

XFEL String & Cryomodule Assembly Workshop

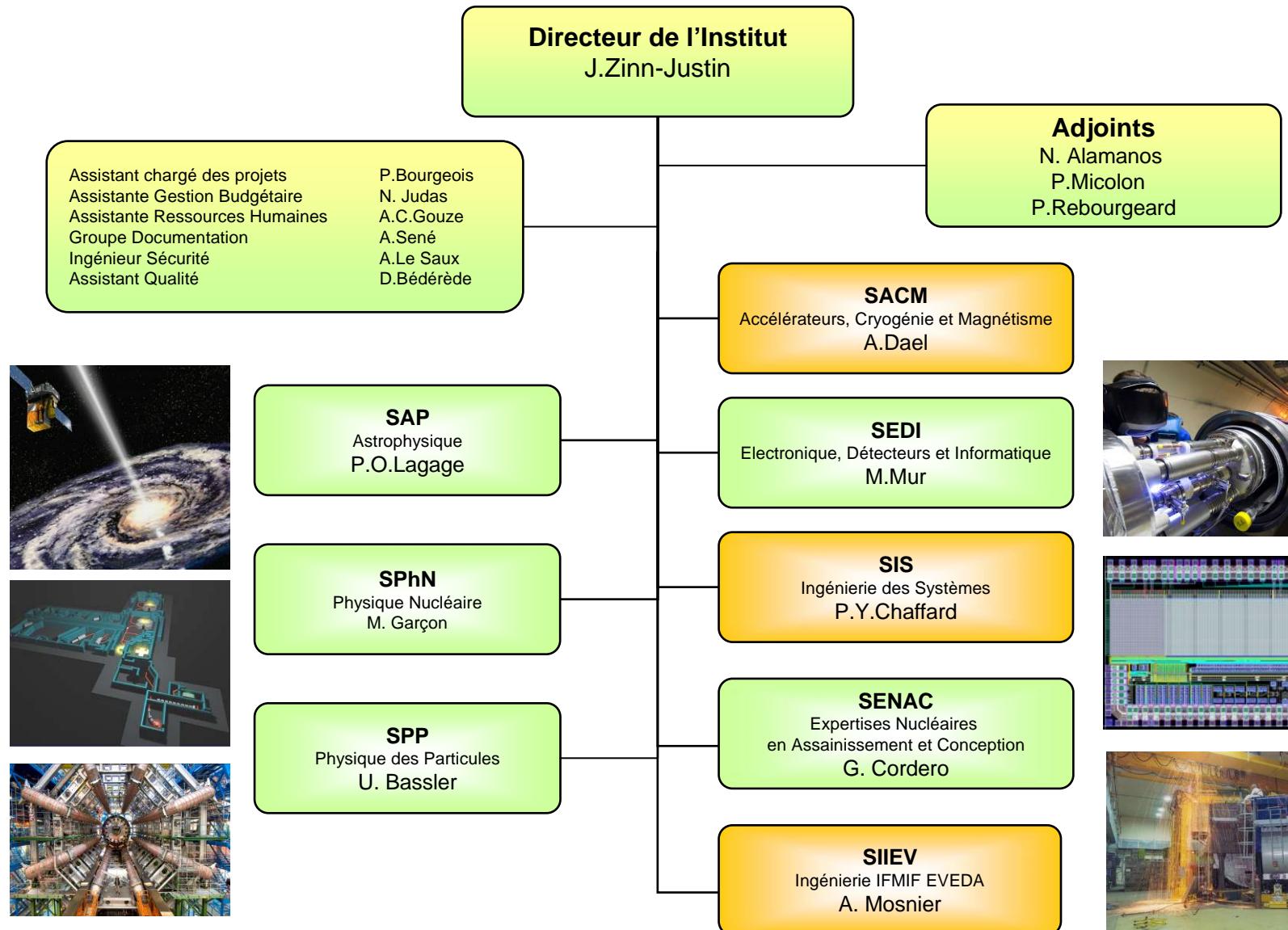
May 26th – 28th, 2008

CEA Saclay

Welcome to Saclay !

DAPNIA changes name to become the IRFU

- The new name of IRFU retains the essence of our activity:
- Laboratoire de Recherche sur les Lois Fondamentales de l'Univers.
- Laboratory for Research into the Fundamental laws of Universe
- The name change will have no other consequences on the institute.
- It affects neither its internal structure nor its operational capabilities (**CERN Courier, March 2008**)

