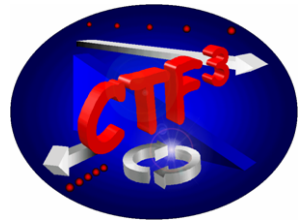
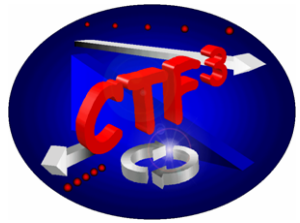


Status of CTF3

G.Geschonke
CERN

CTF3 objectives



International Linear Collider Technical Review Committee (SLAC-R-606),2003 :

R1.1 CLIC accelerating structure, damped, at design gradient and pulse length

** CTF3 as 30 GHz RF power source as early as possible*

** 30 GHz test stand, well instrumented, extended exploitation*

** aggressive structure development*

R1.2 Drive beam scheme with a fully loaded linac

*	*CTF3: 150 MeV*	*CLIC: 2 GeV*
	3.5 A	*4.9 A*
	3 GHz	*937 MHz*

R1.3 Power-Extraction Structure (PETS) with on/off capability, damped

R2.1 Validation of beam stability and losses in the drive beam decelerator, and design of a machine protection system

** benchmark experiments 35 A @ 150 MeV => 150 A @ 2 GeV*

R2.2 Test of a relevant linac sub-unit with beam

** second beam required (probe beam)*

CTF3 objectives

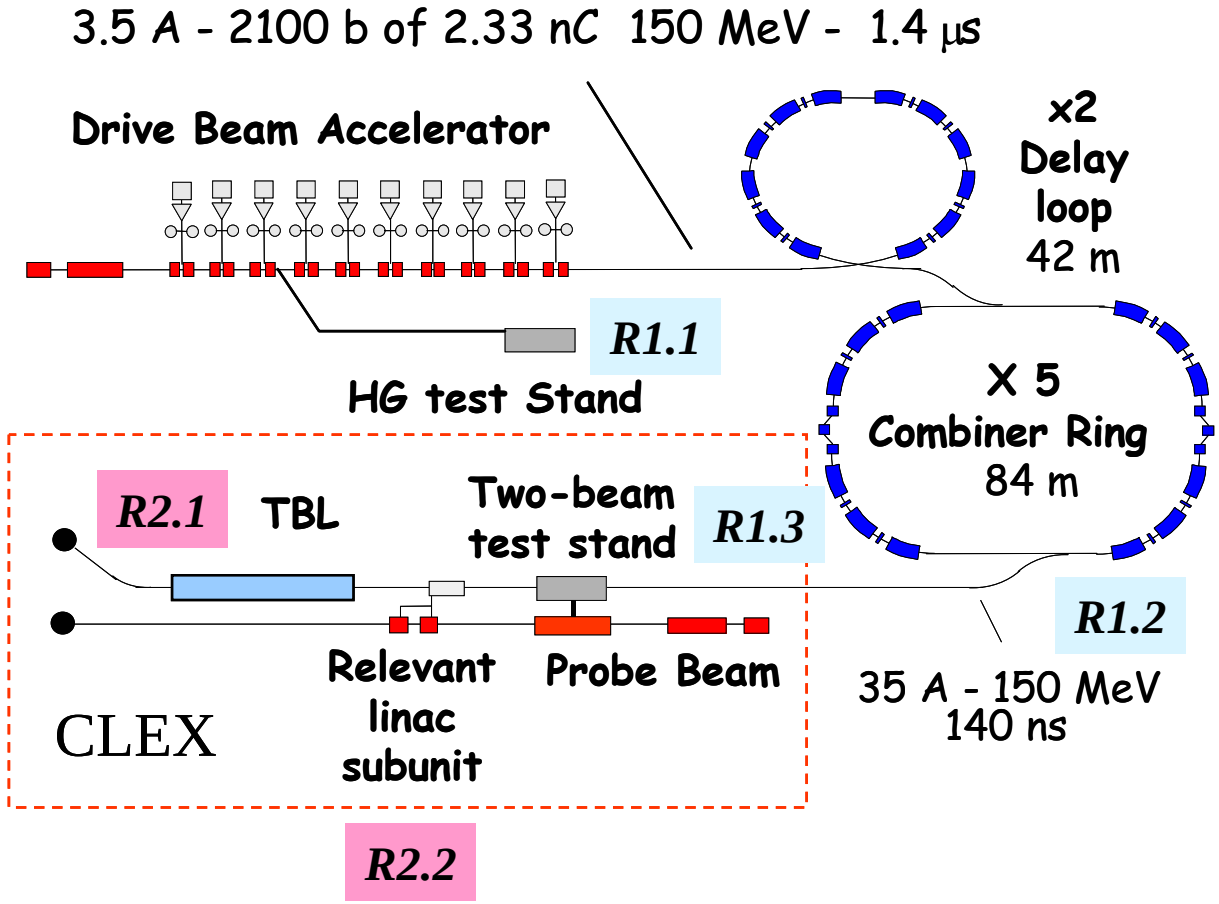
R1.1 CLIC accelerating structure,

R1.2 Drive beam scheme with a fully loaded linac

R1.3 Power-Extraction Structure (PETS)

