



Two Beam Test Stand

I. Syrathev



Aims of the TBTS Test Programme

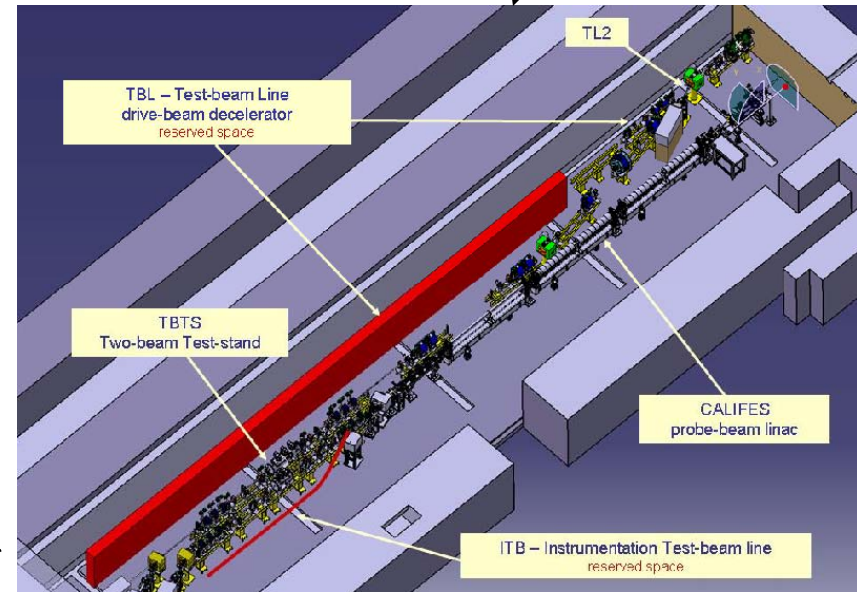
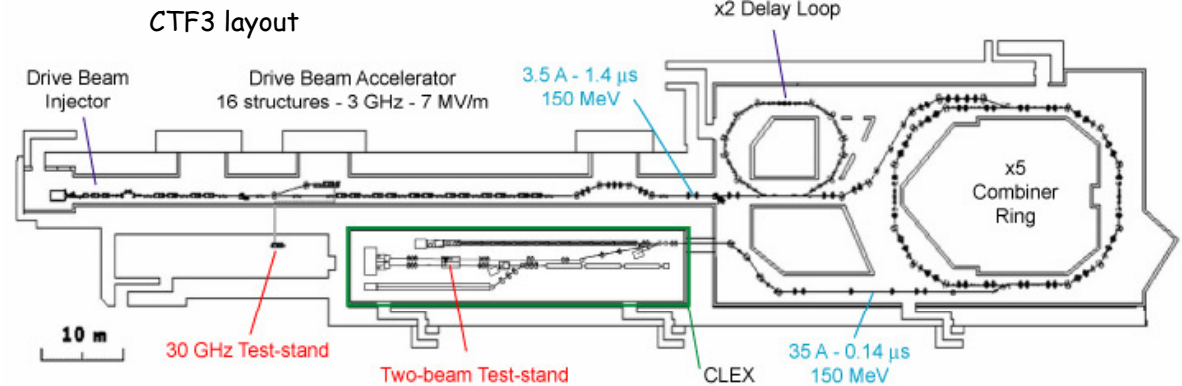
Demonstration