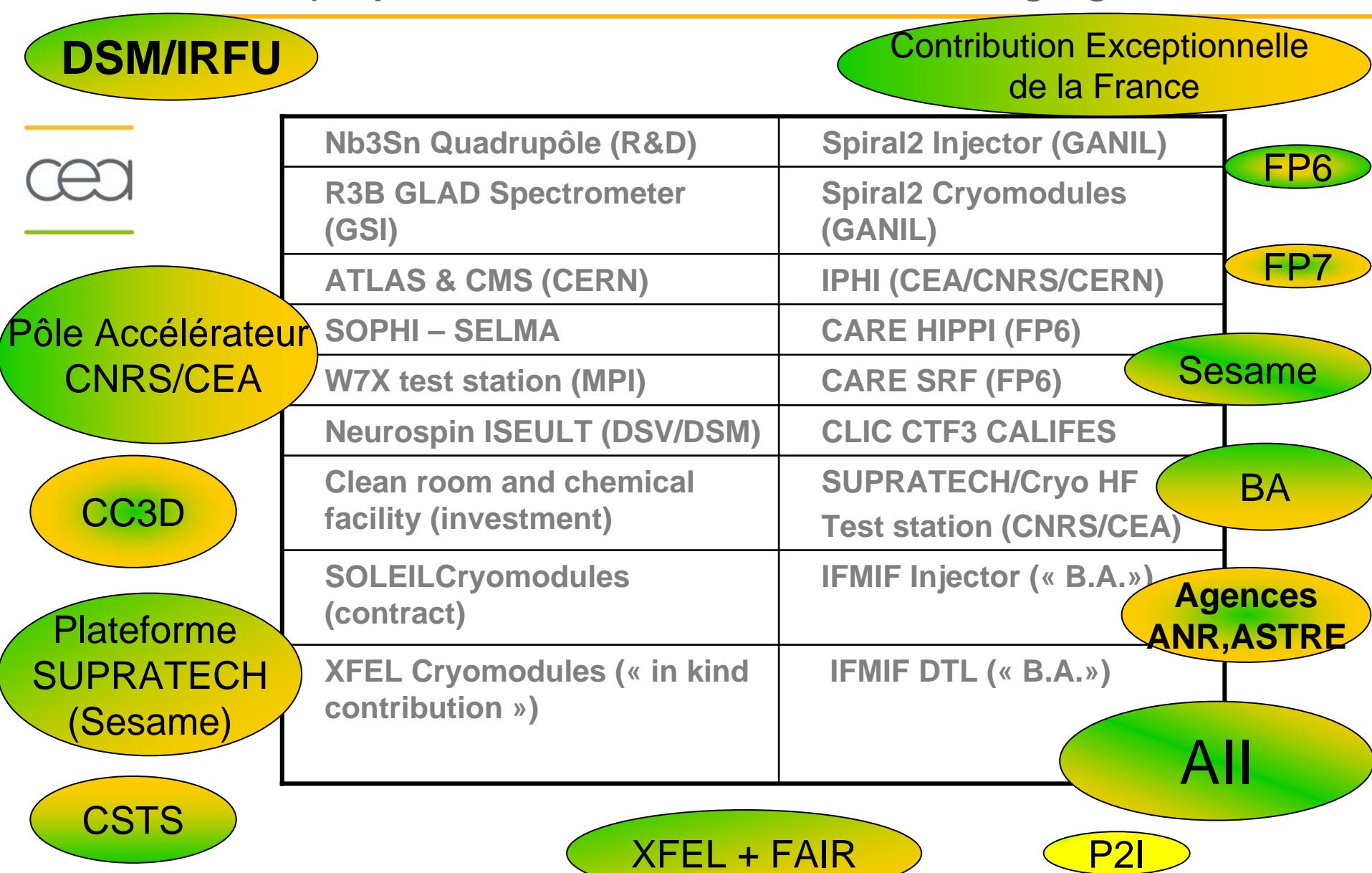


- IRFU/SACM is developing and realizing particle accelerators, cryogenic systems and superconducting magnets for the scientific programs of IRFU and more widely of CEA.
- IRFU/SACM is mainly involved in large scale projects.
- These projects are managed within the IRFU project organisation and rely on the skills and activities of all the IRFU groups.
- In March 2008, 71 engineers and 52 technicians or administrative staff belongs to the division.

The division is organized in four laboratories:

- **LEDA** (*Laboratoire d'études et de développement pour les accélérateurs*)
- **LESAR** (*Laboratoire d'études des structures accélératrices et des radiofréquences*)
- **LEAS** (*Laboratoire d'études des aimants supraconducteurs*)
- **LCSE** (*Laboratoire cryogénie et stations d'essais*)

List of projects with institutions and funding agencies



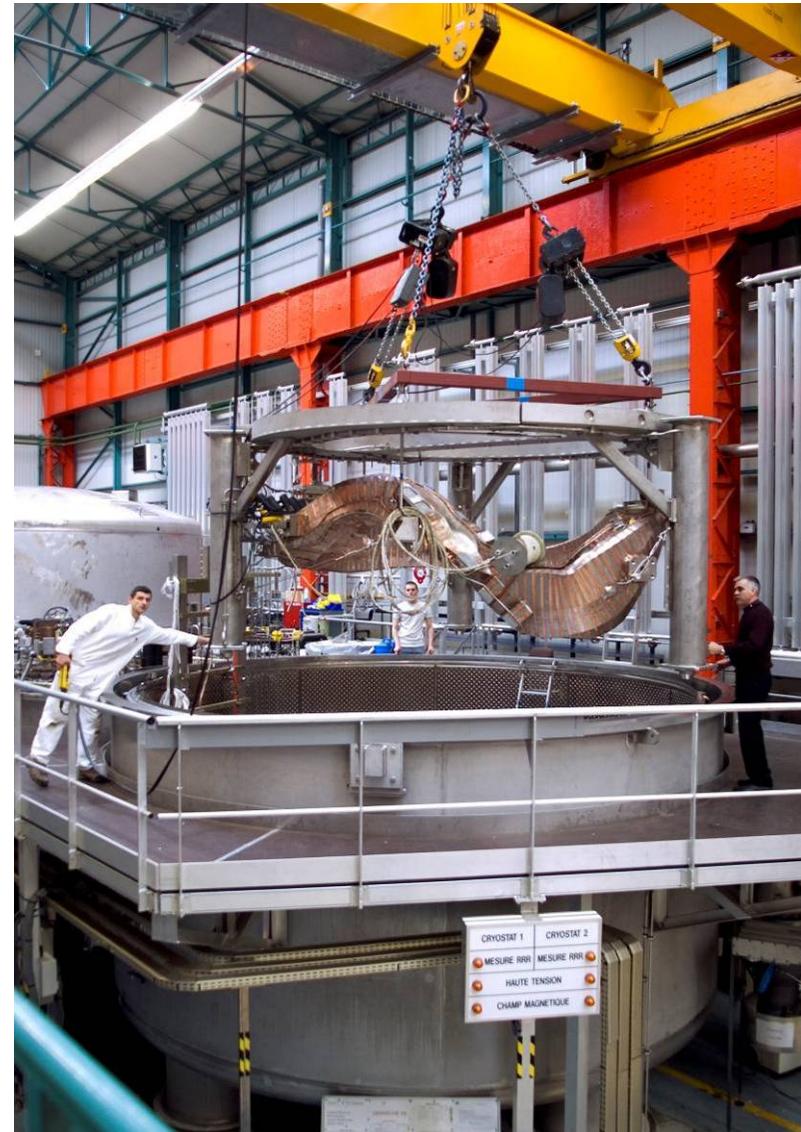
W7X: summary of coil tests (14/03/08)

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Complete test done	58
Total test on NCR	203
Validated coils by Saclay	37
Non validated coils by Saclay	2
Coils on testing at Saclay	4
Coils on storage at Saclay	6
Different coils receipt at Saclay	50

This project is very demanding in schedule and quality organization.

These tests give us a large experience in fusion magnet technology



Push the limits

- Medical MRI : 0,1-1,5 teslas
 - MRI « research »: 3 – 5 teslas
 - MRI « high field » : 7 teslas and more
 - MRI « very high fields » : 11.75 teslas