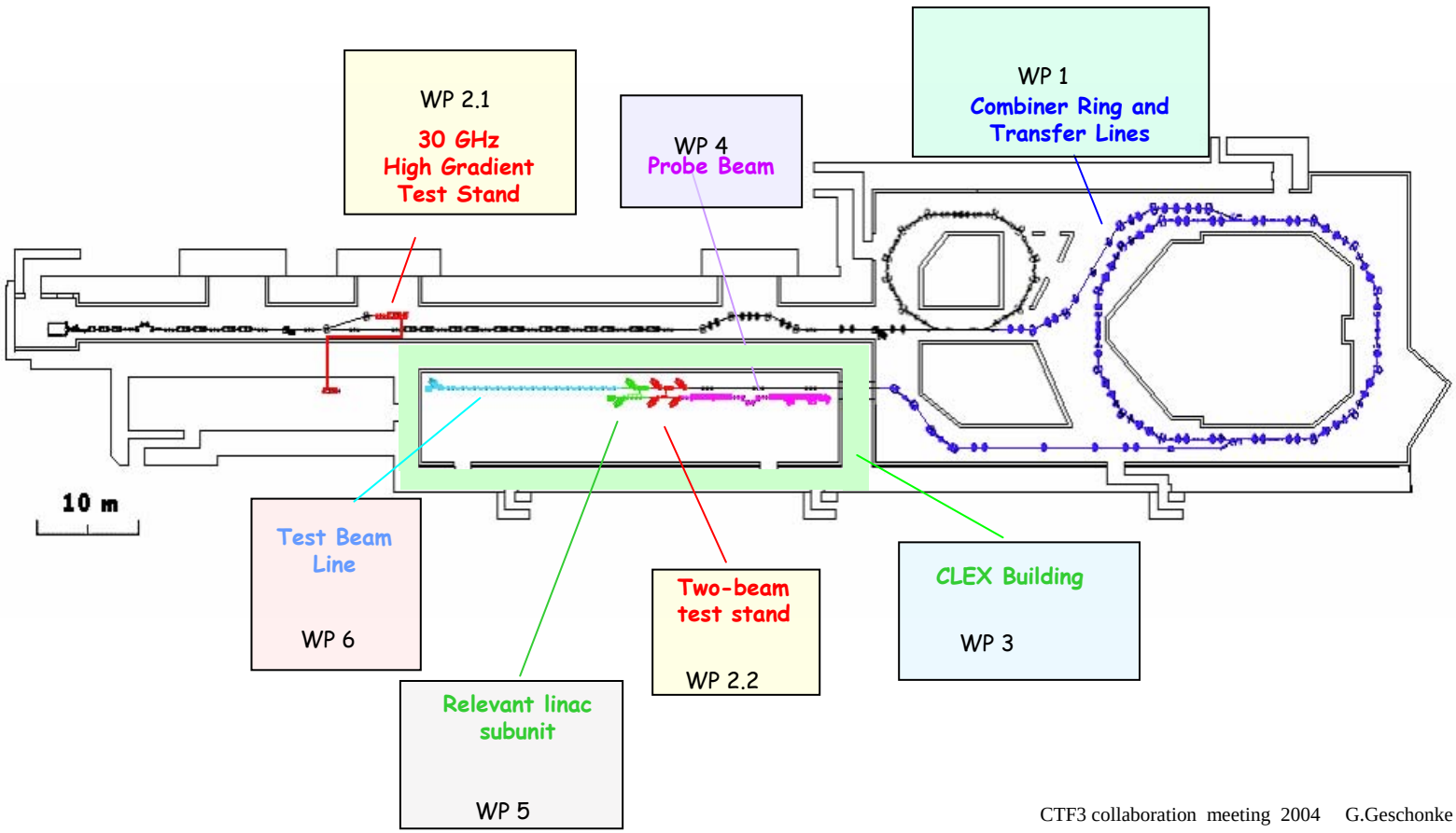
R2.1 stability and losses in the drive beam decelerator,

R2.2 Test of a relevant linac sub-unit with beam



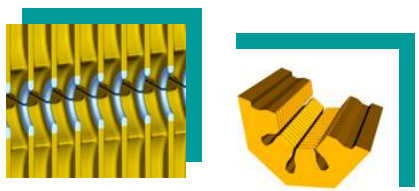
Work packages

Meeting on 19.May 2004:
18 delegations from CERN and 11 countries



Work packages

Structures

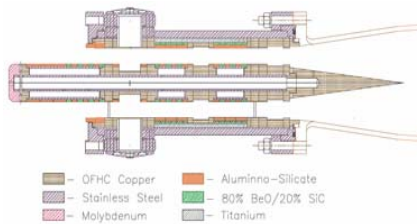


WP 7

CTF3 Operation

WP 8

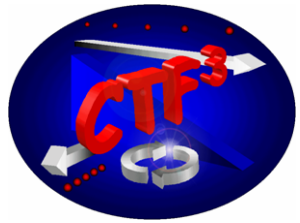
30 GHz power source



WP 9

Cost and manpower of work packages:
Indicative estimate only

New collaborations: 19. May “status”



1) LNF contribution (beyond DL): Waiting for approval

- Optics design for CR and TL1 and TL2 going on between CERN, LNF, Spain ?
- Path length wigglers for CR
- Vacuum chambers for CR and TLs, incl. beam diagnostics (without electronics)

2) Sweden Waiting for approval

- TL2 incl. bunch compressor and Two Beam Test Stand: optics design, missing magnetic elements (6 dipoles) and power converters, beam diagnostic equipment,
- TB Test stand: optics, magnets, vacuum, diagnostics (spectrometers, optical screens, BPMs, WCMs, for Probe Beam and Drive beam)
- RF diagnostics and data handling.

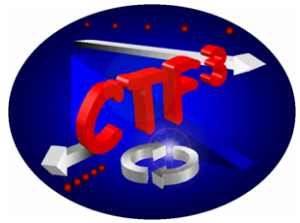
3) Spain:

- Ciemat is building corrector magnets (independent of approval of the rest of the programme)

Waiting for approval:

- 2 double septum magnets for CR, based on scaled DaΦne design.
- Ejection kicker for CR
- TBL quadrupoles with precision movers
- RF structure work

New collaborations: 19. May “status”



4) Finland **Waiting for approval**

- power converters for the CR and technology for accelerating structure.

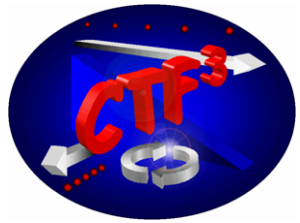
- **5) France** **Waiting for proposal and approval**
- Probe Beam linac (CEA Saclay, LAL)
- Lure magnets

- **6) NW University Illinois**
- beam diagnostics for TBL, **Decision depending on US commitment**

- **7) Turkey**
- Ankara University proposes to send 4 physicists to participate in CTF3, mainly in operation.

- **8) BINP**
- quadrupoles and sextupoles for CR have being ordered from BINP.

