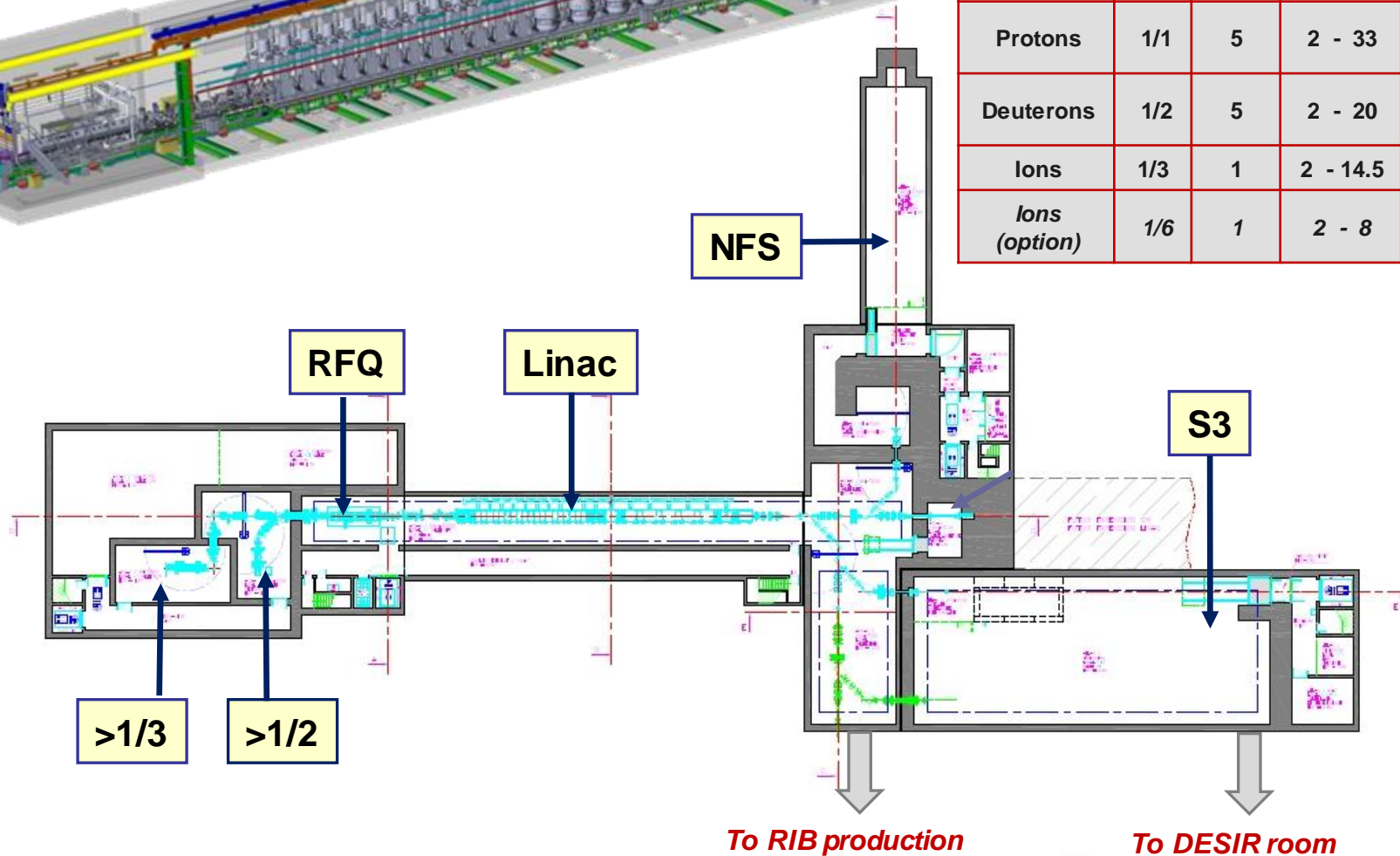
- **Introduction**
  - The Spiral2 project
  - Control system deliverables
  - Collaborations for the control system
- **The Spiral2 control system**
  - Infrastructure
  - Equipment configuration
  - Sources and beam lines controls
  - From RFQ to HEBT
  - GUIs environment
  - Software integration
- **And now ?**

# Spiral2 : a new Rare Ion Beam facility



## Beam characteristics

	Q/A	I (mA)	Energy (Mev/u)	CW max beam power (KW)
Protons	1/1	5	2 - 33	165
Deuterons	1/2	5	2 - 20	200
Ions	1/3	1	2 - 14.5	45
<i>Ions (option)</i>	1/6	1	2 - 8	48



# Spiral2 : building constructions ...



**May 2011**

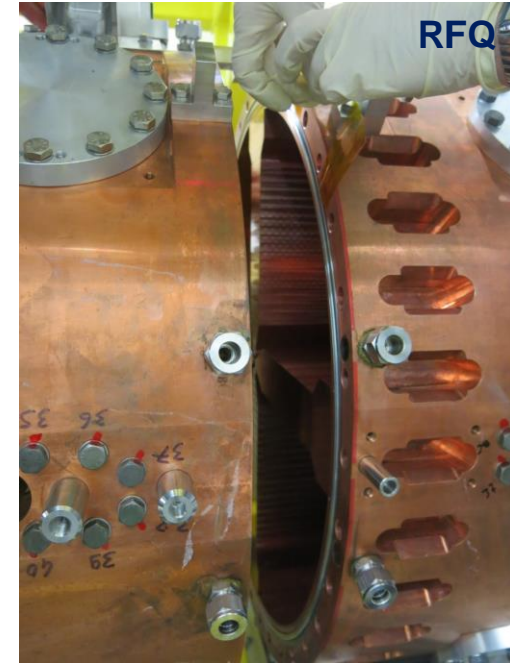
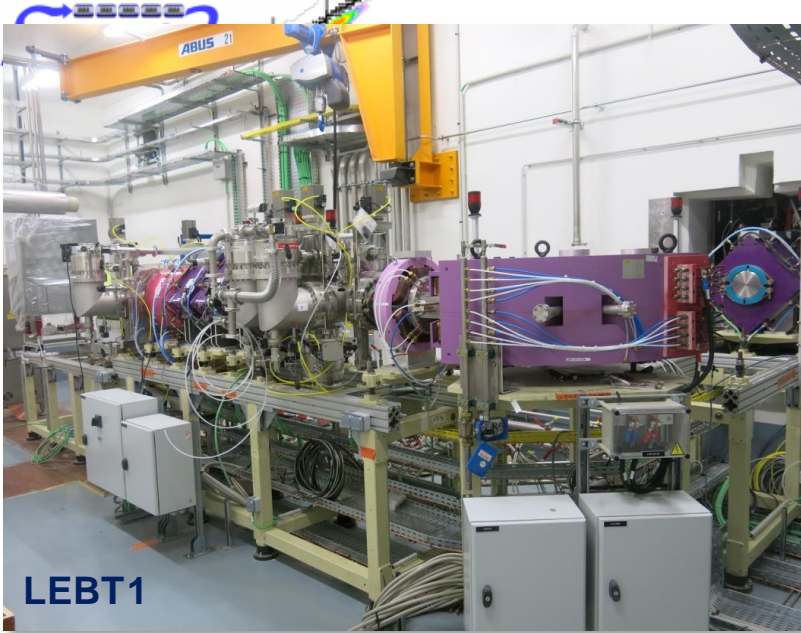
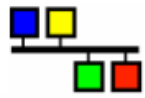