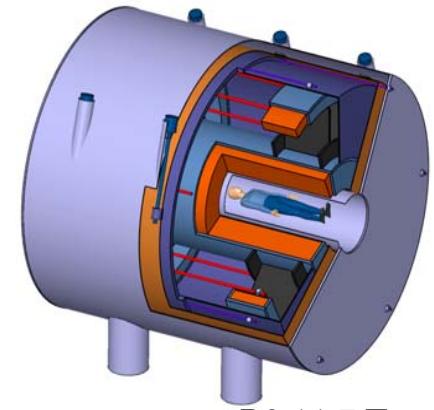
Magnet 1.5T (GE) SHFJ/CEA



Magnet 3.0T (Bruker) SHFJ



*Magnet 9.4 T GE 600 mm
(USA)*

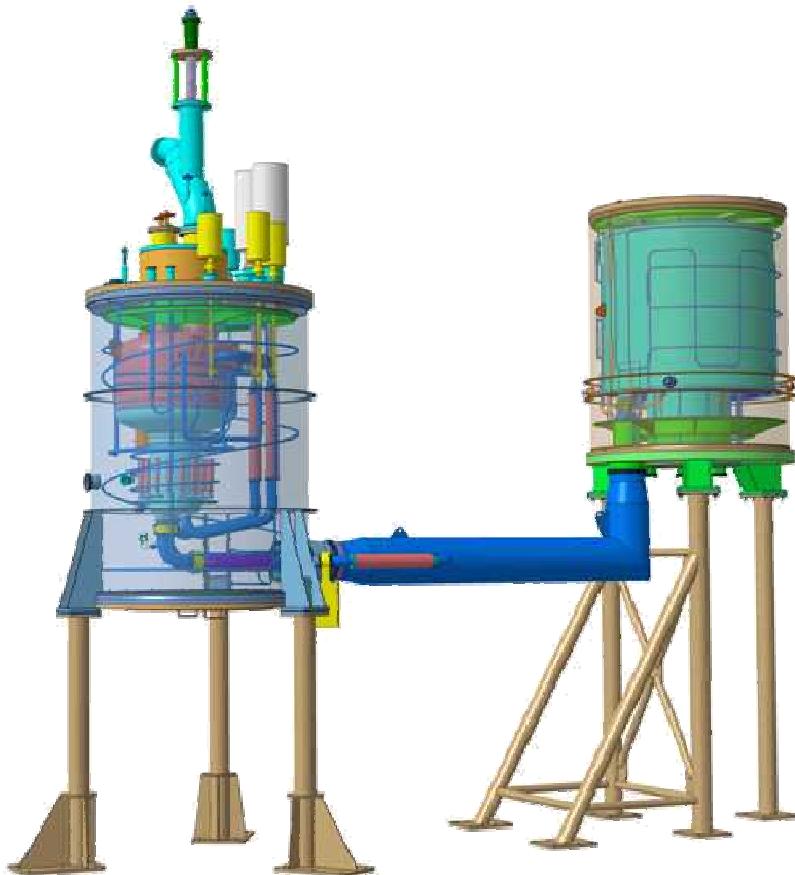


Test Station SEHT

- Target: test of the working conditions and operational modes of the ISEULT Magnet with 1.8K satellite and existing 8 Teslas coil

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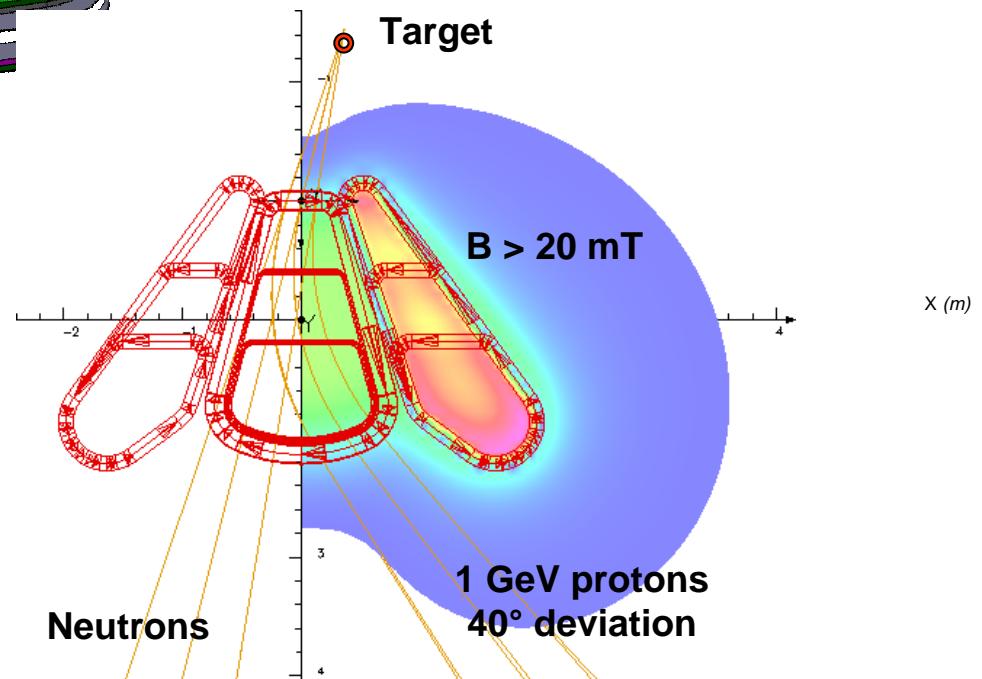
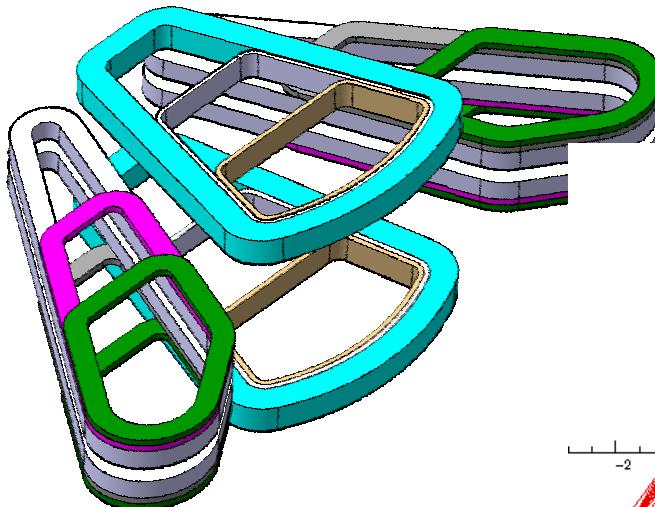
➤ Refurbishing of 8T-600 mm bore magnet





Reactions with Relativistic Radioactive ions Beams (R³B)

GSI Large Acceptance Dipole (Glad)