Existing collaborations

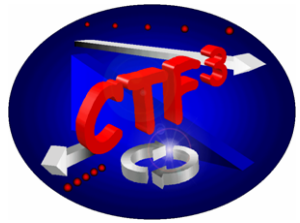


- Finnish Industry: One person for CLIC/CTF3
- INFN: chicane, DL, optics for CR,Operations support, RF deflectors 3 GHz
- LAL: Gun electronics and HV, pre-bunchers
- Northwestern University Illinois: Drive Beam accelerator, Beam loss monitoring
- RAL: Laser development
- SLAC: RF gun, Injector design and commissioning
- University Lausanne: PhD student
- Uppsala University: Operations support, Phase monitor
- Many CERN groups

Photo injector (partly funded by EU)

- LAL: RF gun
- RAL: Laser
- CERN: Photocathodes

The next steps:



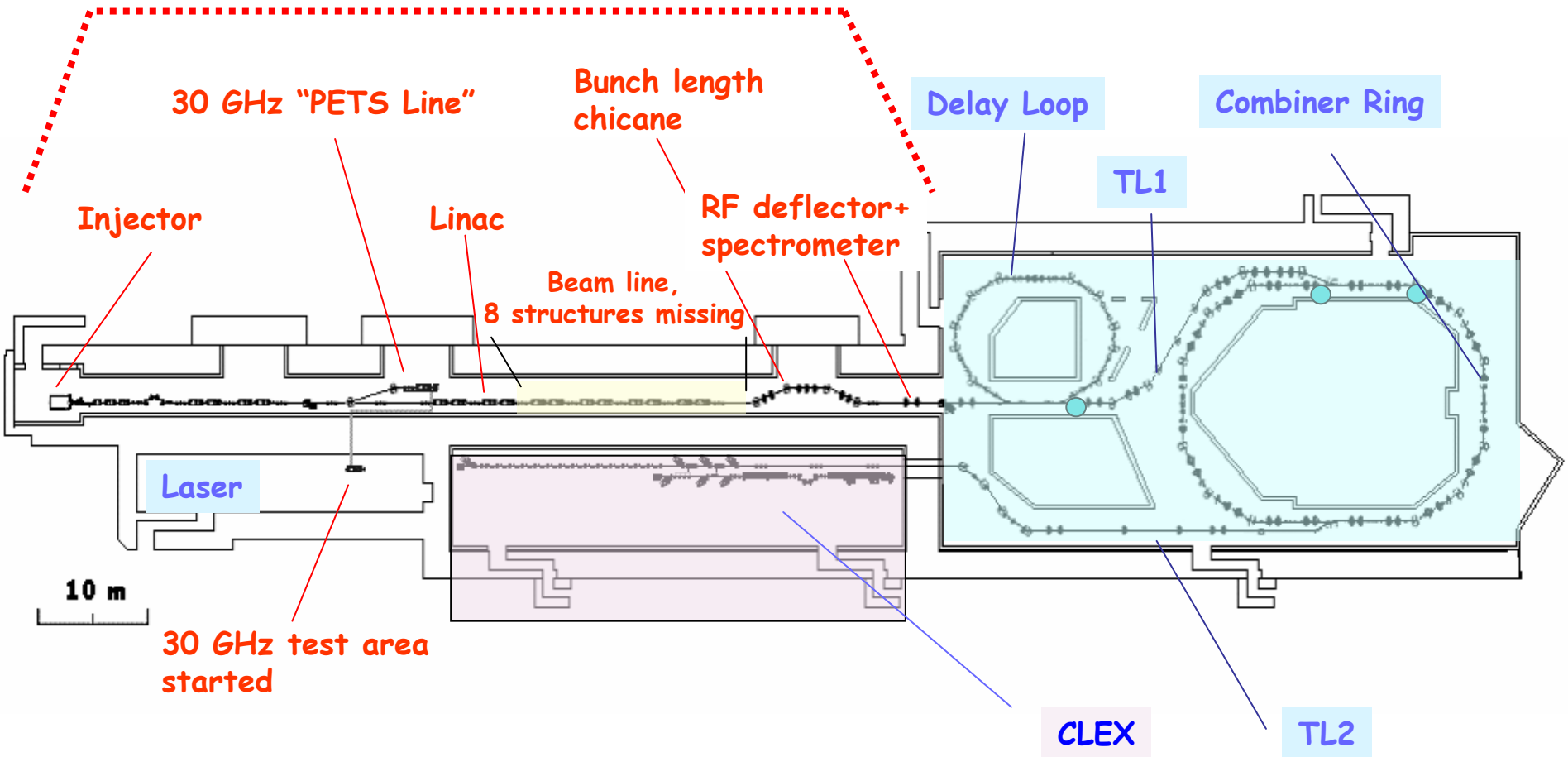
28. January 2005 :