- power production in prototype CLIC PETS
- two-beam acceleration

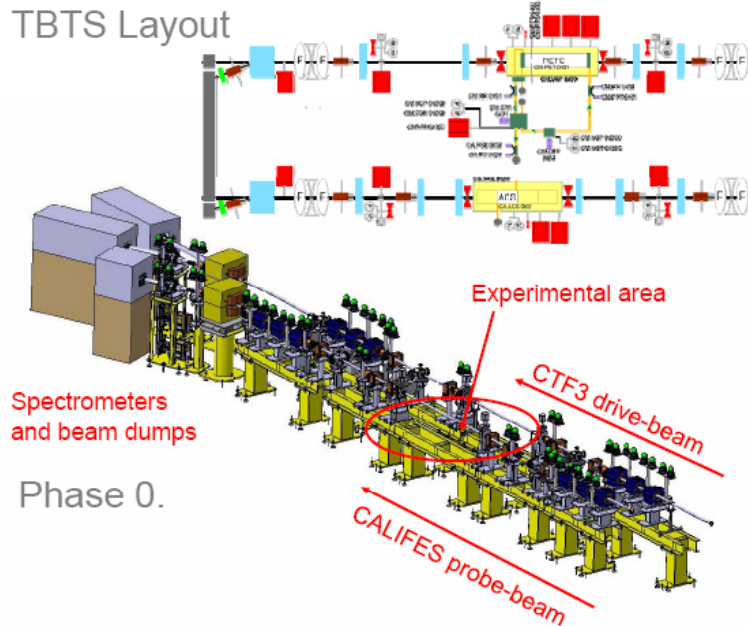
Experiments

- beam loading compensation
- beam dynamics effects
- beam kick due to breakdown or dipole modes
- breakdown rate
- dark currents

Two beam test stand in CLEX



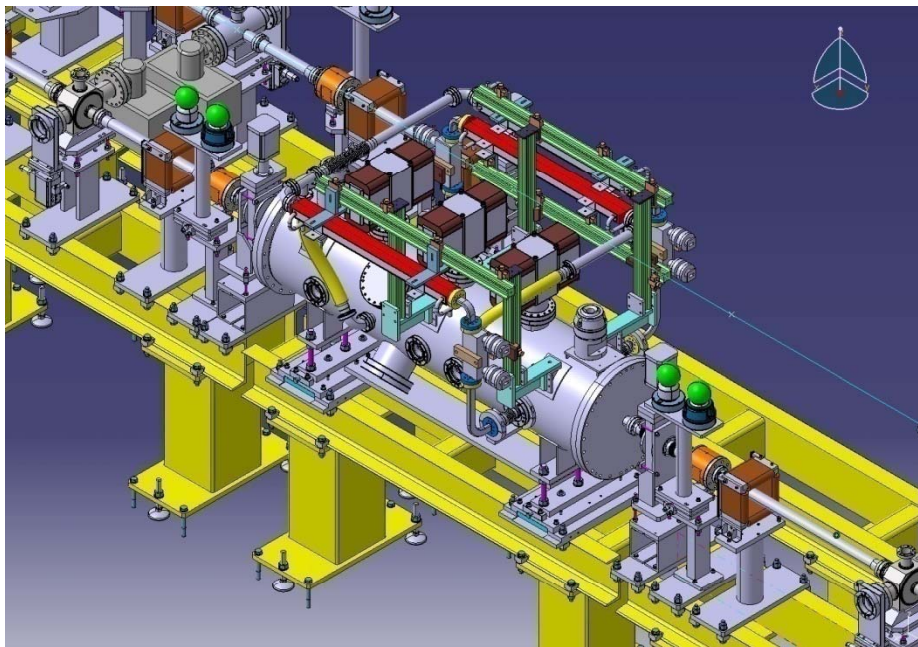
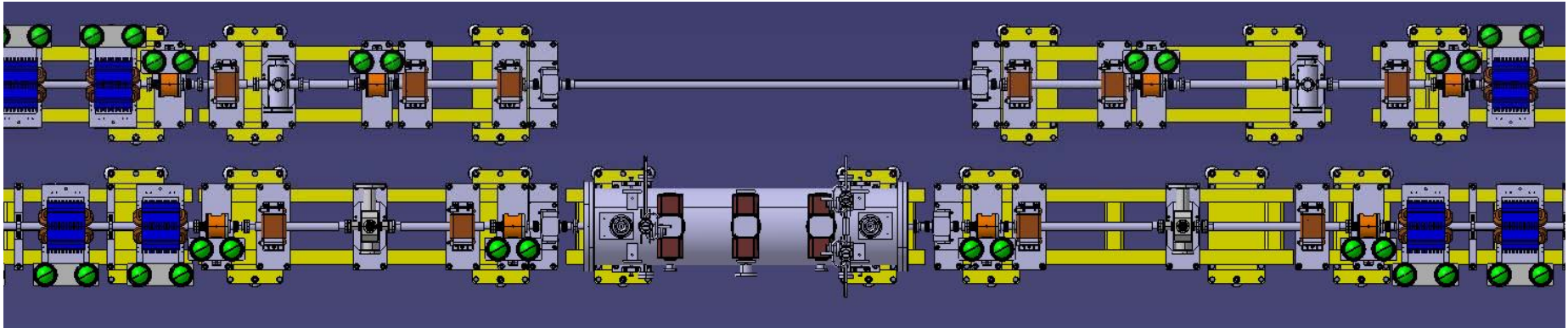
TBTS Layout