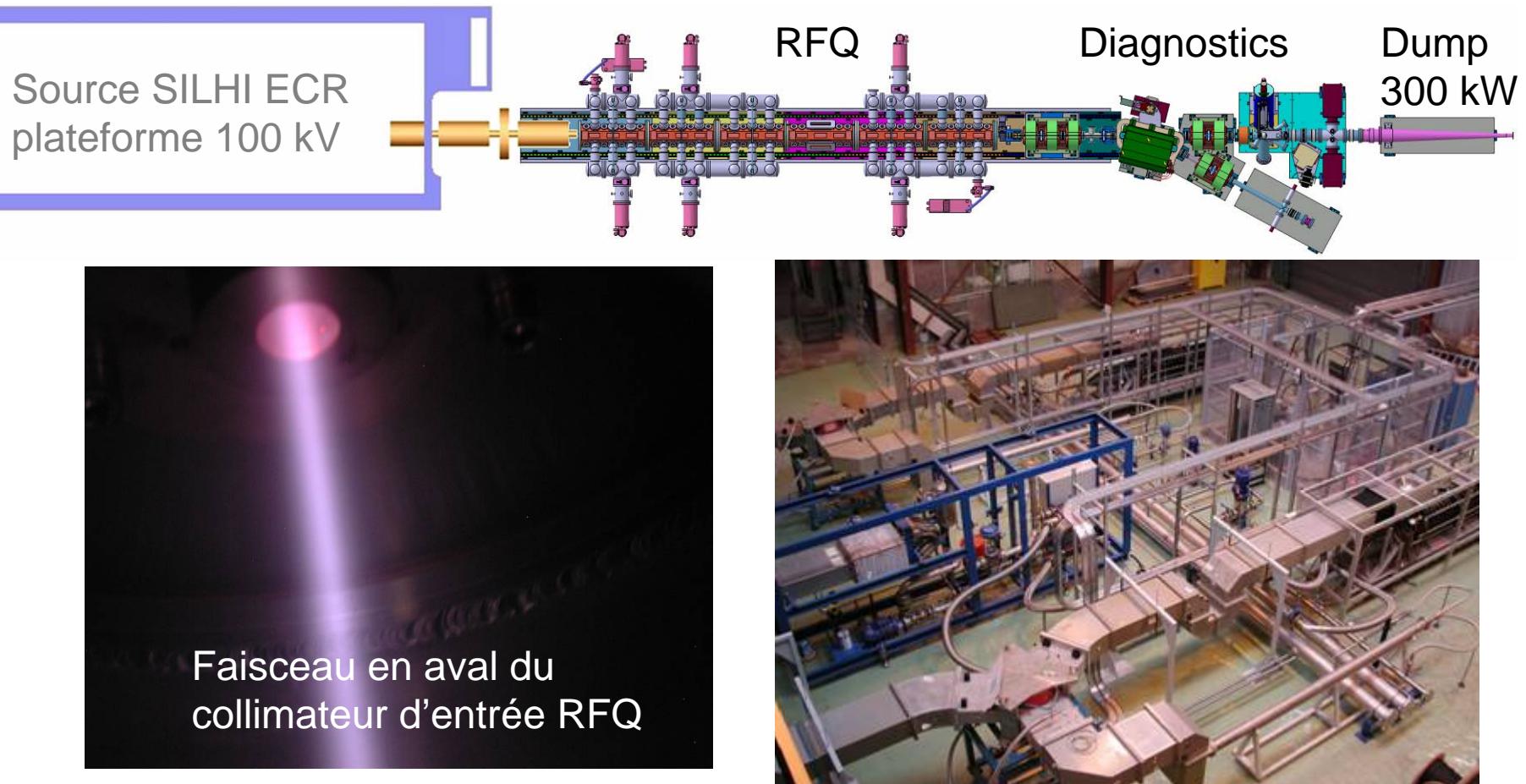
Active shielding
magnet design

4.8 Tm - 24 MJ

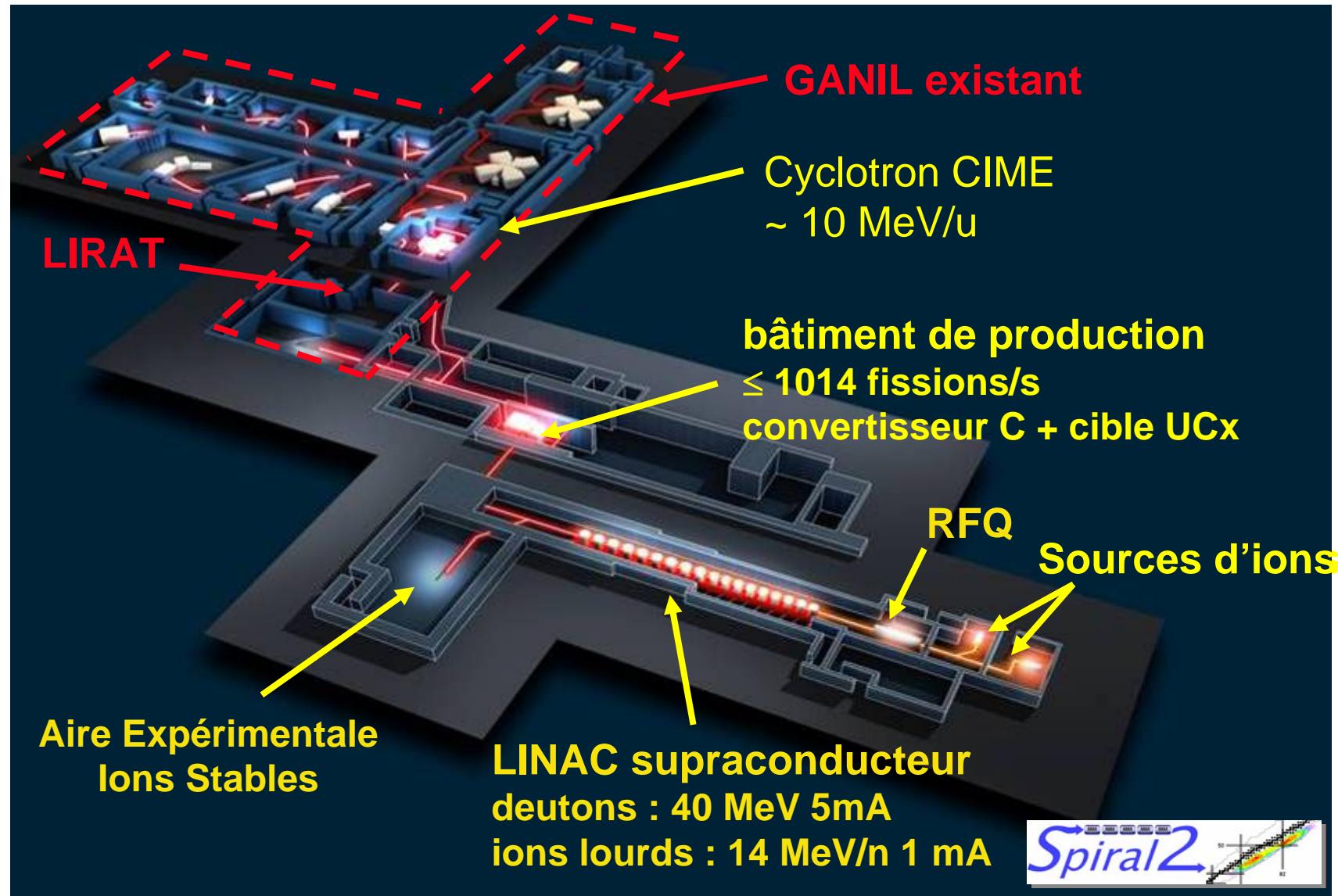
SUPERCONDUCTING MAGNET & TESTS STATIONS

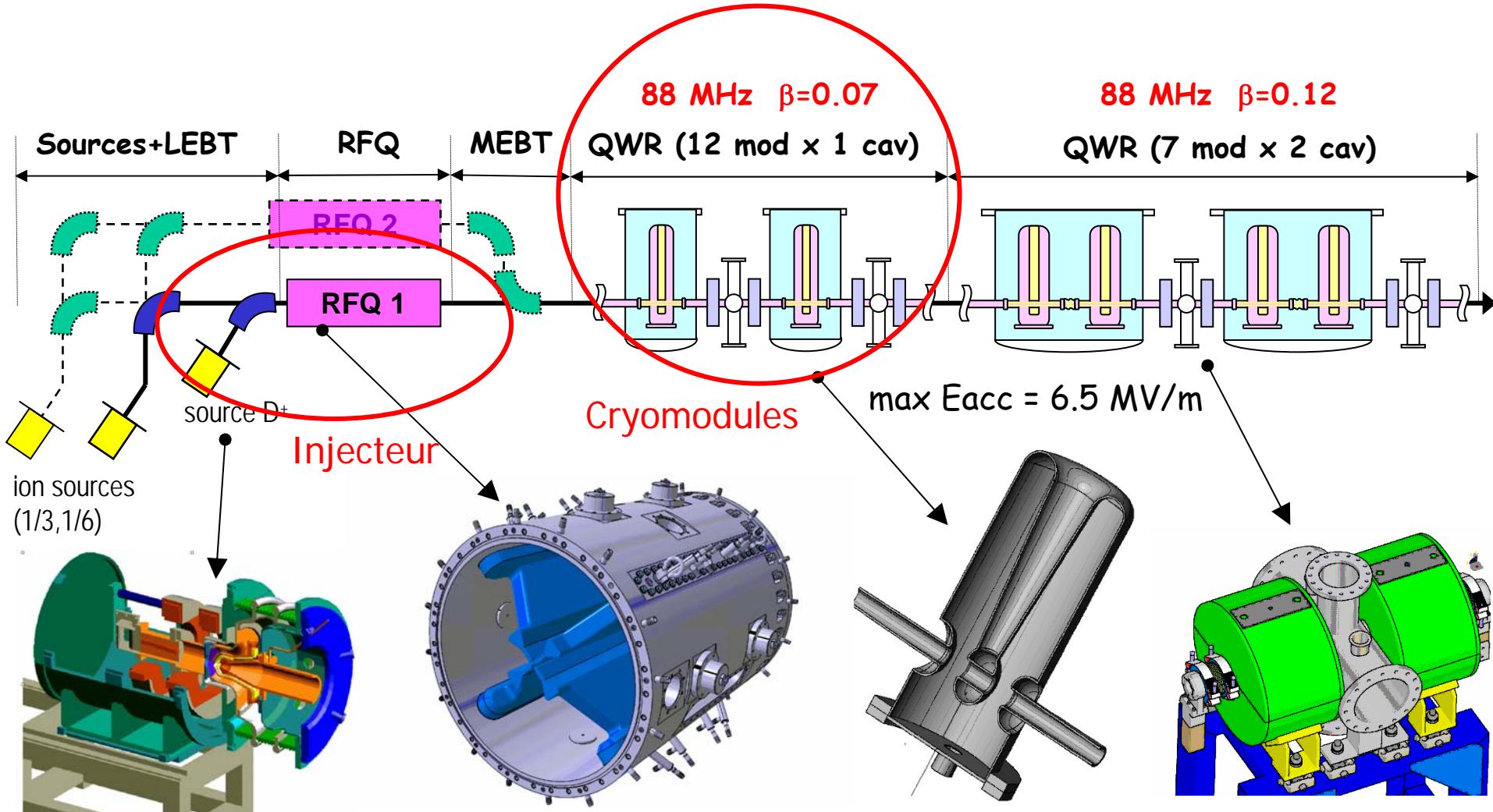
N°	Nom de la tâche	2007				2008				2009				2010				2011				2012	
		Tr1	Tr2	Tr3	Tr4	Tr1	Tr2																
1	Quadrupôle Nb3 Sn																						
2	Intégration																						
3	Tests																						
4	LHC ATLAS & CMS																						
5	Final commissioning																						
6	W7X																						
7	Tests 18 bobines																						
8	Tests 20 bobines																						
9	Tests 12 bobines																						
10	R3B																						