CERN DG has called a meeting of the possible collaboration partners

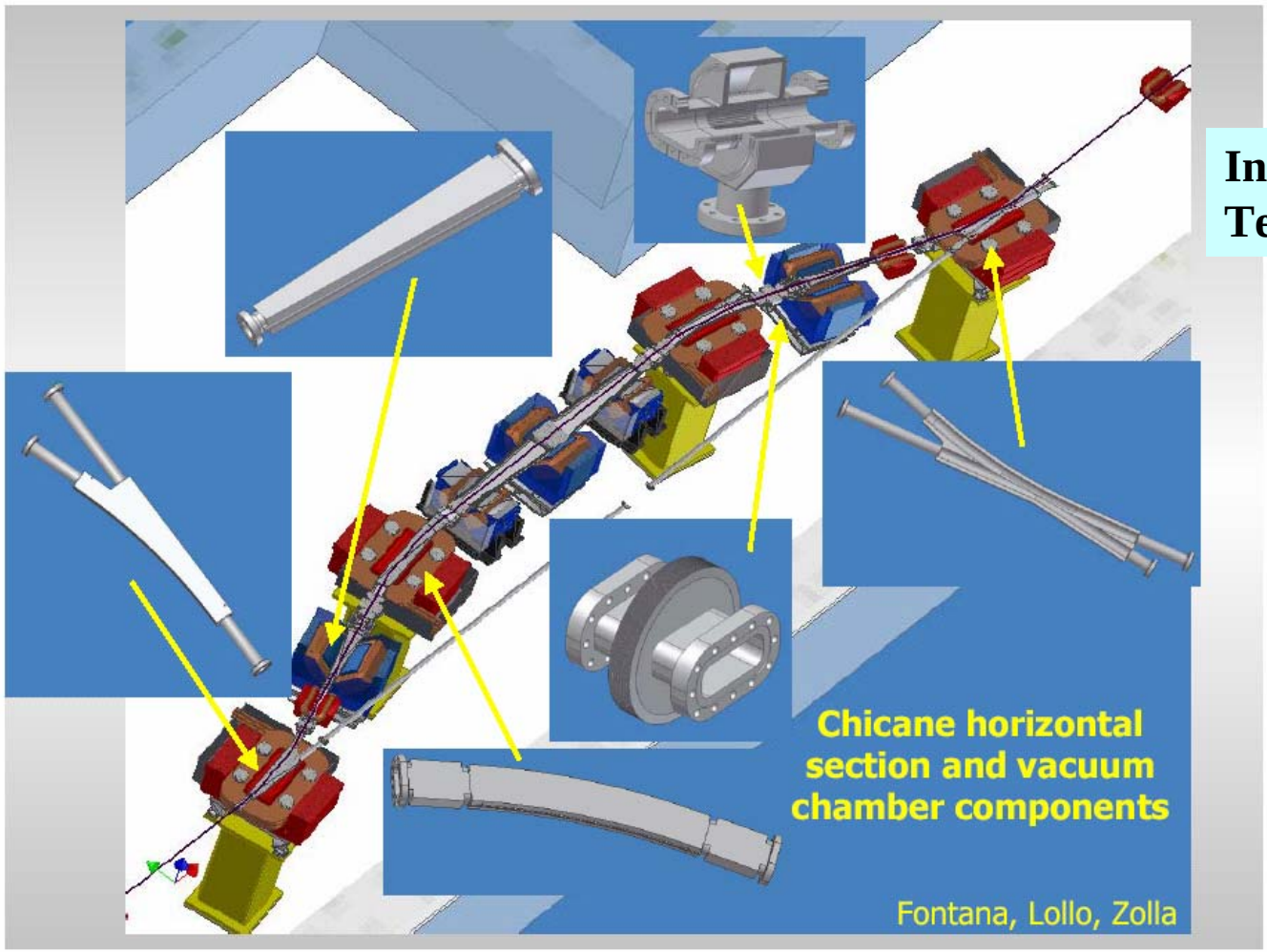
Memorandum of Understanding to be signed by all partners organization like experiment