**October 2012**

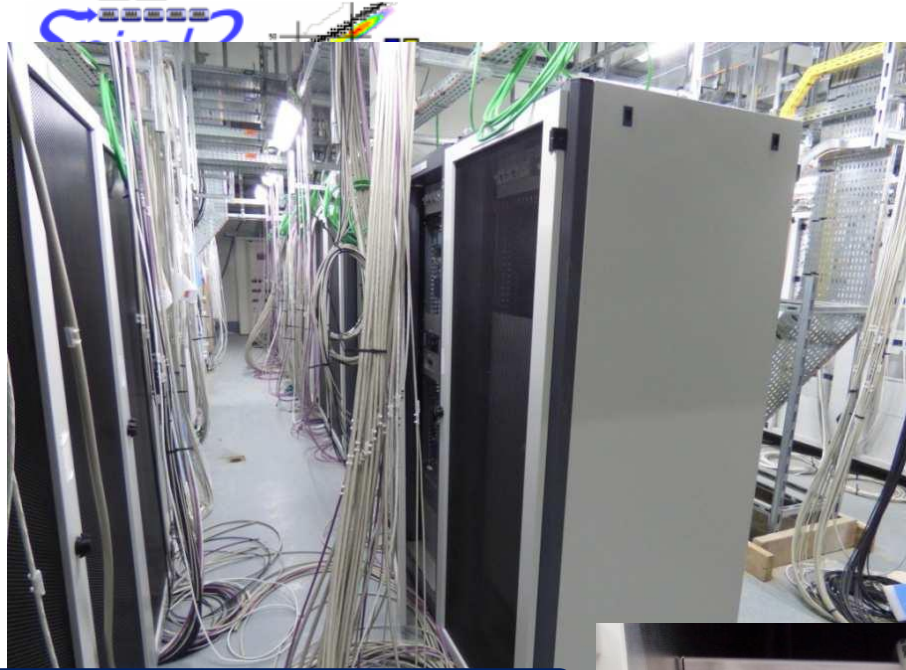


**October 2014**

# Spiral2 : ... along with the process installation



# Spiral2 : and what about the control system ?



Racks installation & cabling



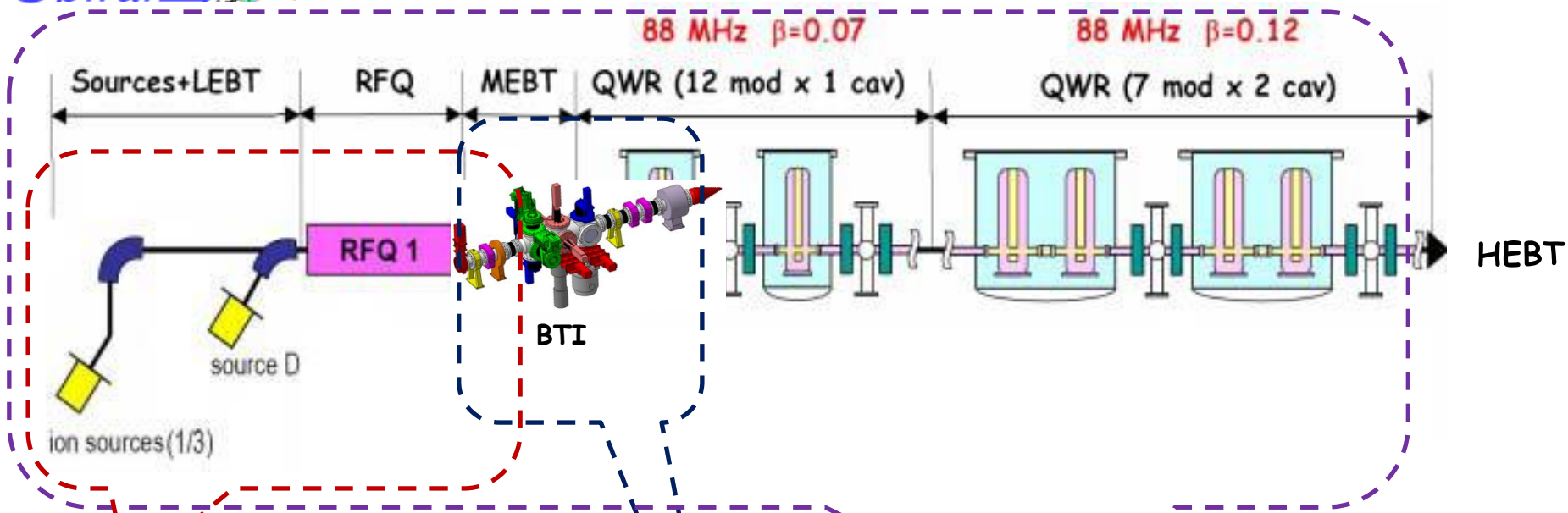
Work project for the PCD control room



VME chassis installed waiting for the electrical switch-on and checks

# Control system : ~70 man.years of collaboration (~8,5 FTW)

Spiral2 



## Injector controls

- ↳ Ion source control
- ↳ Deuteron source control
- Epics distribution & repository
- Equipment interfaces :
  - ↳ CFs, slits, ACCTs-DCCTs
  - ↳ TOF, FCT, CFR
- LRF



## Equipment interfaces :

- ↳ Emittancemeters
- ↳ BEMs
- BTI

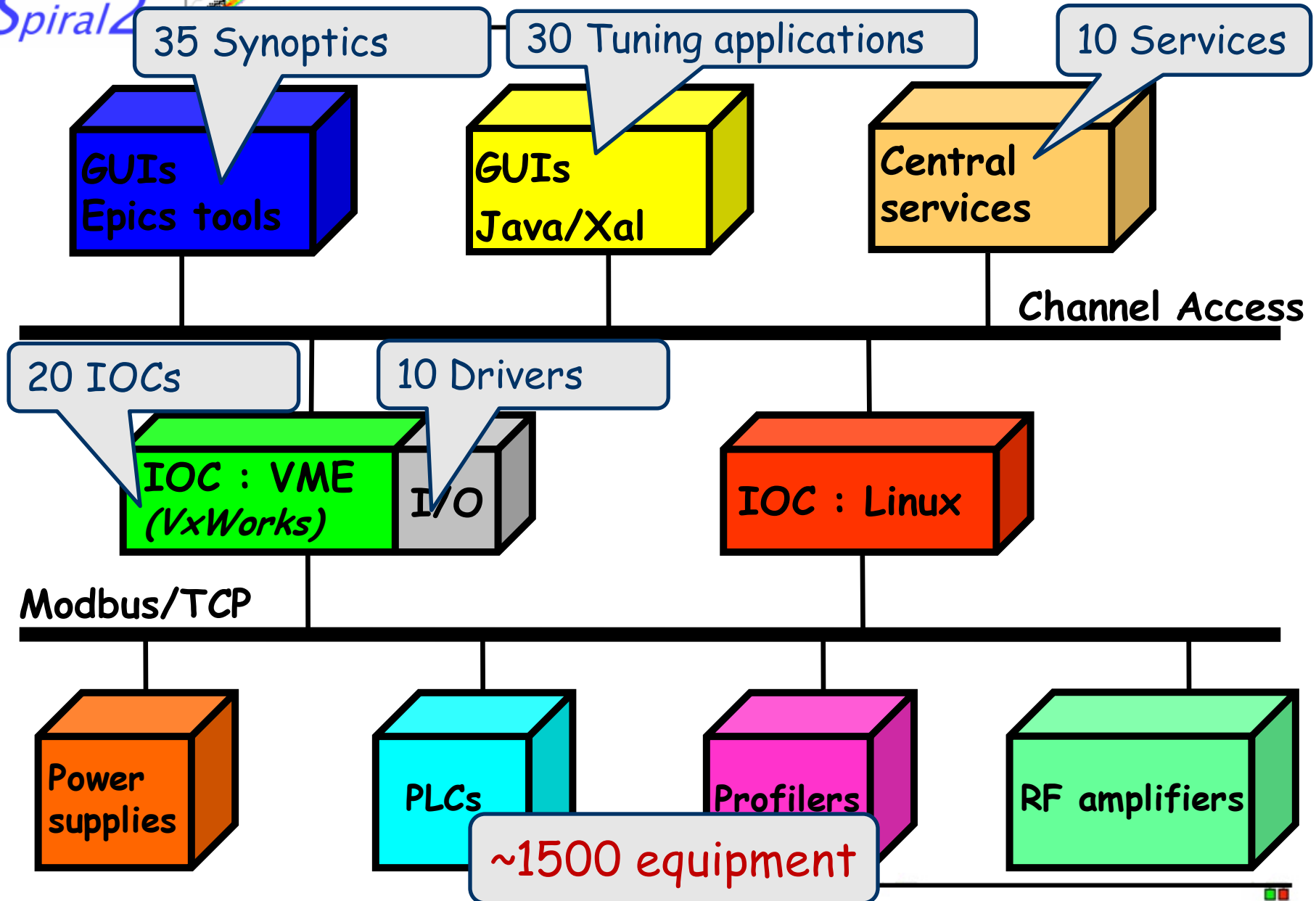


## Global coordination

### Equipment interfaces :

- ↳ Power supplies
- ↳ Profilers, BLMs, BPMs
- ↳ RF
- Central services
- High level applications
- Databases
- CSS distribution
- SVN server



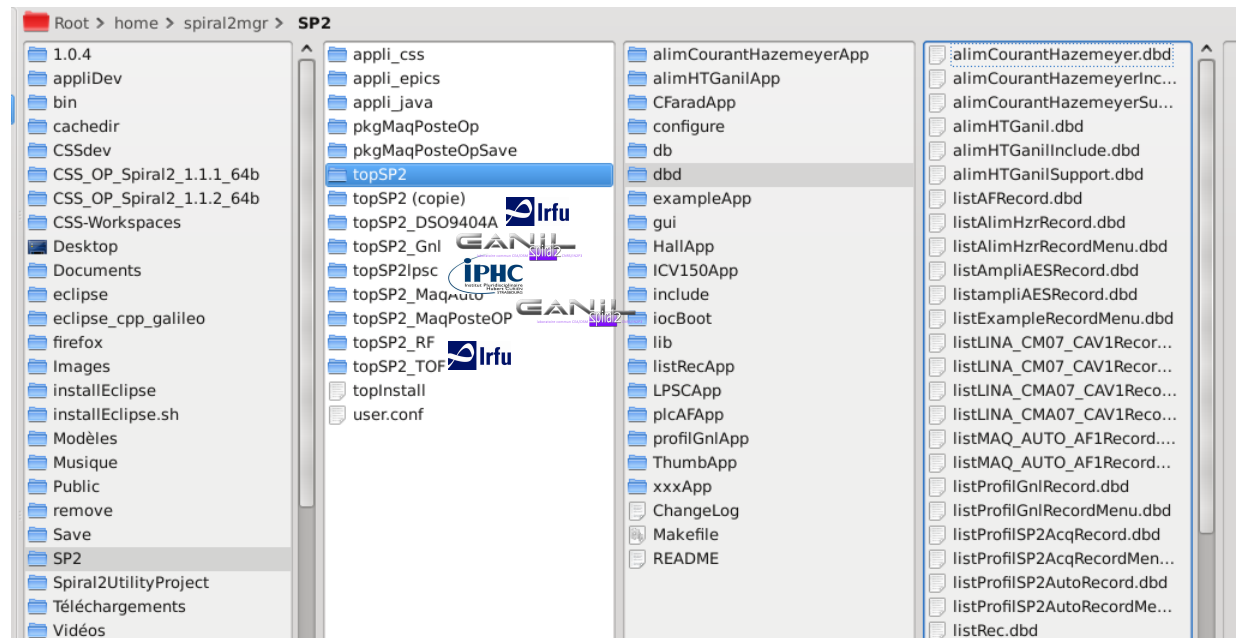




- **Common Spiral2 development platform ("topSp2"):**
  - Provided and maintained by Irfu
  - Shared by the three labs
  - Spiral2 version of the EPICS environment (development, operation)
- **Rules and formalization**

- Interfaces between IOCs and GUIs
- Files naming
- Repository organization
- For on-site integration

- **Development hosted on a shared SVN server @Ganil**



# Infrastructure : central services



Alarms handling  
(in-house development shared Ganil/Spiral2)

```

Test Sin1:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Sin2:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Sin3:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Sin4:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Sin5:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Sin6:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Sin7:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Sin8:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Sin9:EquipmentSin Count : 368 foc=accdv2.ganil.local 2011-07-08 09:01:20
Test Cos0:EquipmentCos foc=accdv2.ganil.local 2011-07-08 09:00:36 09:01:25 11 occurrences
Test Sin0:EquipmentSin Count : 373 foc=accdv2.ganil.local 2011-07-08 09:01:25
Test Cos10:EquipmentCos foc=accdv2.ganil.local 2011-07-08 09:00:36 09:01:25 11 occurrences
Test Sin10:EquipmentSin Count : 373 foc=accdv2.ganil.local 2011-07-08 09:01:25
Test Cos1:EquipmentCos foc=accdv2.ganil.local 2011-07-08 09:00:36 09:01:25 11 occurrences
Test Sin1:EquipmentCos foc=accdv2.ganil.local 2011-07-08 09:01:25
Test Cos2:EquipmentCos foc=accdv2.ganil.local 2011-07-08 09:00:36 09:01:25 11 occurrences
Test Sin2:EquipmentSin Count : 373 foc=accdv2.ganil.local 2011-07-08 09:01:25
Test Cos3:EquipmentCos foc=accdv2.ganil.local 2011-07-08 09:00:36 09:01:25 11 occurrences
Test Sin3:EquipmentSin Count : 373 foc=accdv2.ganil.local 2011-07-08 09:01:25
    
```