11	Development																						
12	Prototypes																						
13	Construction & Assembly																						
14	Tests at Saclay																						
15	Assembly & tests at GS1																						
16	ISEULT																						
17	Development																						
18	Prototypes																						
19	Construction																						
20	Tests																						
21	Special Magnets																						
22	Design studies JLAB																						
23	High field Magnets (FP7)																						

IPHI (Injecteur de Protons Haute Intensité)



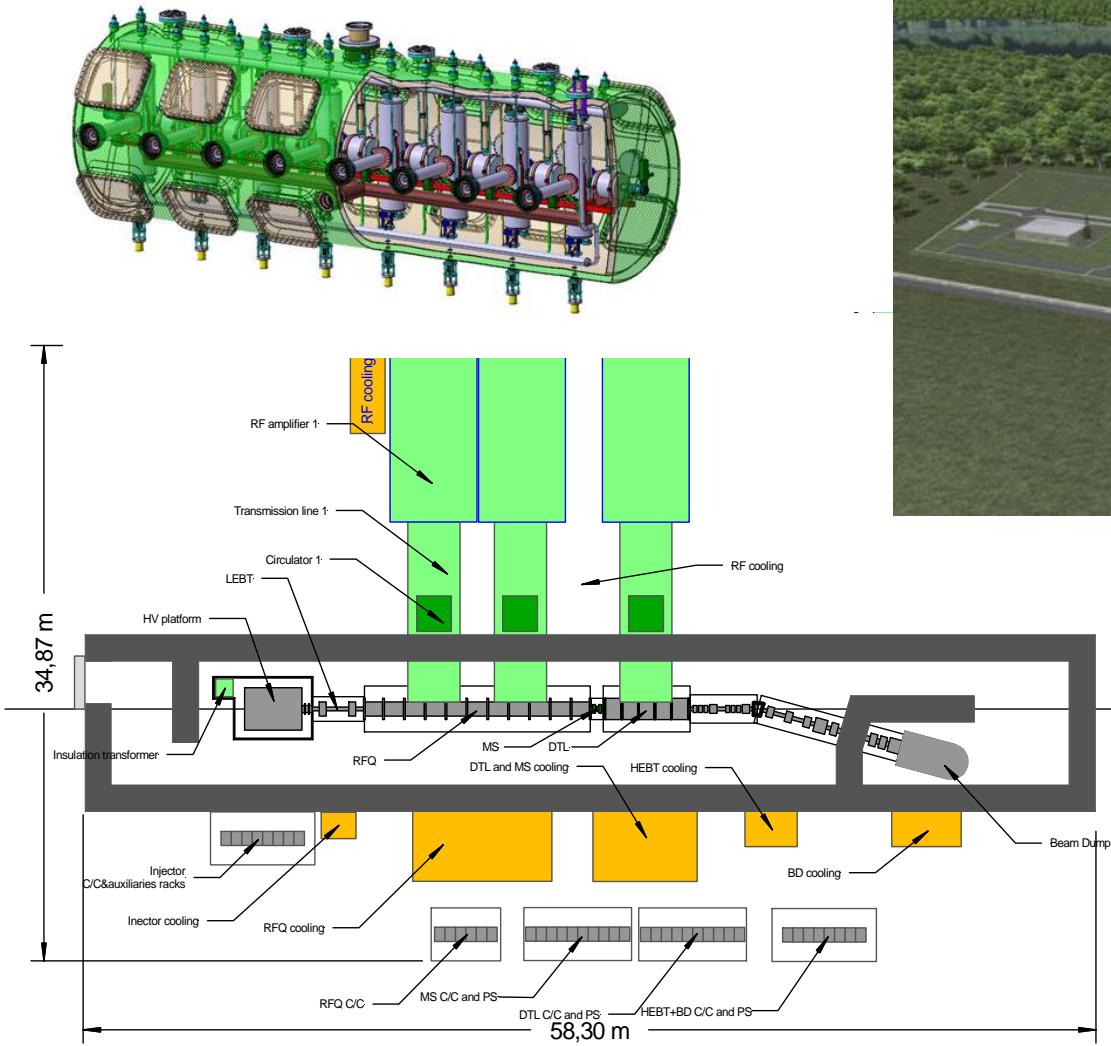
Proton beam 3 MeV 100 mA, commissioning end of 2008.