Existing installation

Commissioned with beam



Installation status INFN

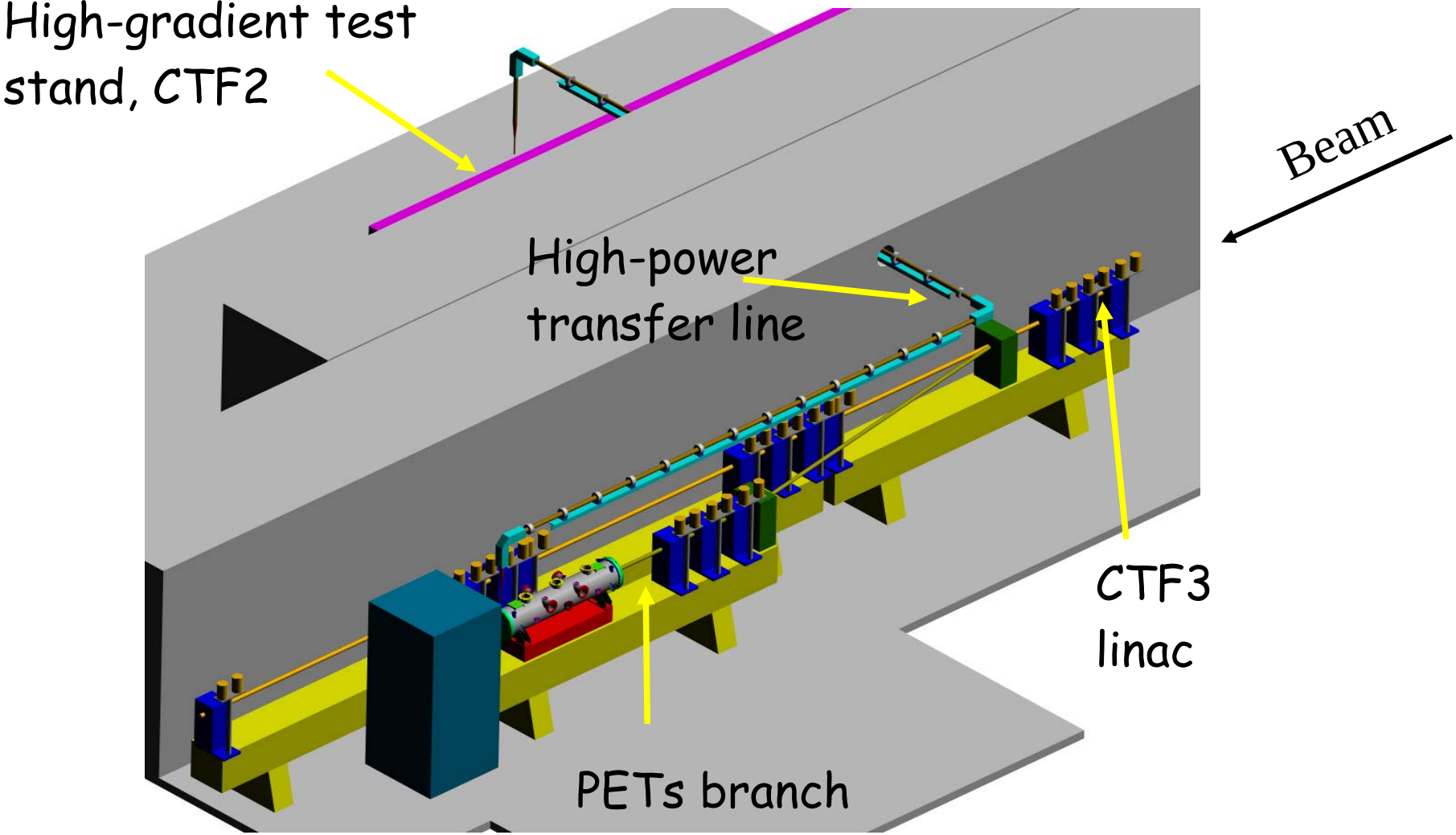


Installation finished
Tested with beam in 2004

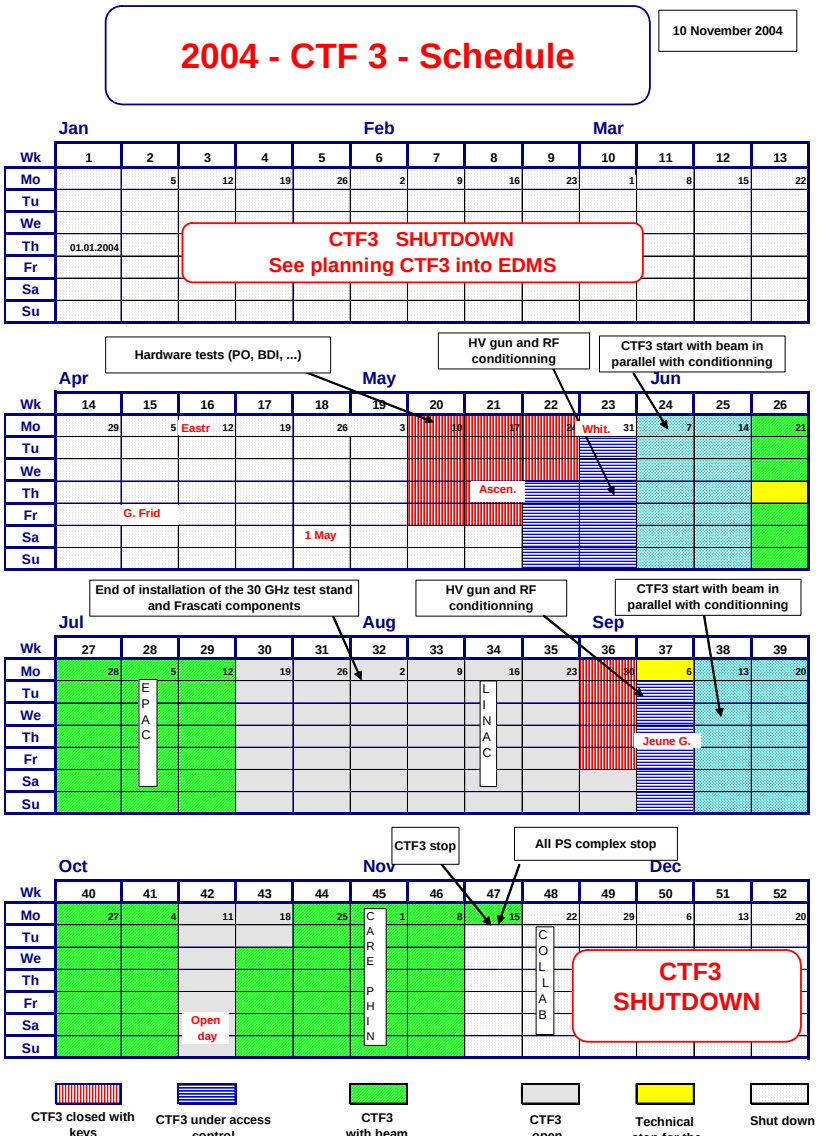
Tunable R_{56} from bunch stretcher to compressor

Slide from A.Ghigo

Two-Beam 30 GHz power production in CTF3



CTF3 operating schedule



Share time between

installation and **operation**

commissioning / studies

30 GHz work

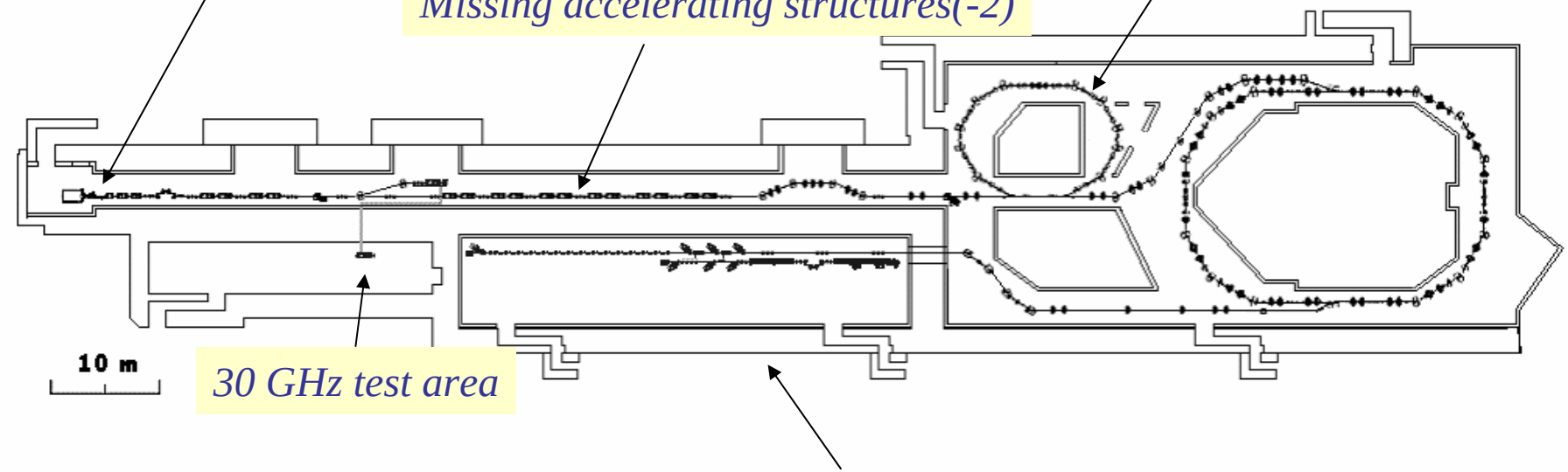
Plan for 2005

Install and commission:

Sub-harmonic bunching system
1.5 GHz

Delay Loop (INFN Frascati)
(Building modification done)

Missing accelerating structures(-2)