Operation in 2008:
 Phase 0: Beam lines commissioning
 Phase 1: Power production from the drive beam
 Operation in 2009 ->...:
 Phase 2: Two beam acceleration



Integration layout for the phase I - PETS power production tests.



CLEX 2BTS:

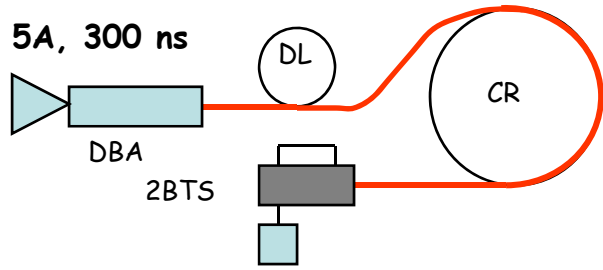
Drive beam: 12GHz, 140ns, 30 A (max)
CLIC PETS, active length 1.0 m,
135 MW will be produced with 20.8 A
beam.
Access to 270 MW (30 A)

Possible PETS configurations:

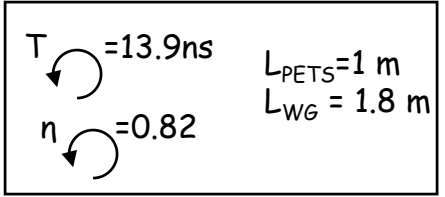
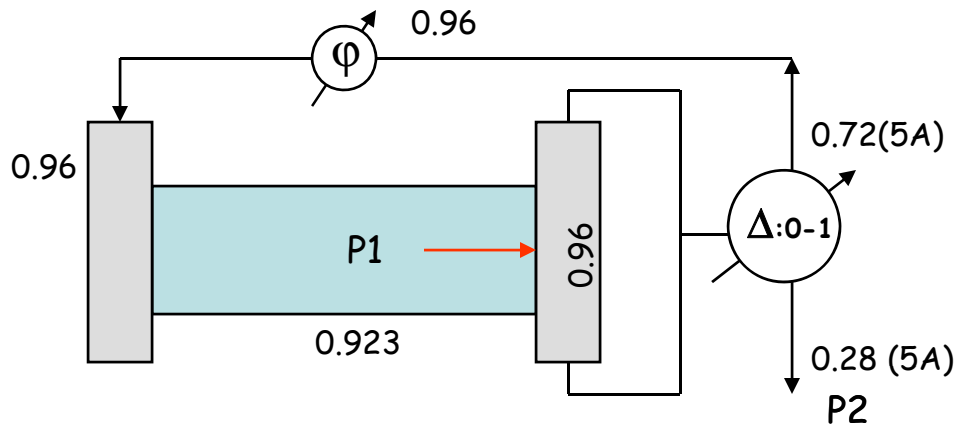
- #1. PETS/ no damping material
- #2. PETS/ with damping material
- #3. PETS with recirculation (access to the full pulse length and power)