Cahier de bord

ganelog.ganil.priv:3090/logbook\_standard/view/ganil

Plus les visités | j5 - Log in | GestionEqpt(BDOPERJ) | Gestion des alarmes | EDM5 Web Login Page | GLPI - Authentification | ChillProject

Docs | Historique des postes | Cahier de bord | Liste des faisceaux

Cahier de bord | lecorche@jSite

Rafraîchir | Pages: 1 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 297 (dernière)

Filtre: **Filtre avancé** | Type | Sous Type | Sévérité | Status | Localisation | Consignes En cours

Type	Date de début	Créé par	Faisceau Description	Message	Sévérité	Status	Fichier(s) joint(s)
Rapport	28/05/2014 15:25:09	Equipe 4	40 Ca 20 8 / 18 / 19 + Energie sortie : 4.49804 MeV/A	fin d'intervention sur les alimentations Qpoles électrostatiques suite réglage source I1	-	-	
Rapport	28/05/2014 15:08:11	Equipe 4	40 Ca 20 8 / 18 / 19 + Energie sortie : 4.49804 MeV/A	modification base de données due au changement de type d'alimentation au niveau de 11.EJ.QP et 11.EJ.QM test alimentations.	-	-	
Rapport	28/05/2014 14:00:00	Equipe 4	40 Ca 20 8 / 18 / 19 + Energie sortie : 4.49804 MeV/A	appel groupe alimentations et charges : intervention sur le 11.EJ.QP. Changement alimentations.	-	-	
Référence machine	28/05/2014 13:04:50	control	40 Ca 20 8 / 18 / 19 + Energie sortie : 4.49804 MeV/A	HF - -	-	-	
Référence machine	28/05/2014 13:04:24	control	86 Kr 36 18 + Energie sortie : 0.8674 MeV/A	12_ECR - -	-	-	
Référence machine	28/05/2014 13:04:14	control	86 Kr 36 18 + Energie sortie : 0.8674 MeV/A	12_ECR - -	-	-	
Rapport	28/05/2014 13:03:12	Equipe 4	40 Ca 20 8 / 18 / 19 + Energie sortie : 4.49804 MeV/A	suite dégazage source I1 faisceau en Irsud : 245 nA	-	-	
Consigne	27/05/2014 19:03:33	Equipe 4		Le passage en faisceau 44Ca9+ est souhaité par les physiciens vers 9 heure le 28/05. Pensez à remettre ON le groupeur 2, et optimisez le faisceau actuel 40Ca8+ (voir rendement à la fin du cahier) Faire un archivage du faisceau avec le titre "faisceau de référence 40Ca8+". Ce faisceau sera la référence pour le réglages des faisceaux suivants.	FAIBLE	CLOSURE	
Référence machine	28/05/2014 09:03:45	Equipe 2	40 Ca 20 8 / 18 / 19 + Energie sortie : 4.49804 MeV/A	Archivage complet de la machine avec G1 et G2 en marche avant le passage du Ca 40 8+ au Ca44 9+.	-	-	
Rapport	28/05/2014 01:01:34	Equipe 3	40 Ca 20 8 / 18 / 19 + Energie sortie : 4.49804 MeV/A	La source est stable avec 600nA disponible sur IL.CF11 => envoi à la physique. Départ astreinte qui n'a pas trouvé de solution pour retrouver l'intensité nominale. L'intensité est suffisante pour la faire un spectre et stabiliser l'astreinte.	-	-	
Rapport	27/05/2014 23:36:36	Equipe 3	40 Ca 20 8 / 18 / 19 + Energie sortie : 4.49804 MeV/A	L'intensité faisceau est trop faible un spectre et stabiliser l'astreinte.	-	-	

E-logbook  
(commercial j5 product in use at Ganil)

Data Browser | SNS Control System Studio

Archive Search | Navigator

URL: jdbc:oracle:thin:@DESCRIPTION...

Name	Description	Key
rdb	Oracle	1

Pattern: DTL\*Load | Search

Replace search results | Reg.Exp.

PV Name	Name
DTL_Diag:IOC_BLM1:Load	rdb
DTL_Diag:IOC_D8CM01:Load	rdb
DTL_HPRF:IOC3:Load	rdb
DTL_LLRF:FCM1:RFLoad	rdb
DTL_LLRF:FCM2:RFLoad	rdb
DTL_LLRF:FCM3:RFLoad	rdb
DTL_LLRF:FCM4:RFLoad	rdb
DTL_LLRF:FCM5:RFLoad	rdb
DTL_LLRF:FCM6:RFLoad	rdb
DTL_LLRF:IOC1:Load	rdb
DTL_LLRF:IOC2:Load	rdb
DTL_LLRF:IOC3:Load	rdb

Value 1: 58.86, 49.19, 56, 54, 52, 50, 48, 46, 44, 42, 40, 38, 36, 34, 32, 30, 28, 26, 24, 22, 20, 18, 16, 14, 12, 10, 8, 6, 4, 2, 0

Time: 2010-02-22 13:02:28, 13:09:00, 13:15:00, 13:21:00, 13:27:00, 13:33:00, 13:39:00, 13:45:00, 13:51:00, 14:02:28

Annotation 1: 2010-02-22 13:20:43.940635666 48 OK, OK

Source: RDB Original (2010-02-22 13:20:43, 48.1)

Dropped!

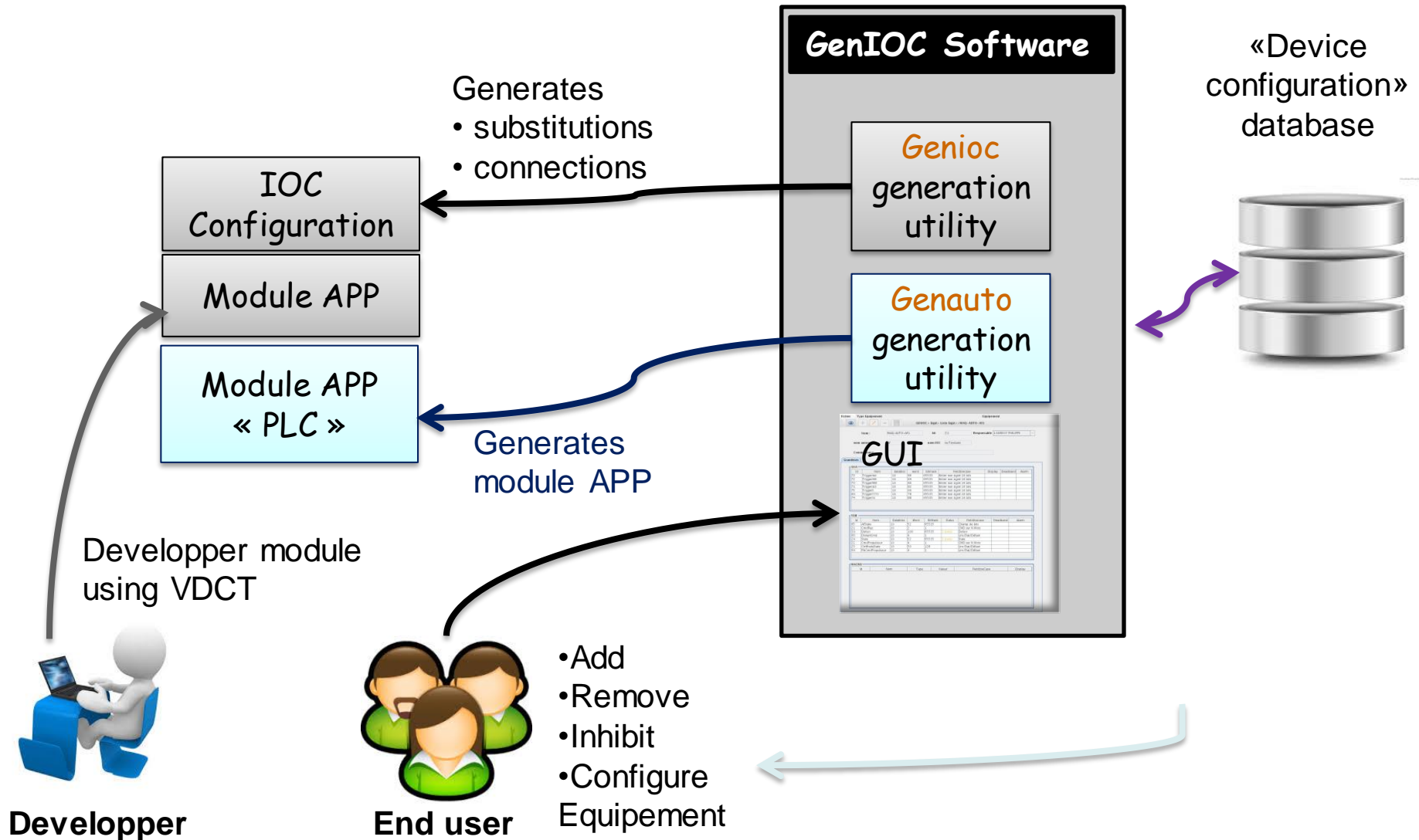
Properties | Export Samples

Trace	Item (PV, Formula)	Display Name	Color	Scan Period	Buffer Size	Width	Axis	Trace Type	Request
<input checked="" type="checkbox"/>	DTL_LLRF:IOC1:Load	DTL_LLRF:IOC1:Load	0.0	10000	2	Value 1	Area	Optimized	
<input checked="" type="checkbox"/>	DTL_LLRF:IOC2:Load	DTL_LLRF:IOC2:Load	0.0	10000	2	Value 2	Area	Optimized	

Archive Data Sources

Name	Key	URL
rdb	1	jdbc:oracle:thin:@DESCRIPTION=(ADDRESS_LIST=(LOAD_BALANCE=OFF)ADDRESS=(PROTOCOL=TCP)

Archiving system  
(CSS)



# Infrastructure : equipment configuration phases

The screenshot shows the GENIO software interface for equipment configuration. The main window displays the configuration for 'MAQ-AUTO-AF1' (Id: 21). The 'Génération status' section shows 'Genloc status: GENERATED' and 'GenAuto status: GENERATED'. The 'Adressage automate' table is the central focus, listing various PLC addresses and their corresponding equipment and grandeur values.