The IFMIF-EVEDA Accelerator

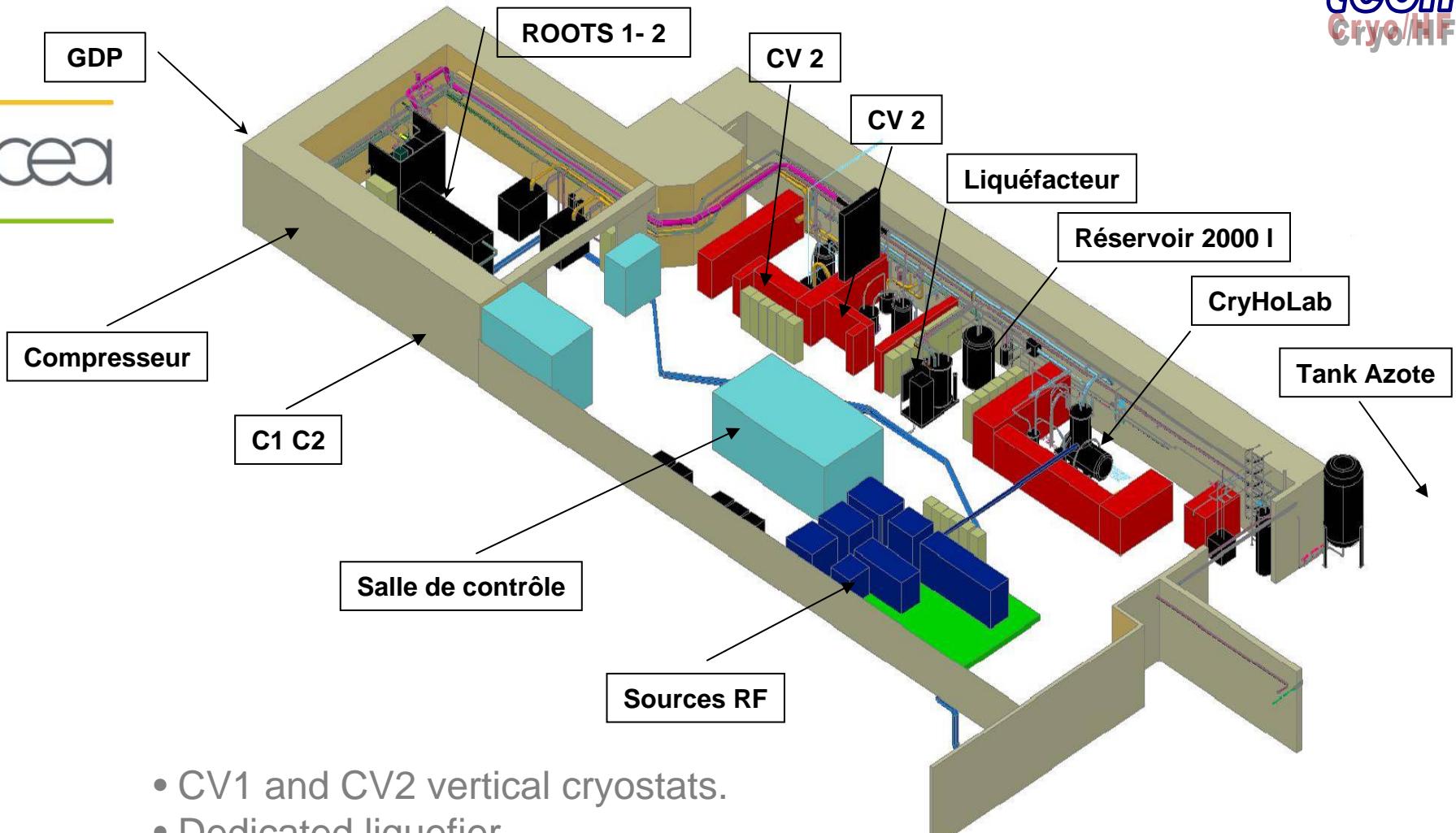
Artist view of the Cryomodule



Artist view of the Rokkasho site

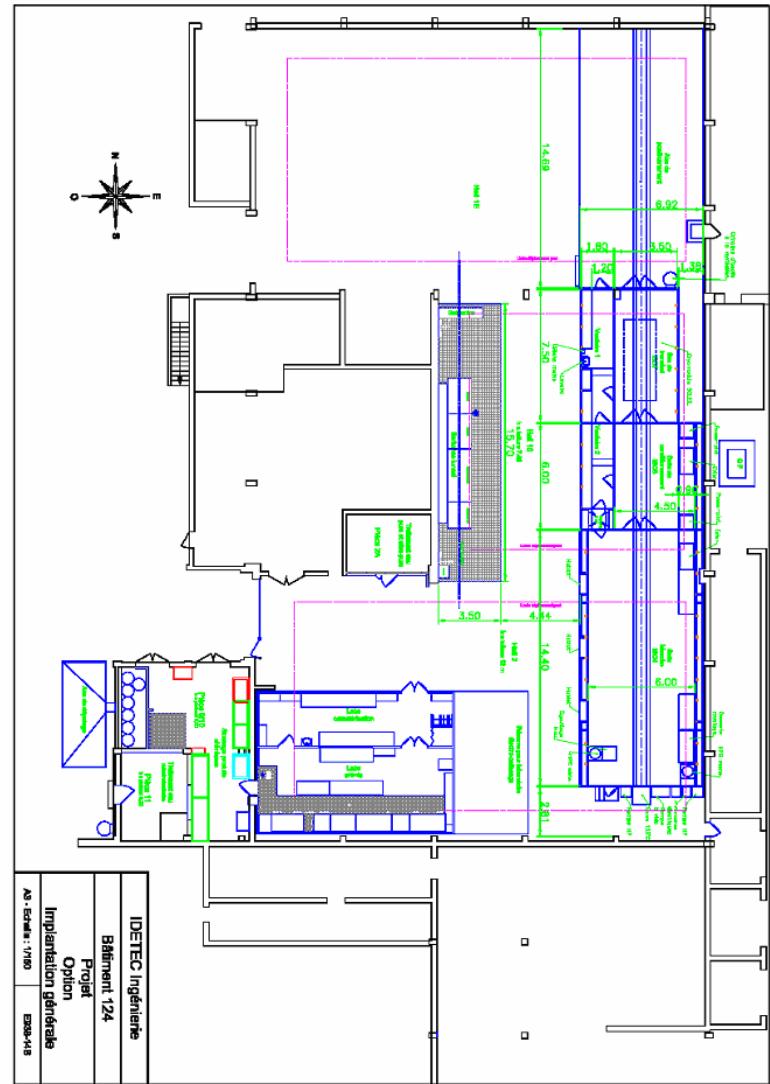


Maquette de l'état final 2007