30 GHz test area

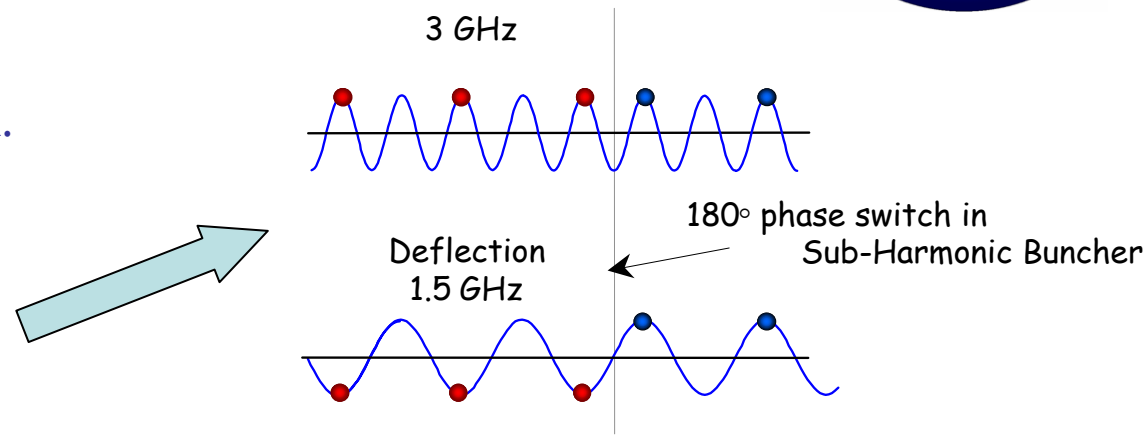
CLEX building

In addition:
add 2 accelerating structures in front of PETS
add collimator in PETS line

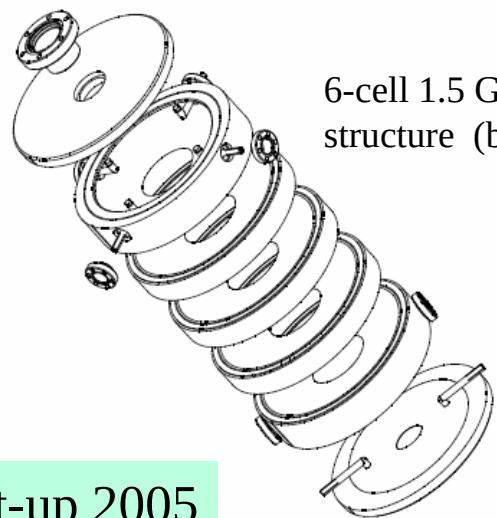
Injector issues

Present status:
only 3 GHz bunching system.

For bunch interleaving in
Delay Loop the bunches
have to be “phase-coded”



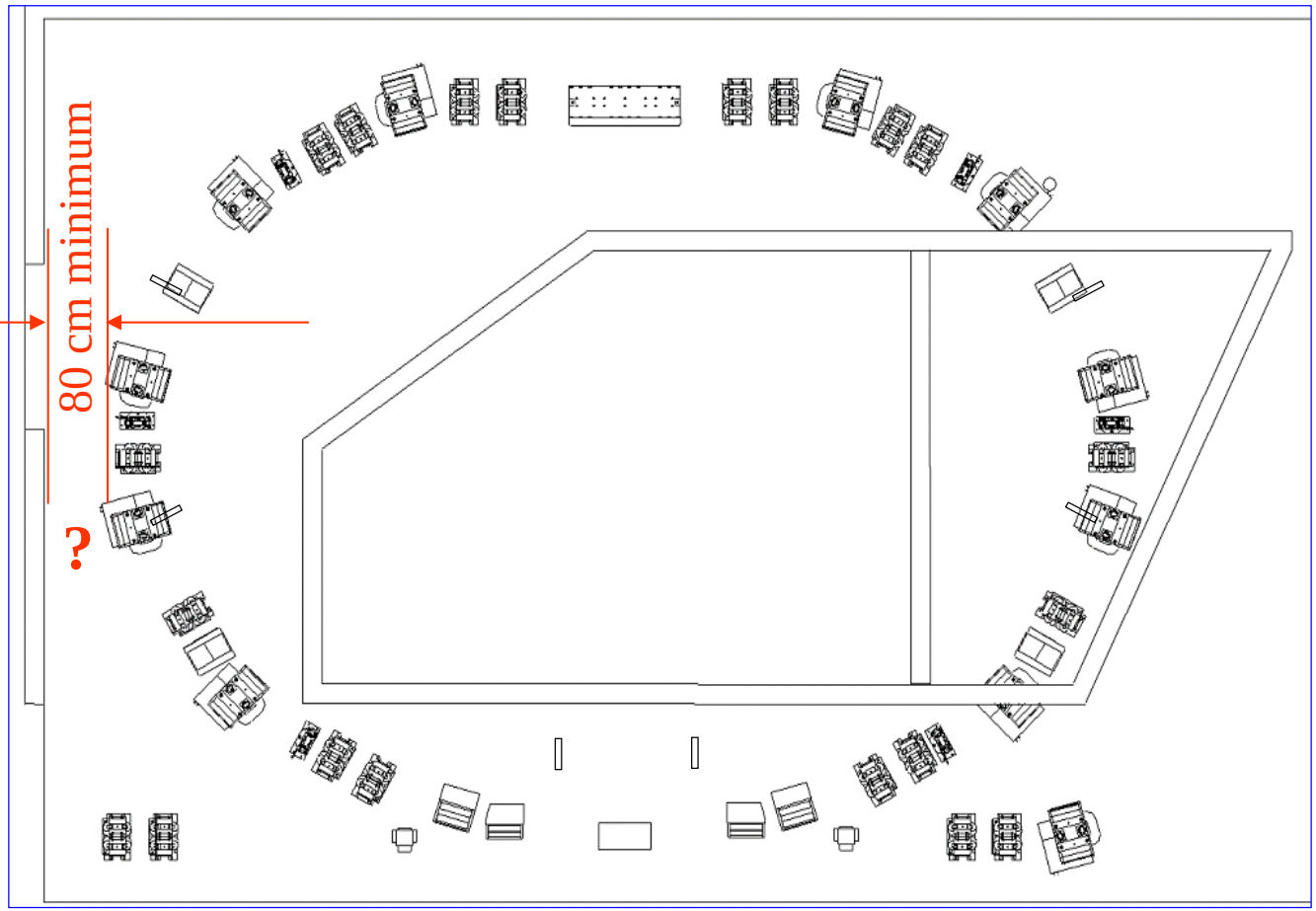
Base line design: Thermionic injector
with Sub-Harmonic Bunchers.
design finished
adopted solution
3 Travelling wave buncher structures driven by three 40 kW Travelling Wave Tubes
Everything on order