DB	WORD	MASK	Equipement	Grandeur	Commentaire
10	0	0000FFFF	Ana1	Value2 Cons	
10	2	00000001	MAQ-AUTO-AF1	CmdRaz	
10	2	0000FFFF	Ana1	Value1 Cons	
10	2	0000FFFF	Ana1	Value2 Cons	
10	4	0000FFFF	MAQ-AUTO-AF1	TEst	
10	4	00000001	MAQ-AUTO-AF1	DistantCmd	
10	4	0000FFFF	MAQ-AUTO-ANA1	Value1 Cons	
10	4	00000001	MAQ-AUTO-AF1	ICmdPropulseur	
10	4	00000001	MAQ-AUTO-AF1	RbCmdPropulseur	
10	6	0000FFFF	Ana1	Value2 Mes	
10	8	0000FFFF	Ana1	Value2 Mes	
10	8	0000FFFF	MAQ-AUTO-ANA1	Value2 Cons	
10	10	0000FFFF	MAQ-AUTO-ANA1	Value2 Cons	
10	12				
10	14				
10	16				
10	18				
10	20				
10	22				
10	24				
10	26				
10	28				
10	30				
10	32				
10	34				
10	36				
10	38				
10	40				
10	42				
10	44				
10	46				
10	48				
10	50	00000080	MAQ-AUTO-AF1	CtrlModeState	Mode LOCAL/DISTANT
10	52	0000FFFF	MAQ-AUTO-AF1	State	Mot d'état
10	52	0000FFFF	MAQ-AUTO-AF1	AFState	
10	54	0000FFFF	MAQ-AUTO-ANA1	Value1Act	Valeur actuelle 1
10	56	0000FFFF	MAQ-AUTO-ANA1	Value2 Mes	
10	58	0000FFFF	MAQ-AUTO-ANA1	Value2 Mes	
10	60				
10	62				
10	64	0000FFFF	AutoMaquette	IsAlive	
10	66				

- Non Epics fields  
↳ IP, builder ...

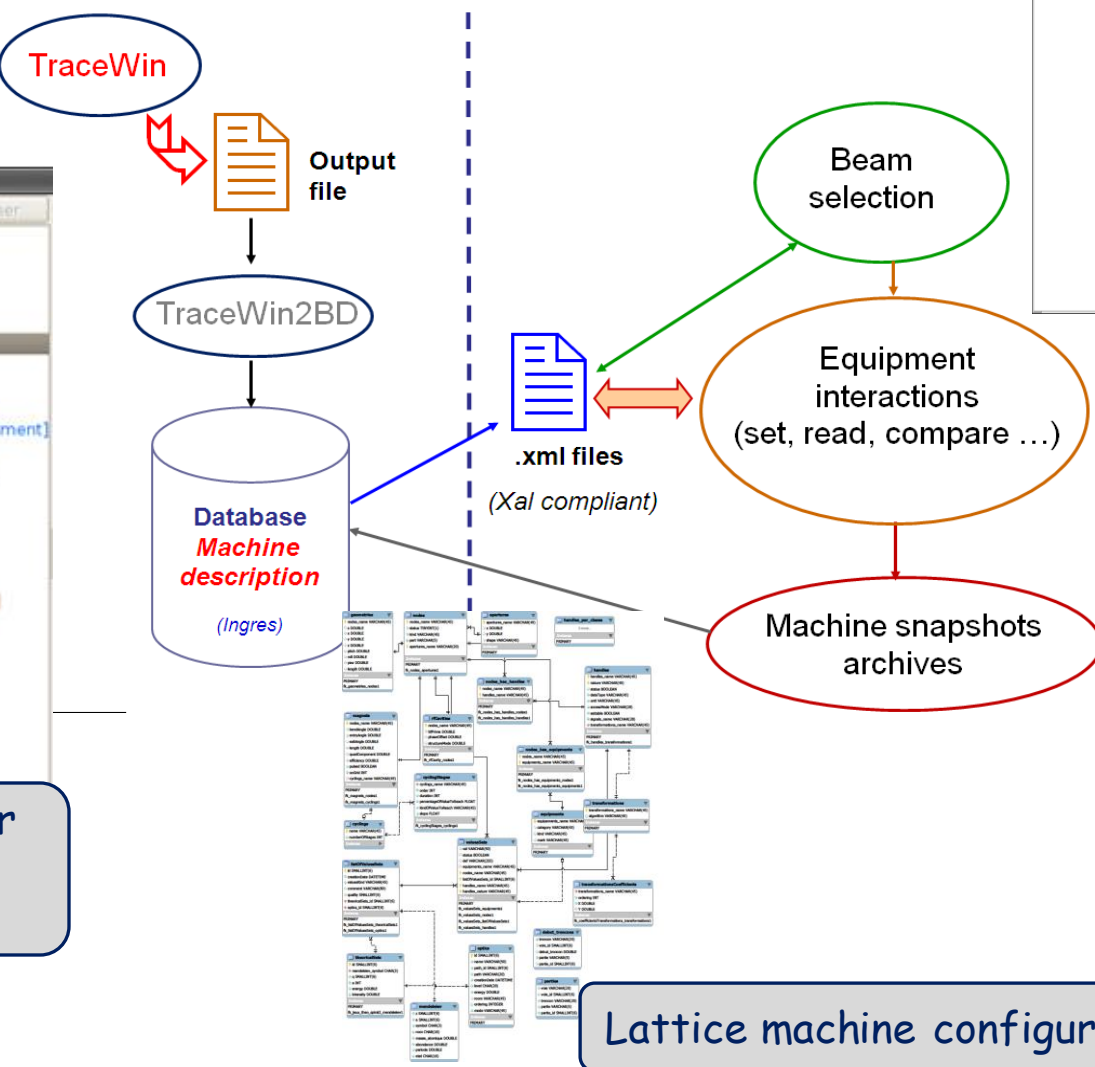
Monitoring (access, mask)  
Value for non Epics fields  
PLC address ...



# Infrastructure : machine settings management

Off-line run preparation

On-line operation



TraceWin

Output file

TraceWin2BD

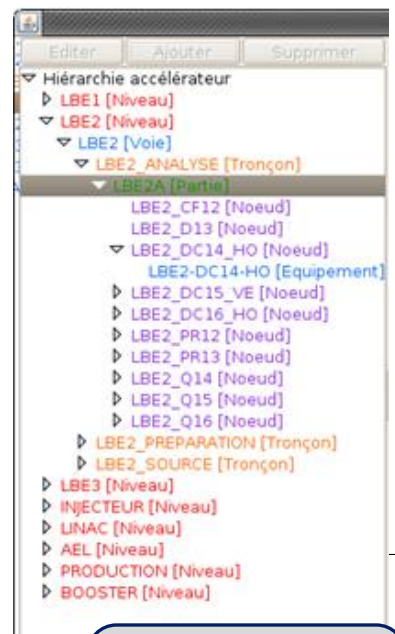
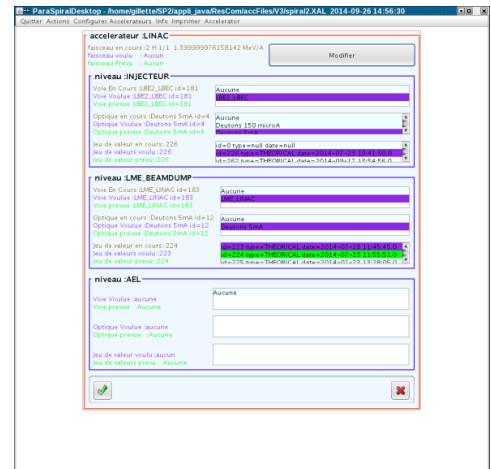
Database  
Machine  
description  
(Ingres)

.xml files  
(Xal compliant)

Beam  
selection

Equipment  
interactions  
(set, read, compare ...)