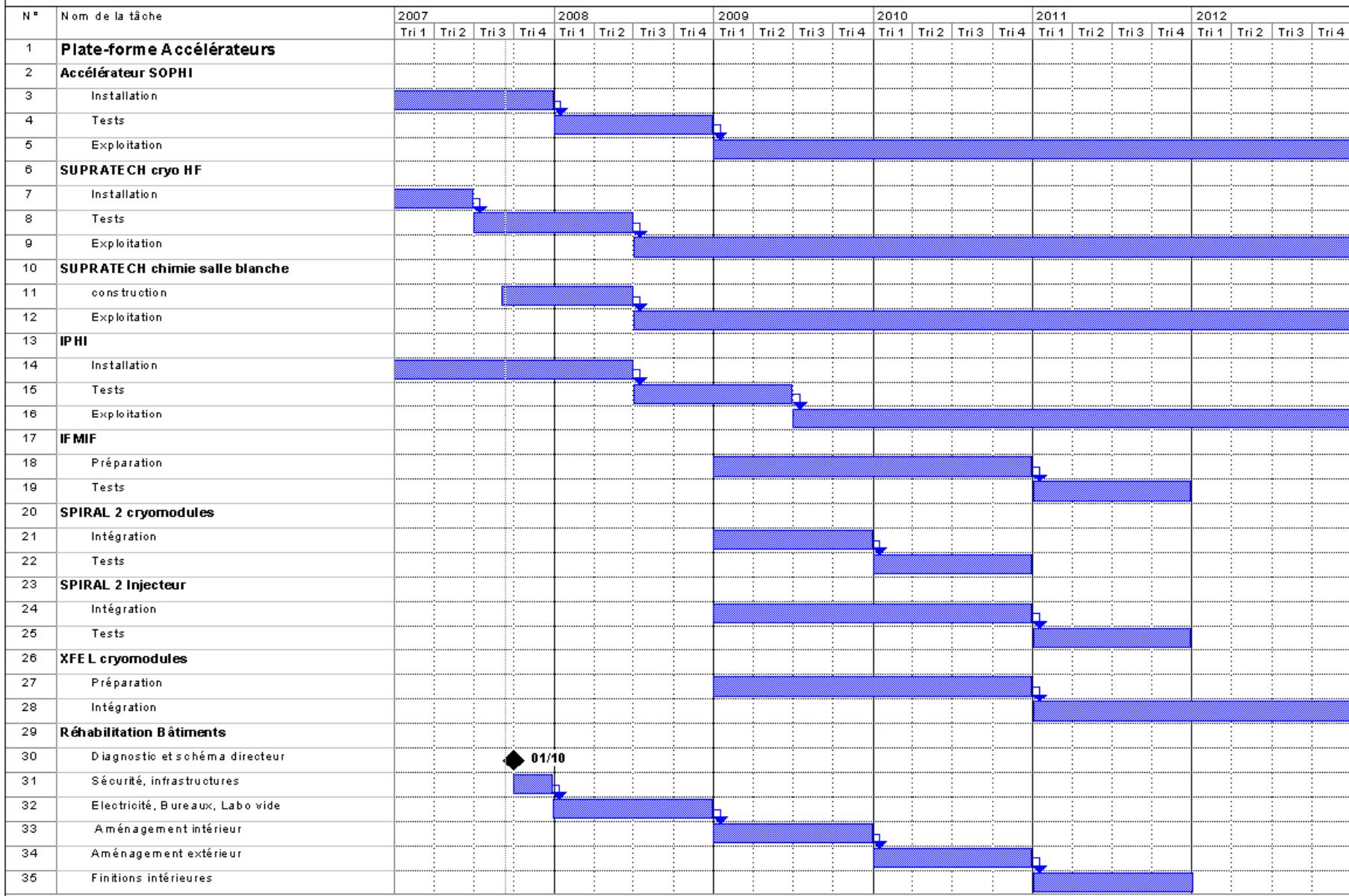


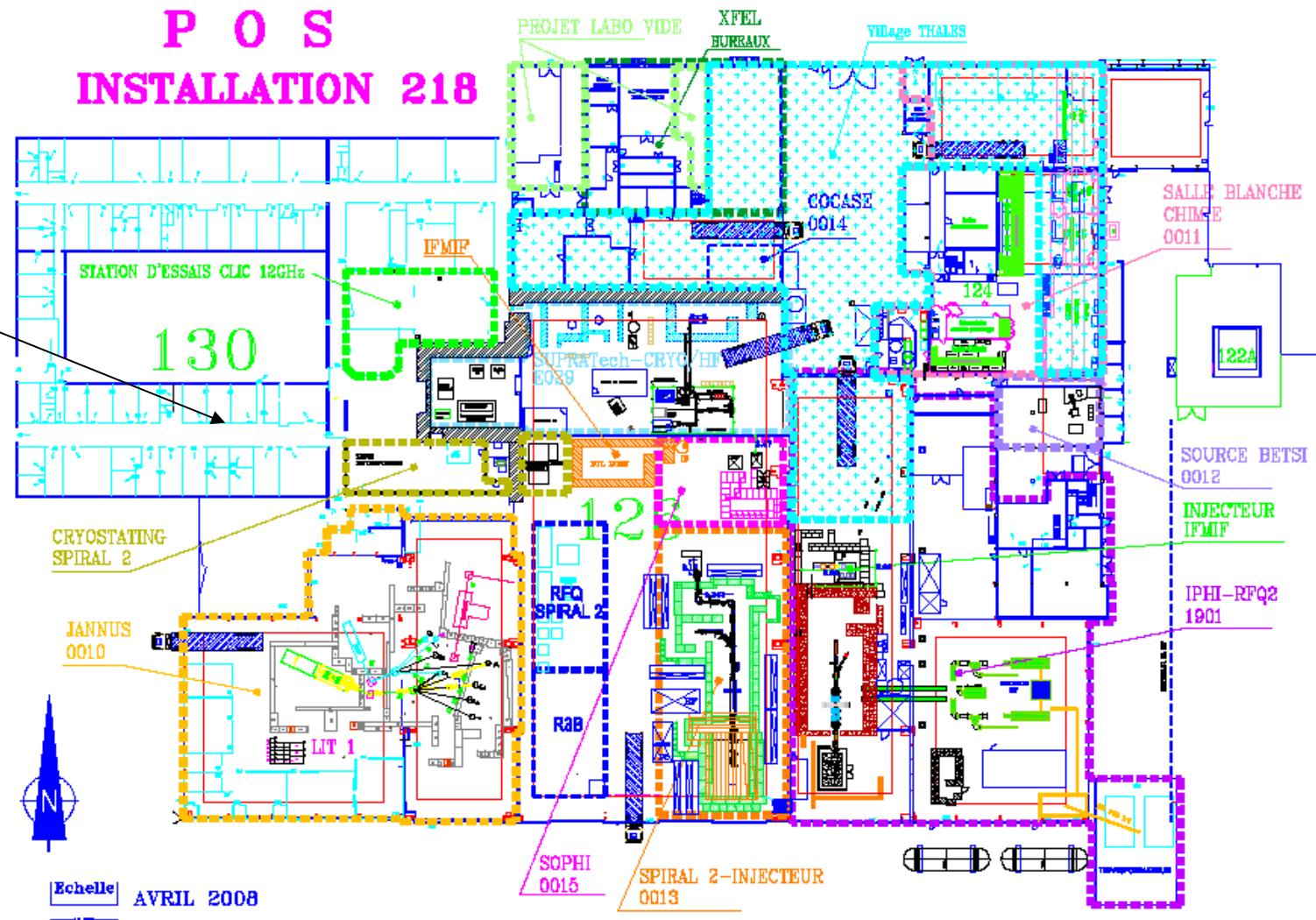
- CV1 and CV2 vertical cryostats.
- Dedicated liquefier.
- Cryholab horizontal cryostat.
- RF sources