6-cell 1.5 GHz buncher
structure (being built)

To be installed for start-up 2005

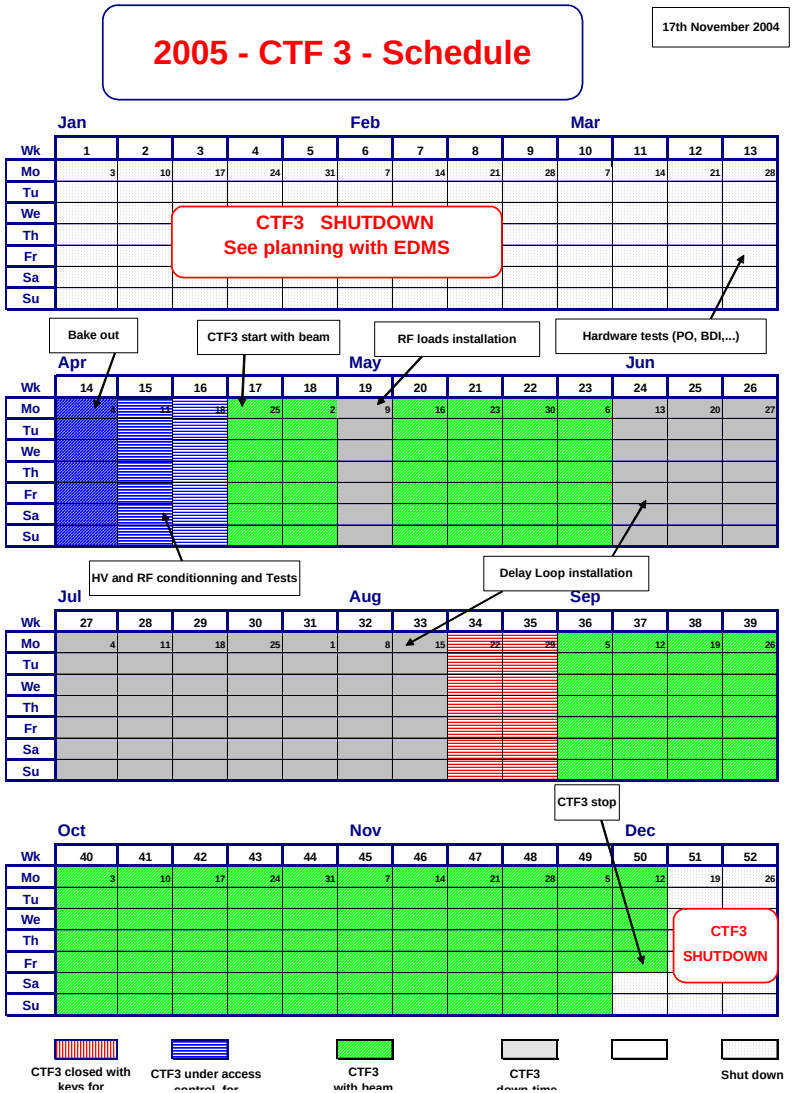
Delay Loop



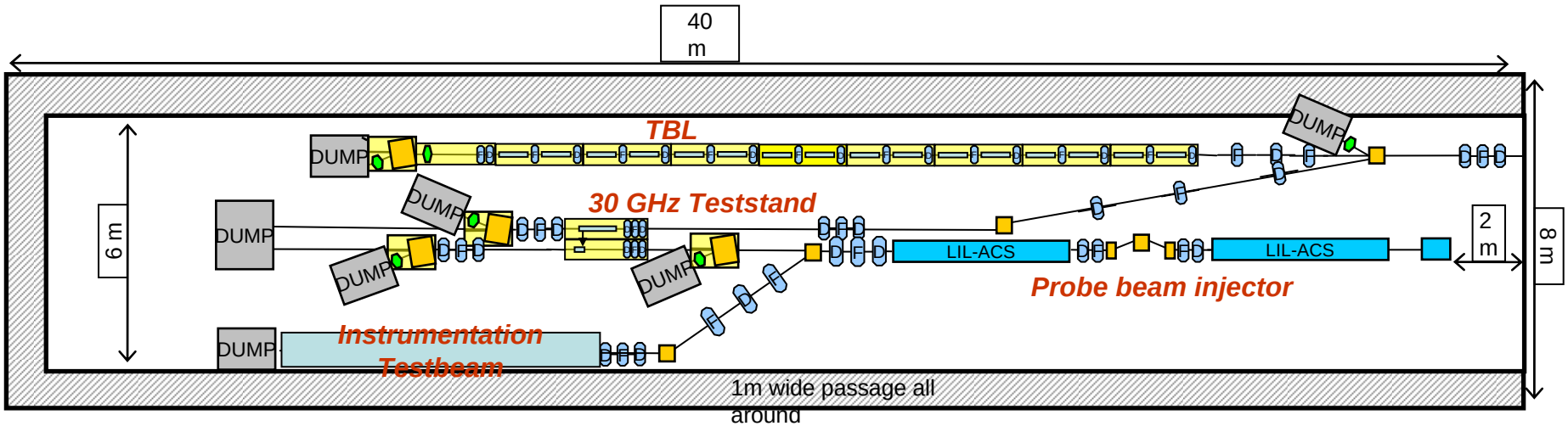
Winter:
Infrastructure
most magnets

Summer:
vacuum
septa
RF deflector

CTF3 operating schedule

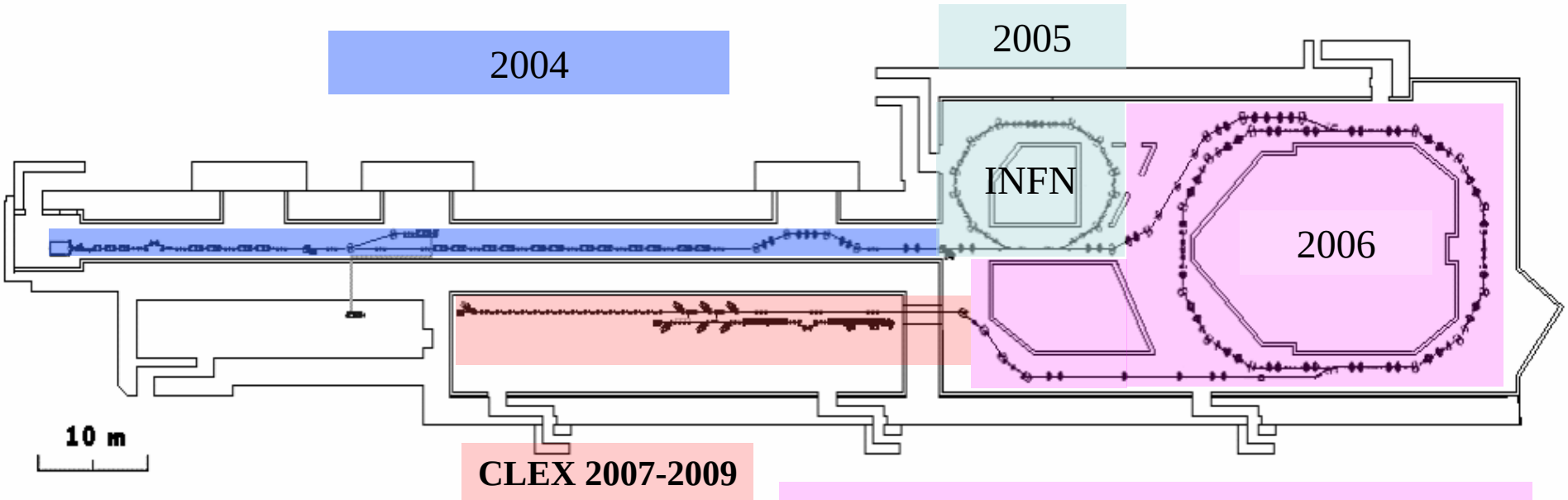


Tentative layout for CLEX floor space



Hans-H. Braun, 3.9.2004

CTF3 programme



From collaborations:
- ***Probe beam linac ?***
- ***Two-Beam test stand ?***

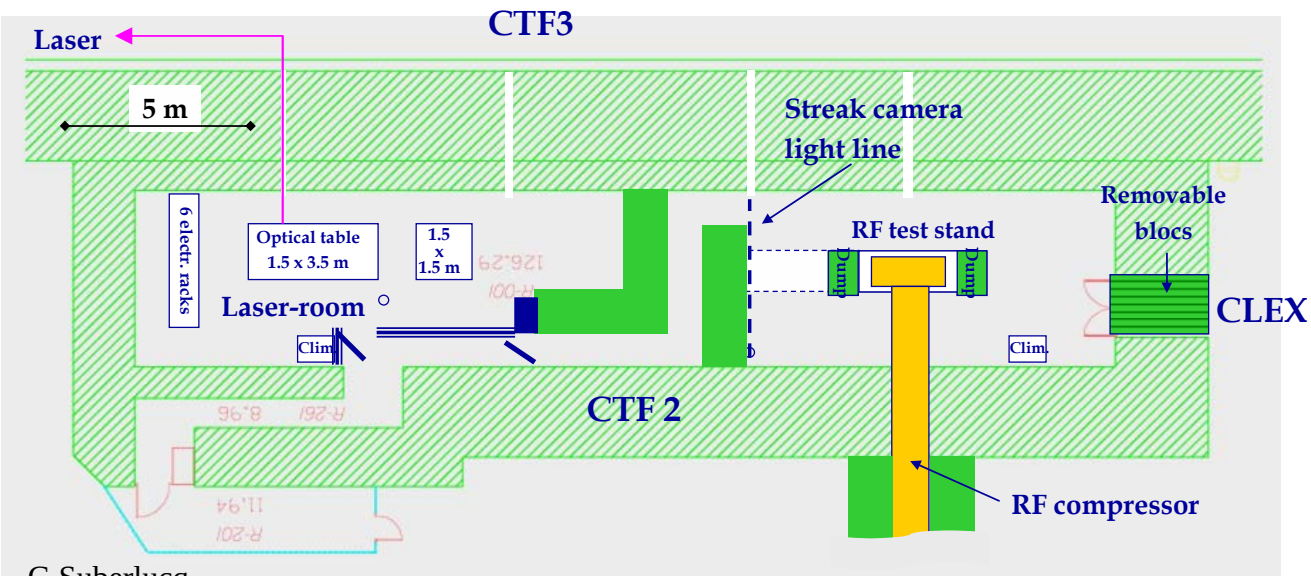
Magnets available/ordered/INFN wiggler(s)
from Collaborations:
- **Vacuum chambers ?**
- **Power supplies ?**
- **Beam Diagnostics ?**
- **Kicker ? (CERN fall-back)**
- **Septa ?**

Photo Injector

In parallel:

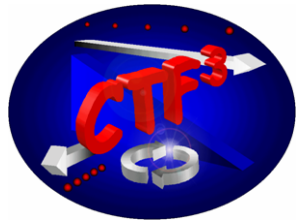
Development of Photo injector

Plan to install instead of Thermionic injector in 2007.



G.Suberlucq

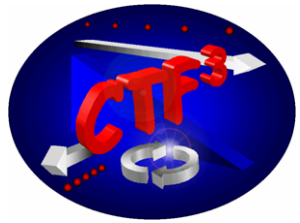
Conclusion



- Programme assured up to including Delay Loop
- Very ambitious programme
- Many open questions, in particular concerning benchmarking experiments
- Completion within time scale possible with and more collaborations

Highly motivated team,
excellent collaboration between all partners

Planning



	2004	2005	2006	2007	2008	2009
Drive Beam Accelerator						
30 GHz high-gradient test stand						
30 GHz high-gradient testing (4 months per year)						
R1.1 feasibility test of CLIC accelerating structure						
Delay Loop						
Combiner Ring						
R1.2 feasibility test of drive beam generation						
CLEX						
R1.3 feasibility test of PETS* structure						
Probe Beam						
R2.2 feasibility test of relevant CLIC linac sub unit						
Test beam line						
R2.1 Beam stability bench mark tests						