Machine snapshots  
archives



Accelerator  
hierarchy  
description

Nom	Equipement	Niveau	LBE2 PREPARATION	LIVE	Statut	Default
LBE2_2011	LBE2_2011	INJECTEUR	LBE2_2011_LIVE	0.000	0	0
LBE2_2012	LBE2_2012	INJECTEUR	LBE2_2012_LIVE	0.000	0	0
LBE2_2013	LBE2_2013	INJECTEUR	LBE2_2013_LIVE	0.000	0	0
LBE2_2014	LBE2_2014	INJECTEUR	LBE2_2014_LIVE	0.000	0	0
LBE2_2015	LBE2_2015	INJECTEUR	LBE2_2015_LIVE	0.000	0	0
LBE2_2016	LBE2_2016	INJECTEUR	LBE2_2016_LIVE	0.000	0	0
LBE2_2017	LBE2_2017	INJECTEUR	LBE2_2017_LIVE	0.000	0	0
LBE2_2018	LBE2_2018	INJECTEUR	LBE2_2018_LIVE	0.000	0	0
LBE2_2019	LBE2_2019	INJECTEUR	LBE2_2019_LIVE	0.000	0	0
LBE2_2020	LBE2_2020	INJECTEUR	LBE2_2020_LIVE	0.000	0	0
LBE2_2021	LBE2_2021	INJECTEUR	LBE2_2021_LIVE	0.000	0	0
LBE2_2022	LBE2_2022	INJECTEUR	LBE2_2022_LIVE	0.000	0	0
LBE2_2023	LBE2_2023	INJECTEUR	LBE2_2023_LIVE	0.000	0	0
LBE2_2024	LBE2_2024	INJECTEUR	LBE2_2024_LIVE	0.000	0	0
LBE2_2025	LBE2_2025	INJECTEUR	LBE2_2025_LIVE	0.000	0	0
LBE2_2026	LBE2_2026	INJECTEUR	LBE2_2026_LIVE	0.000	0	0
LBE2_2027	LBE2_2027	INJECTEUR	LBE2_2027_LIVE	0.000	0	0
LBE2_2028	LBE2_2028	INJECTEUR	LBE2_2028_LIVE	0.000	0	0
LBE2_2029	LBE2_2029	INJECTEUR	LBE2_2029_LIVE	0.000	0	0
LBE2_2030	LBE2_2030	INJECTEUR	LBE2_2030_LIVE	0.000	0	0
LBE2_2031	LBE2_2031	INJECTEUR	LBE2_2031_LIVE	0.000	0	0
LBE2_2032	LBE2_2032	INJECTEUR	LBE2_2032_LIVE	0.000	0	0
LBE2_2033	LBE2_2033	INJECTEUR	LBE2_2033_LIVE	0.000	0	0
LBE2_2034	LBE2_2034	INJECTEUR	LBE2_2034_LIVE	0.000	0	0
LBE2_2035	LBE2_2035	INJECTEUR	LBE2_2035_LIVE	0.000	0	0
LBE2_2036	LBE2_2036	INJECTEUR	LBE2_2036_LIVE	0.000	0	0
LBE2_2037	LBE2_2037	INJECTEUR	LBE2_2037_LIVE	0.000	0	0
LBE2_2038	LBE2_2038	INJECTEUR	LBE2_2038_LIVE	0.000	0	0
LBE2_2039	LBE2_2039	INJECTEUR	LBE2_2039_LIVE	0.000	0	0
LBE2_2040	LBE2_2040	INJECTEUR	LBE2_2040_LIVE	0.000	0	0
LBE2_2041	LBE2_2041	INJECTEUR	LBE2_2041_LIVE	0.000	0	0
LBE2_2042	LBE2_2042	INJECTEUR	LBE2_2042_LIVE	0.000	0	0
LBE2_2043	LBE2_2043	INJECTEUR	LBE2_2043_LIVE	0.000	0	0
LBE2_2044	LBE2_2044	INJECTEUR	LBE2_2044_LIVE	0.000	0	0
LBE2_2045	LBE2_2045	INJECTEUR	LBE2_2045_LIVE	0.000	0	0
LBE2_2046	LBE2_2046	INJECTEUR	LBE2_2046_LIVE	0.000	0	0
LBE2_2047	LBE2_2047	INJECTEUR	LBE2_2047_LIVE	0.000	0	0
LBE2_2048	LBE2_2048	INJECTEUR	LBE2_2048_LIVE	0.000	0	0
LBE2_2049	LBE2_2049	INJECTEUR	LBE2_2049_LIVE	0.000	0	0
LBE2_2050	LBE2_2050	INJECTEUR	LBE2_2050_LIVE	0.000	0	0
LBE2_2051	LBE2_2051	INJECTEUR	LBE2_2051_LIVE	0.000	0	0
LBE2_2052	LBE2_2052	INJECTEUR	LBE2_2052_LIVE	0.000	0	0
LBE2_2053	LBE2_2053	INJECTEUR	LBE2_2053_LIVE	0.000	0	0
LBE2_2054	LBE2_2054	INJECTEUR	LBE2_2054_LIVE	0.000	0	0
LBE2_2055	LBE2_2055	INJECTEUR	LBE2_2055_LIVE	0.000	0	0
LBE2_2056	LBE2_2056	INJECTEUR	LBE2_2056_LIVE	0.000	0	0
LBE2_2057	LBE2_2057	INJECTEUR	LBE2_2057_LIVE	0.000	0	0
LBE2_2058	LBE2_2058	INJECTEUR	LBE2_2058_LIVE	0.000	0	0
LBE2_2059	LBE2_2059	INJECTEUR	LBE2_2059_LIVE	0.000	0	0
LBE2_2060	LBE2_2060	INJECTEUR	LBE2_2060_LIVE	0.000	0	0
LBE2_2061	LBE2_2061	INJECTEUR	LBE2_2061_LIVE	0.000	0	0
LBE2_2062	LBE2_2062	INJECTEUR	LBE2_2062_LIVE	0.000	0	0
LBE2_2063	LBE2_2063	INJECTEUR	LBE2_2063_LIVE	0.000	0	0
LBE2_2064	LBE2_2064	INJECTEUR	LBE2_2064_LIVE	0.000	0	0
LBE2_2065	LBE2_2065	INJECTEUR	LBE2_2065_LIVE	0.000	0	0
LBE2_2066	LBE2_2066	INJECTEUR	LBE2_2066_LIVE	0.000	0	0
LBE2_2067	LBE2_2067	INJECTEUR	LBE2_2067_LIVE	0.000	0	0
LBE2_2068	LBE2_2068	INJECTEUR	LBE2_2068_LIVE	0.000	0	0
LBE2_2069	LBE2_2069	INJECTEUR	LBE2_2069_LIVE	0.000	0	0
LBE2_2070	LBE2_2070	INJECTEUR	LBE2_2070_LIVE	0.000	0	0
LBE2_2071	LBE2_2071	INJECTEUR	LBE2_2071_LIVE	0.000	0	0
LBE2_2072	LBE2_2072	INJECTEUR	LBE2_2072_LIVE	0.000	0	0
LBE2_2073	LBE2_2073	INJECTEUR	LBE2_2073_LIVE	0.000	0	0
LBE2_2074	LBE2_2074	INJECTEUR	LBE2_2074_LIVE	0.000	0	0
LBE2_2075	LBE2_2075	INJECTEUR	LBE2_2075_LIVE	0.000	0	0
LBE2_2076	LBE2_2076	INJECTEUR	LBE2_2076_LIVE	0.000	0	0
LBE2_2077	LBE2_2077	INJECTEUR	LBE2_2077_LIVE	0.000	0	0
LBE2_2078	LBE2_2078	INJECTEUR	LBE2_2078_LIVE	0.000	0	0
LBE2_2079	LBE2_2079	INJECTEUR	LBE2_2079_LIVE	0.000	0	0
LBE2_2080	LBE2_2080	INJECTEUR	LBE2_2080_LIVE	0.000	0	0
LBE2_2081	LBE2_2081	INJECTEUR	LBE2_2081_LIVE	0.000	0	0
LBE2_2082	LBE2_2082	INJECTEUR	LBE2_2082_LIVE	0.000	0	0
LBE2_2083	LBE2_2083	INJECTEUR	LBE2_2083_LIVE	0.000	0	0
LBE2_2084	LBE2_2084	INJECTEUR	LBE2_2084_LIVE	0.000	0	0
LBE2_2085	LBE2_2085	INJECTEUR	LBE2_2085_LIVE	0.000	0	0
LBE2_2086	LBE2_2086	INJECTEUR	LBE2_2086_LIVE	0.000	0	0
LBE2_2087	LBE2_2087	INJECTEUR	LBE2_2087_LIVE	0.000	0	0
LBE2_2088	LBE2_2088	INJECTEUR	LBE2_2088_LIVE	0.000	0	0
LBE2_2089	LBE2_2089	INJECTEUR	LBE2_2089_LIVE	0.000	0	0
LBE2_2090	LBE2_2090	INJECTEUR	LBE2_2090_LIVE	0.000	0	0
LBE2_2091	LBE2_2091	INJECTEUR	LBE2_2091_LIVE	0.000	0	0
LBE2_2092	LBE2_2092	INJECTEUR	LBE2_2092_LIVE	0.000	0	0
LBE2_2093	LBE2_2093	INJECTEUR	LBE2_2093_LIVE	0.000	0	0
LBE2_2094	LBE2_2094	INJECTEUR	LBE2_2094_LIVE	0.000	0	0
LBE2_2095	LBE2_2095	INJECTEUR	LBE2_2095_LIVE	0.000	0	0
LBE2_2096	LBE2_2096	INJECTEUR	LBE2_2096_LIVE	0.000	0	0
LBE2_2097	LBE2_2097	INJECTEUR	LBE2_2097_LIVE	0.000	0	0
LBE2_2098	LBE2_2098	INJECTEUR	LBE2_2098_LIVE	0.000	0	0
LBE2_2099	LBE2_2099	INJECTEUR	LBE2_2099_LIVE	0.000	0	0
LBE2_2100	LBE2_2100	INJECTEUR	LBE2_2100_LIVE	0.000	0	0

Lattice machine configuration database

./SourceD+.edi (on pcibe2s)

## SPIRAL2 : Pilotage Source Deuton

**H2** ON **D2** OFF **Ouvr. Vanne H2** ON

Debit: 1.111 SSCM ON

0 1.11 5 1.11

Init Loc.

**Alimentation HT** ON

Tension: 20.10 kV ON 50 Eo.10

Courant: 14.1 mA ON 100 Eo.00

CF11 ON HORS

CF12 ON HORS

CF34 ON HORS

**Alimentation HTEI** ON

Tension: 1.02 kV ON 0 1.03

Courant: 0.0 mA ON 0 1.03

**Azote (N2)** ON **Ferm. Vanne N2** OFF

Debit: 0.004 SSCM OFF

0 0.0 5 0.00

**Magnetron** ON

PHF: 830 WATT CONTINU

1 2000

Periode: 500.0 ms

Larg. Pulse: 500.0 ms

Reset Loc.

**Diagramme de la source de deutons:**

Deuterons & LBE2/C :  
Used and validated during  
production tests @Saclay

Ions & LBE1 :  
Different from the @Grenoble  
control system ⇒ To be tested

### Source d'Ions

Alim HT Champs HF/ Gaz Config

HF

Voulue	Actuelle	Mesure
P Incidente:	<span style="color: green;">ON</span>	<span style="color: green;">ON</span> W
P Reflexie:	<span style="color: green;">ON</span>	<span style="color: green;">ON</span> W

Start Rampe STOP CONTINU

Gaz

Type de gaz: Ar O16

Consigne Gaz1: 8.20 V

Consigne Gaz2: 10.00 V

Pression

P injection: mbar

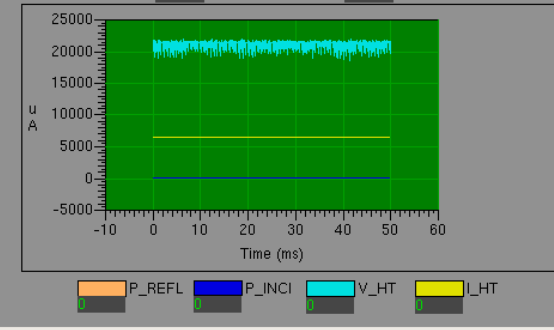
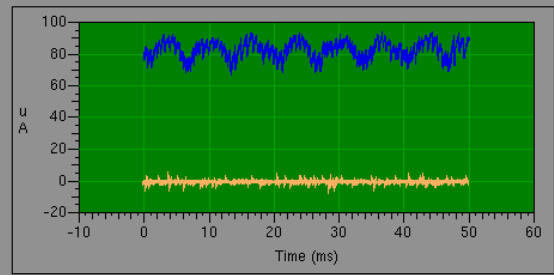
P extraction: 0.0016-08 mbar