- DAPNIA has launched a large investment for a new clean room at « XFEL-ILC » standard(12m*7m in class10)
 - DAPNIA is also preparing a « cryostating area »
 - In last September XFEL project management has asked Saclay to be the unique site for assembly of 101 cavities strings and 101 cryomodules
 - Operation will be executed by industrial company under the supervision of DAPNIA agents.

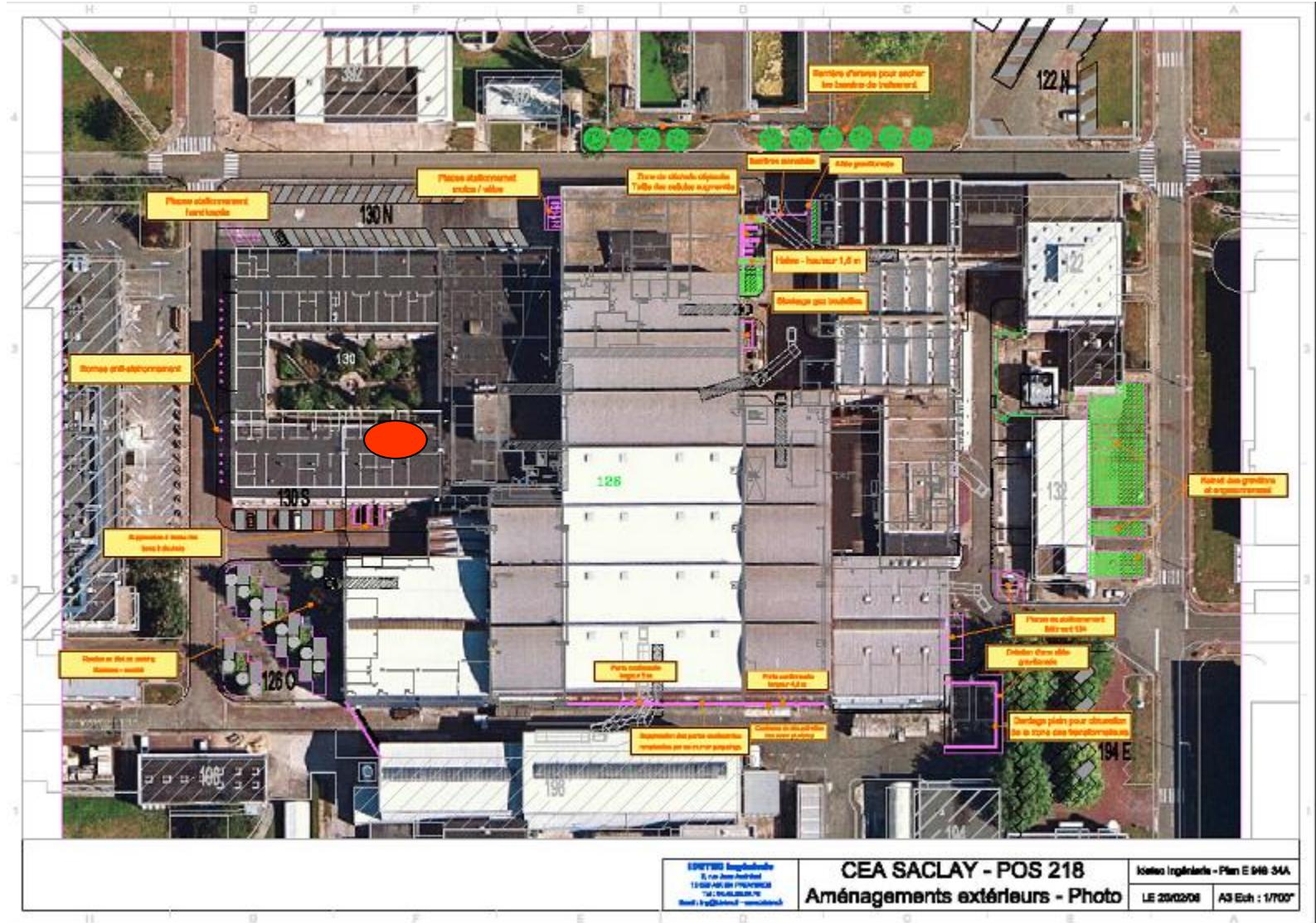


Accelerator Platform planning





Satellite view of IRFU/SACM buildings



What are we waiting from the XFEL workshop ?

1. To better know each other in view of this deep and close collaboration
2. To listen to your recommendations on all the steps of assembly
3. To show you the early stages of our preliminary studies
4. To offer a visit of our existing infrastructure and of our future facility

More specific expectation are the following:

1. Check the method for analysis of assembly scenario
2. Confirm the technical options for the « cavity wash »
3. Contribute to the method for vacuum checking
4. Solve the exchange of drawings between the two draft offices

- Finish our clean room infrastructure
- Do the civil engineering for our cryostating infrastructure
- Realize the main assembly tooling : cantilever, girders , special carriage, etc...
- Take part in the prototyping with DESY
- Enlarge the training of personal both on Saclay side and Industrial side
- Finish the quality preparation

- Due to numerous external contracts, SACM is now overbooked, at the limit of its possibilities, particularly in design tasks and in projects in preliminary development phase.
- The planning of these projects is such that there will be a intense technical activity in the years 2009 to 2012 both on magnets and accelerators.
- Development programs for the R3B GLAD spectrometer and the MRI Neurospin ISEULT will pass the critical phases in the coming years.
- European programs are a vital part of SACM R&D.
- Contributions to XFEL & FAIR are offering opportunities for collaboration with the DESY & GSI laboratories.
- For 2011 & 2012 to be the great XFEL years, we have to manage the preparation work in 2009 & 2010.