Etat HT/Bias/Four: OFF

Pression Injection: mbar

Sonde de Hall: Gauss

Emergency StripTool



# Sources and LEBTs : integration of devices

AR-GT7-PC3

Power supplies

GANIL

12

Commande

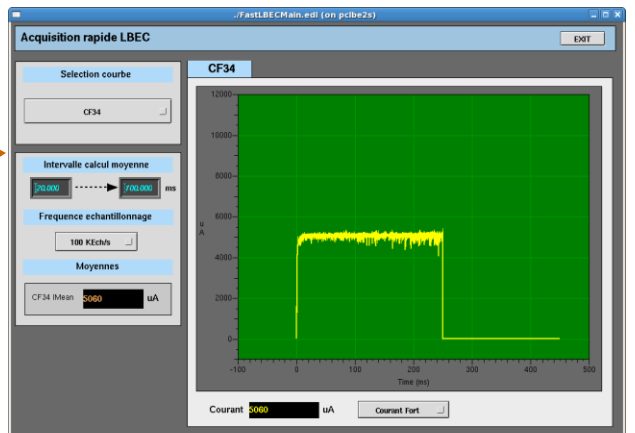
État

Démarrer/Arrêter

Changer de valeur

Valeur Consigne : 49,5000 A

Valeur Actuelle : 0,6411 A



Faraday Cups & ACCT-DCCT

Slits

Irfu

FR2

FR2

BTUTEE RENCONTRE ACTIVE!

Consigne 80 mm 1 C

Statut

Def. 20 A 0 V

Def. Prep & Sbc

Def. Cam & IC

F.C. Max

F.C. Min

Stop

Consigne 80 mm 1 C

Statut

Def. 20 A 0 V

Def. Prep & Sbc

Def. Cam & IC

F.C. Max

F.C. Min

Stop

Slits

Configuration Huchler

Alimentation

Temp. Support C

Temp. Air C

Consigne position

Statut

Def. 20 A 0 V

Def. Prep & Sbc

Def. Cam & IC

F.C. Max

F.C. Min

Stop

Logique Huchler

Statut

Def. 20 A 0 V

Def. Prep & Sbc

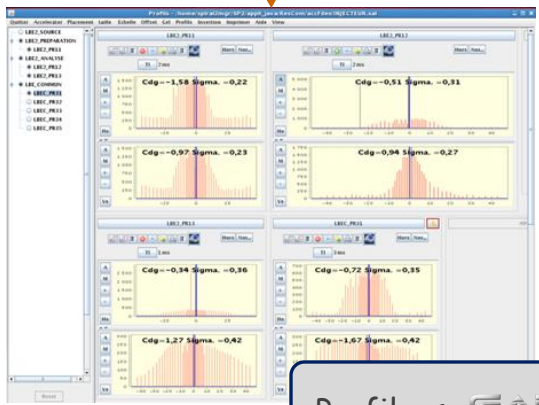
Def. Cam & IC

F.C. Max

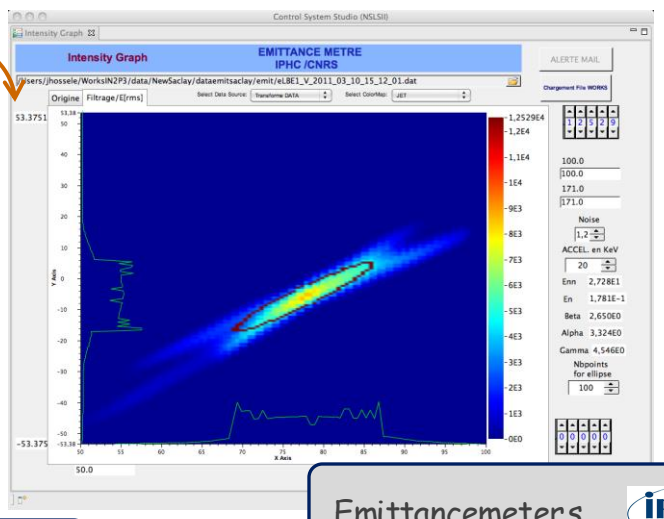
F.C. Min

Stop

Slow chopper



Profilers



Emittancemeters

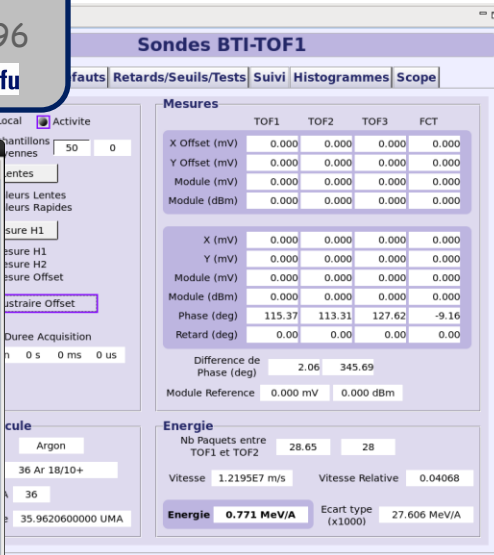
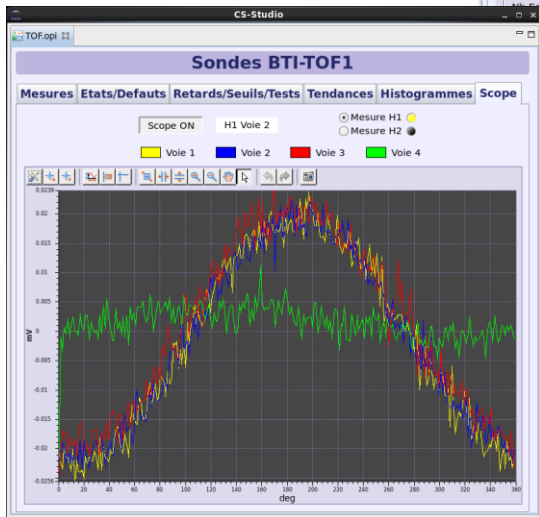


# From RFQ to HEBT : Beam diagnostics



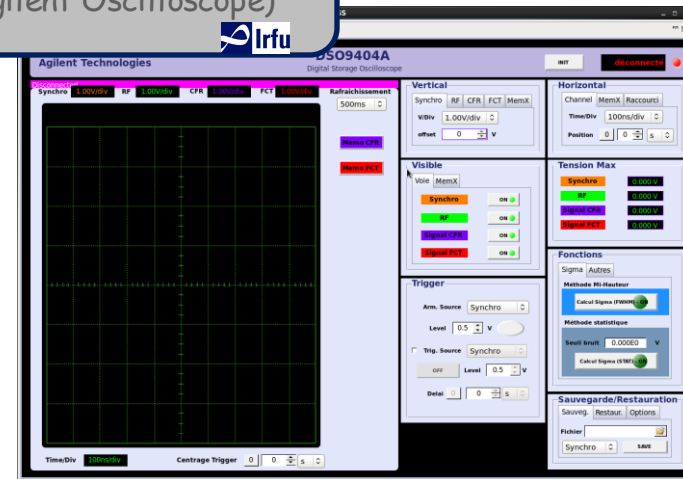
## Time Of Flight

Modbus-TCP & binary ADAS ICV 196



## Fast Faraday Cup

Stream device  
(Agilent Oscilloscope)



## Beam Position Monitor

Specific VME 64 hardware and software  
⇒ In progress



## Beam Loss Monitor

Cosylab development for VME Caen 1495

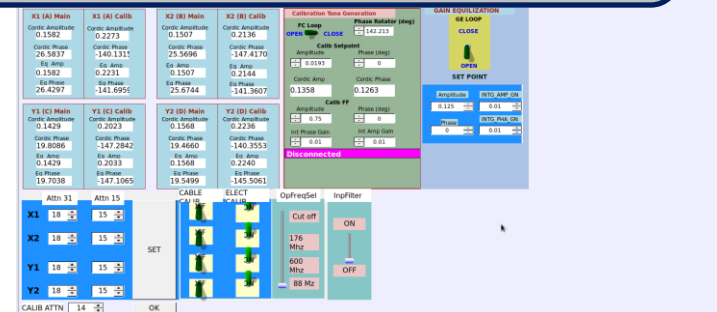
⇒ June 2015



## Beam Extension Monitor

NIM Multichannel Canberra Analyzer

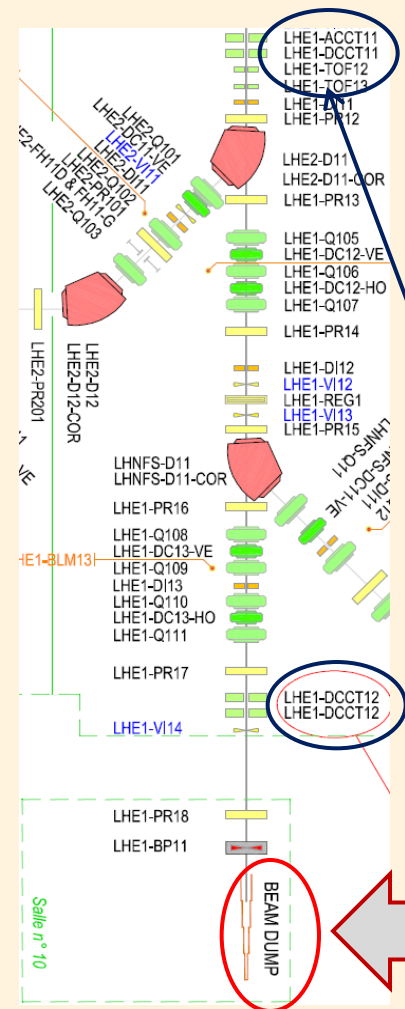
⇒ Just starting



# From RFQ to HEBT : beam dump activation monitoring



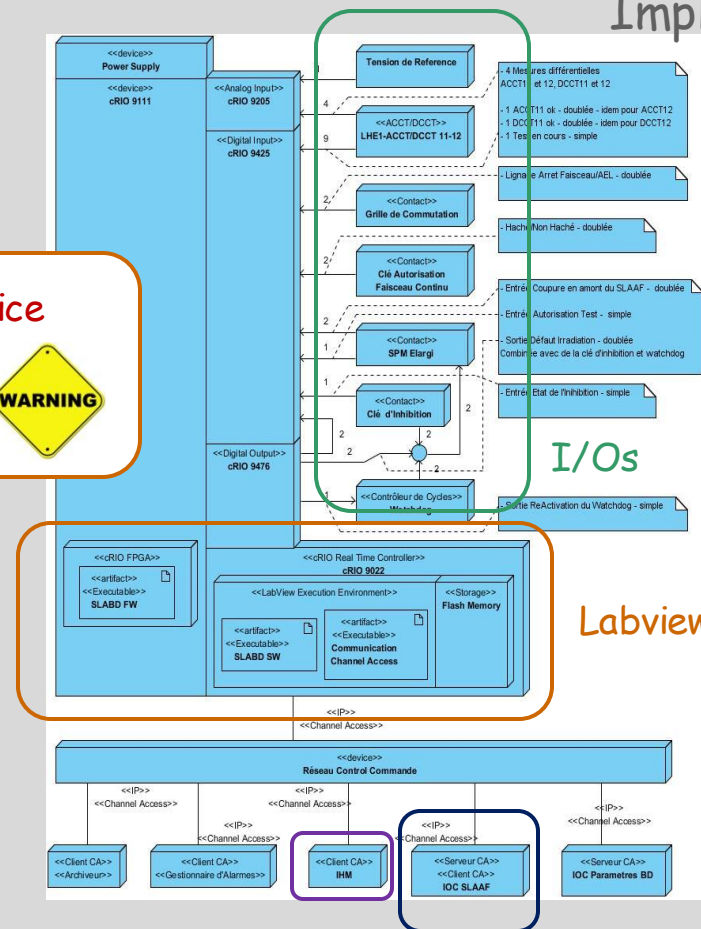
## Objective



EPS classified device  
FMEA required

Limitation of the Linac beam dump activation

## Implementation



Labview cRIO device

EPICs IOC

**Surveillance de l'activation de l'arrêt faisceau du linac spiral2**

**Définition des paramètres d'intégration**

saisis	Relus en BD	activables	actifs
Charge 2	2	2	2
Seuil 9876543210	9876543210	9876543210	9876543210

ChargeBD 2  
SeuilBD 9876543210  
Valeur initiale de l'intégrale 0  
PasDeCommande

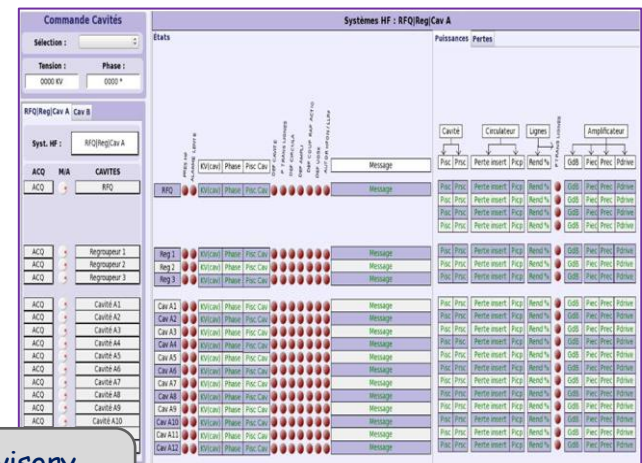
**Surveillance de l'intégration**

MODES	résultats
Machine	Irradiation
Arrêt Faisceau	Enirradiation
Struct Faisceau	Acquisition
Hache	ACCT

Intégrale du nombre de particules 6716049383  
Pourcentage du seuil atteint 68,00 %  
Pourcentage du seuil pour alarme 80,00 %

CSS/BOY GUI

- CSS/BOY suite adapted for Spiral2 (Ganil)
  - Nb : former EDM screens developped at the beginning still there
  - Contexts :
    - ✓ **CSSdev** : development
    - ✓ **CSSop** : operation
  - Widget library
  
- Available :
  - TOF / FCT-CFR interfaces, Emittance control & display, AES interface
- Under development
  - BTI GUI, Machine synoptics
- To be developped
  - Interlocks, Beam pulse control, Beam losses
- And many others to come ...



RF supervisory controls  
(under evaluation)



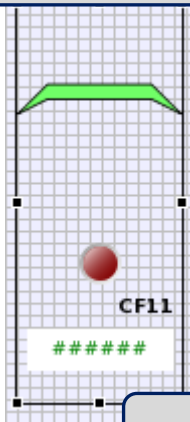
- **Operator control environment : CSSop**
  - Implementation :
    - ✓ Perspectives limited to CSS runtime and data-browser
    - ✓ One unique workspace NFS mounted for all stations (Eclipse lock suppressed)
  - For operation :
    - ✓ No editing capability for no hazardous modifications
    - ✓ Light view : unused menus suppressed
    - ✓ One central and unique launcher for all applications : CSS, Java/XAL, EDM (+Ganil/Ada ones).



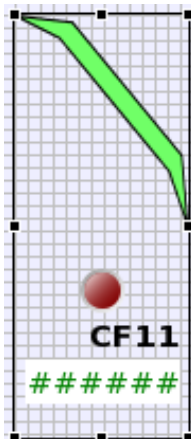
Annotations in the image:

- Alarms (java)
- Beam characteristics
- e-logbook (j5)
- Equipment (CSS)
- Tuning (java)
- Data Browser (CSS)
- Equipment

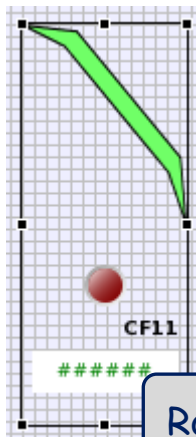
## Optional displays



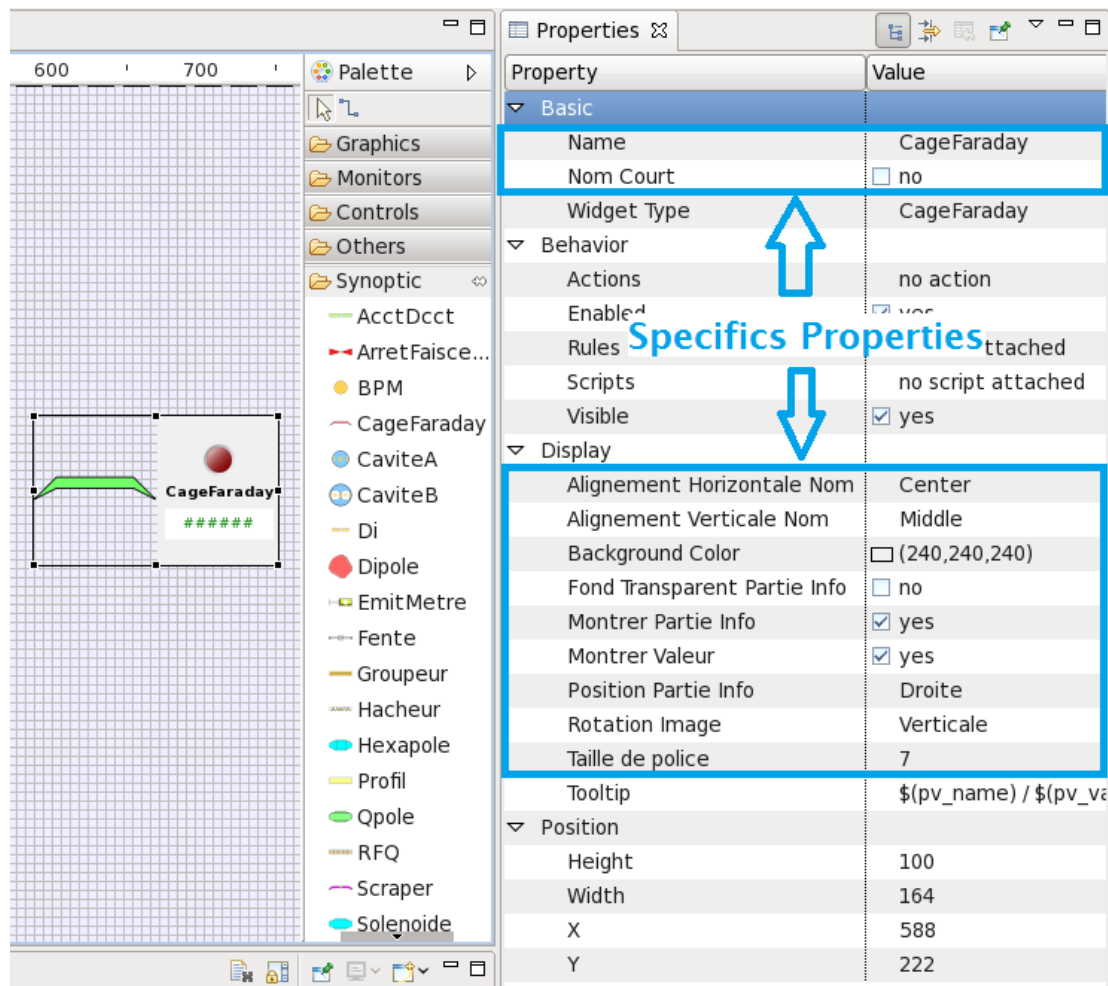
Alignment



Font size



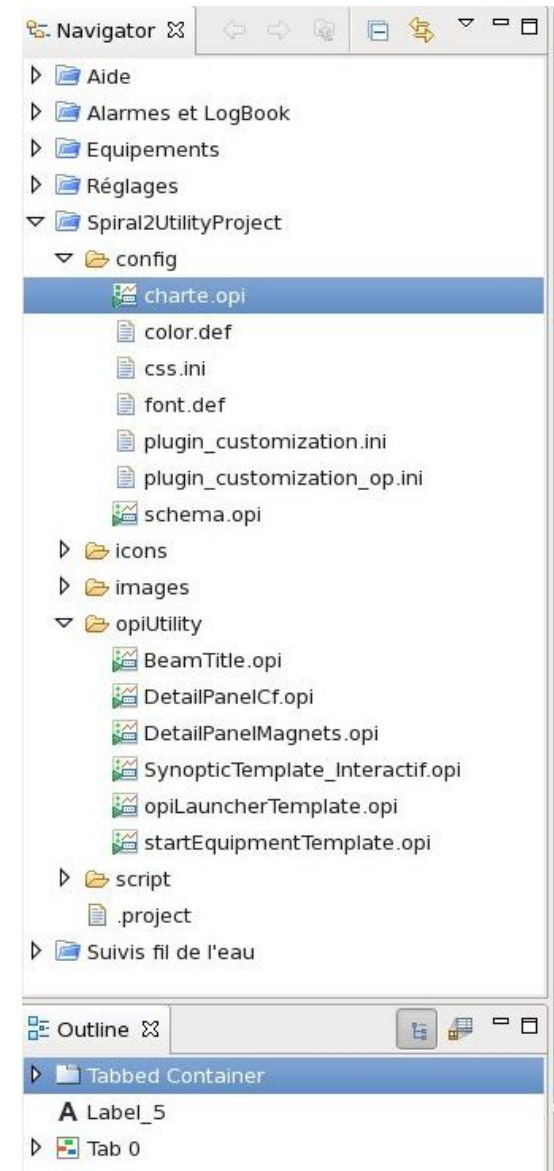
Rotation



Property	Value
<b>Basic</b>	
Name	CageFaraday
Nom Court	<input type="checkbox"/> no
Widget Type	CageFaraday
<b>Behavior</b>	
Actions	no action
Enabled	<input checked="" type="checkbox"/> yes
Rules	no rule attached
Scripts	no script attached
Visible	<input checked="" type="checkbox"/> yes
<b>Display</b>	
Alignement Horizontale Nom	Center
Alignement Verticale Nom	Middle
Background Color	<input type="checkbox"/> (240,240,240)
Fond Transparent Partie Info	<input type="checkbox"/> no
Montrer Partie Info	<input checked="" type="checkbox"/> yes
Montrer Valeur	<input checked="" type="checkbox"/> yes
Position Partie Info	Droite
Rotation Image	Verticale
Taille de police	7
Tooltip	\$(pv_name) / \$(pv_va
<b>Position</b>	
Height	100
Width	164
X	588
Y	222

Specifics Properties

- **Development environment : CSSdev**
  - SPIRAL2 accelerator widget library
  - SPIRAL2 OPI templates automatically added in user's workspace :
    - ✓ Beam characteristics header
    - ✓ Launcher
    - ✓ Pydev added
    - ✓ SVN access added ...
  - Common icons and pictures
  - Graphical common usage template
- **CSSdev & CSSop distribs' link :**
  - <https://u.ganil-spiral2.eu/csssp2/>





# GUIs : high level applications

## Environment

- Java programming
- Derived from XAL framework (SNS)

## Available

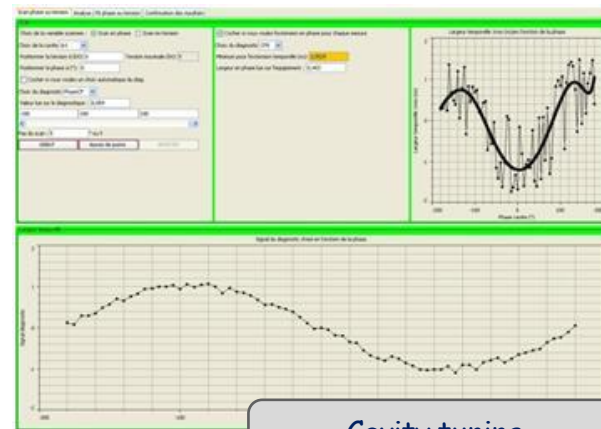
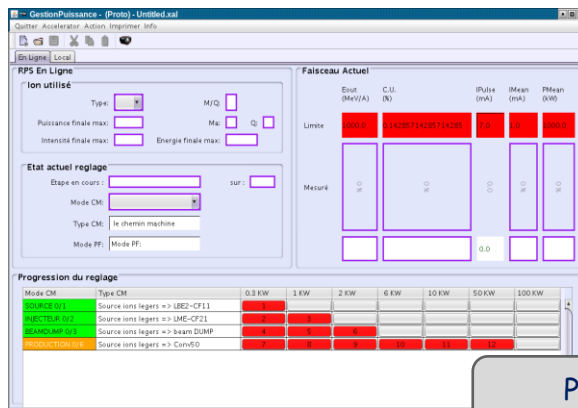
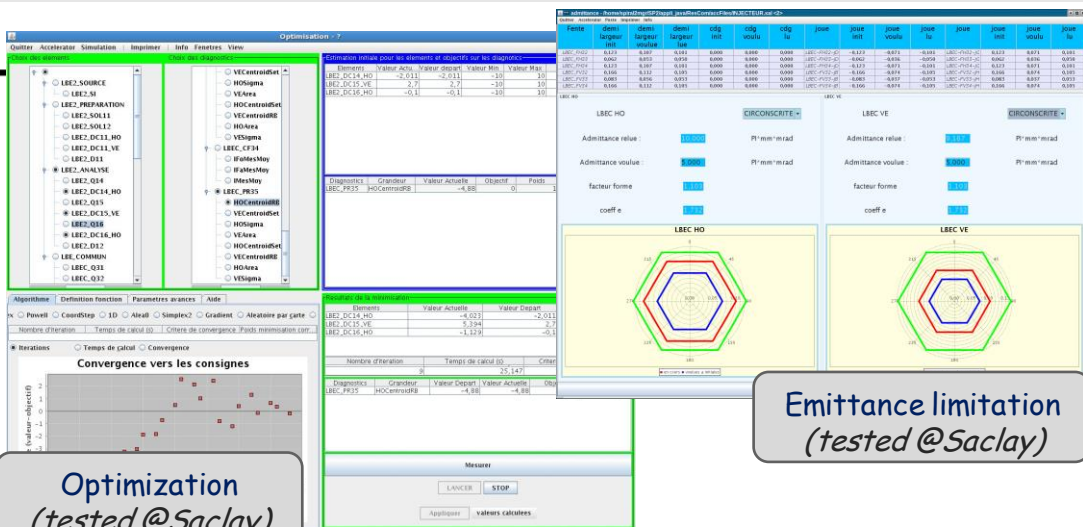
- Parameter management
- Optimization
- Emittance limitation
- Beam analysis
- Hook
- Beam profilers display

## Under development

- Power raise

## To be developed

- Cavity tuning
- MPS



Power raise (graphical design)





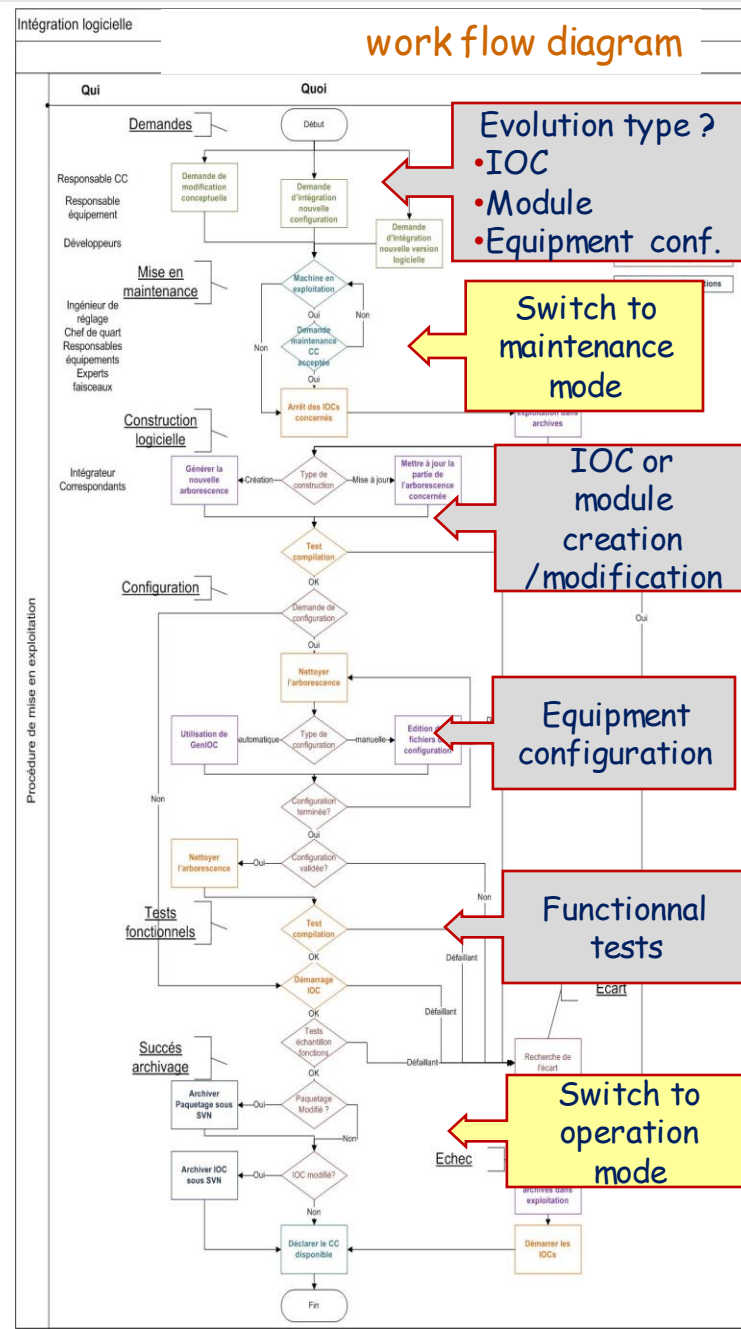
# Integration : work flow

## Integration mechanism

- Coherency check between
  - ✓ Software deliveries (through SVN)
  - ✓ Conventions & rules
- genIOC environment

## Control system evolutions

- Identified items :
  - ✓ topSp2 repositories
    - ❑ Modules
    - ❑ Equipment
    - ❑ Alarms
  - ✓ CSS GUIs
  - ✓ Java applications
- Operation & maintenance modes
- Procedures
- Software tools & utilities





Milestones

Sources + LEBTx  
12/2014

RFQ + MEBT  
05/2015

Linac + HEBT  
09/2015

## Control system

### Software :

- ✓ Infrastructure : ~ready for use
- ✓ Integration of external developments on Ganil site : in progress

### Testing & commissioning

#### ✓ Sources & LEBTs :

- ❑ Prior to software : installation, cabling and wiring tests
- ❑ Control system tests possible when equipment declared available

#### ✓ From RFQ to HEBT :

~ expect to provide basic functionalities

### Knowledge transfer : ?