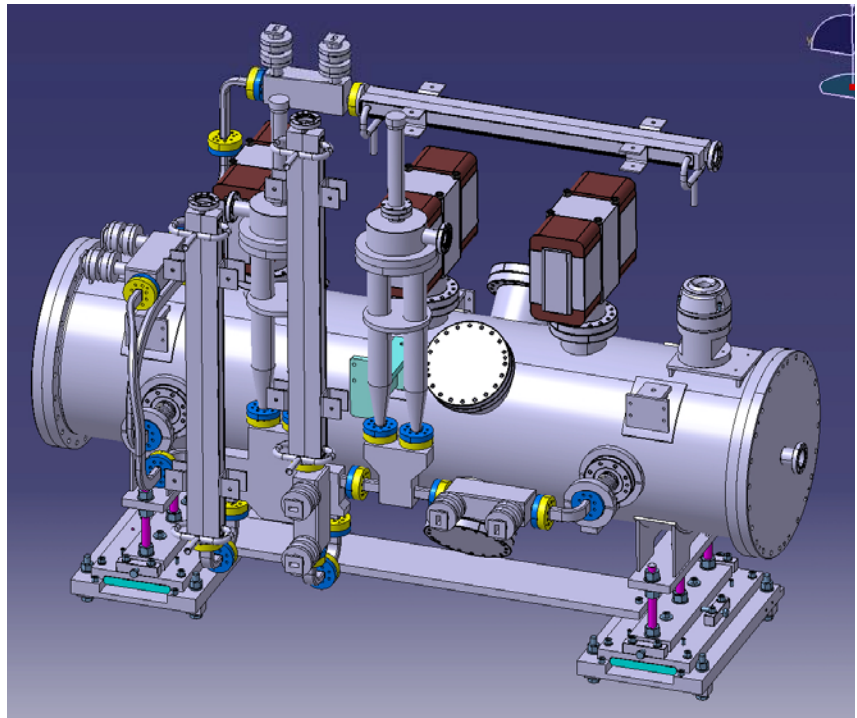
In the CTF3 the PETS high power mode (high current) is limited in the pulse length by 140 ns. The re-circulation is a method to increase significantly power production and thus the drive beam current can be used directly from DBA (5A, 3GHz). In this case current pulse can be increased up to 300-400 ns.



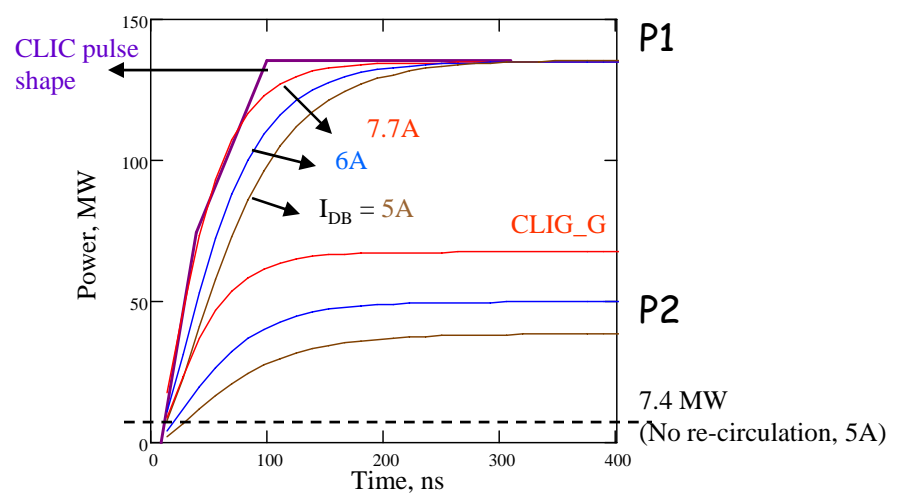
PETS with recirculation schematic:



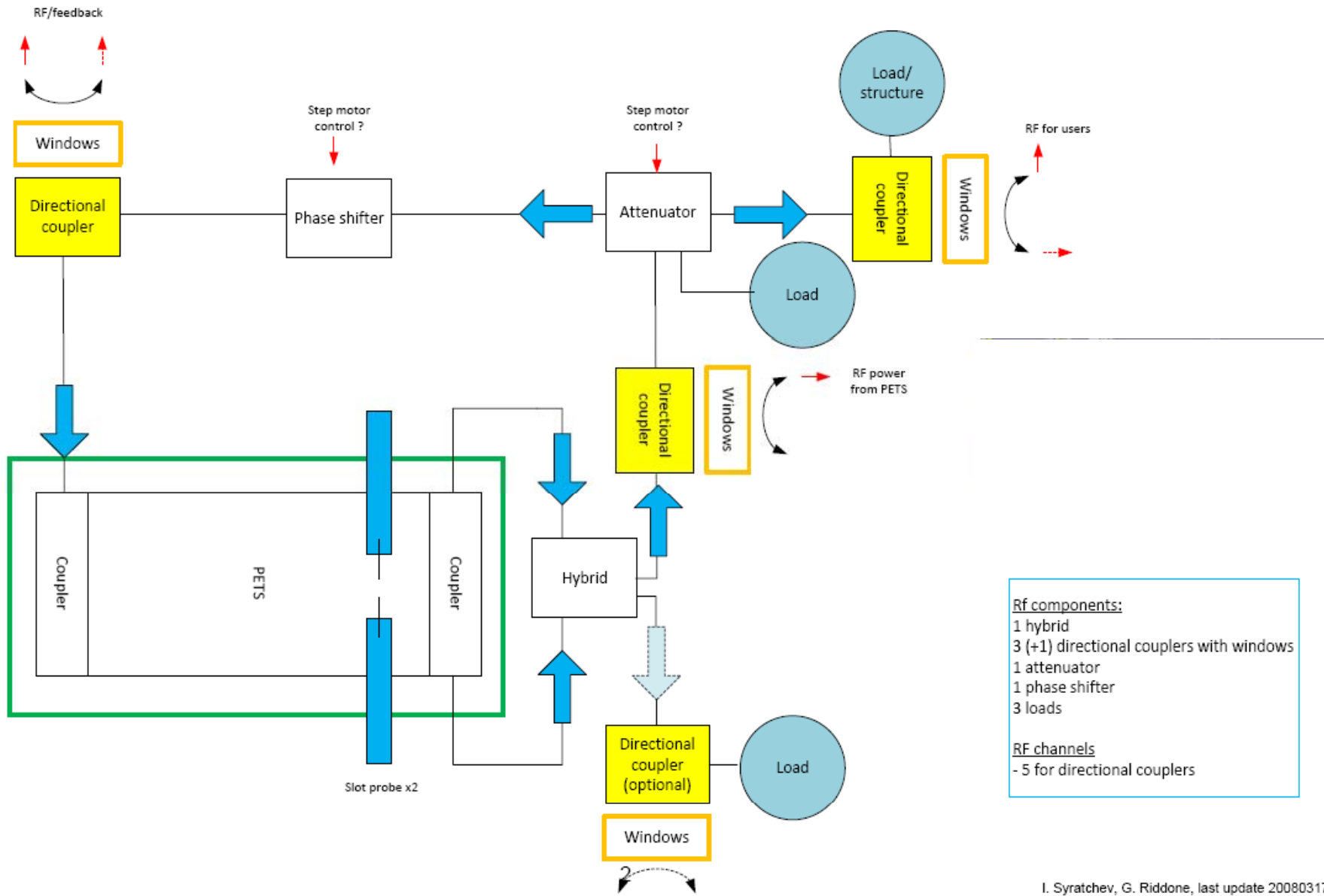
Phase 1: PETS with re-circulation



Optimized (coupling) RF pulse shapes



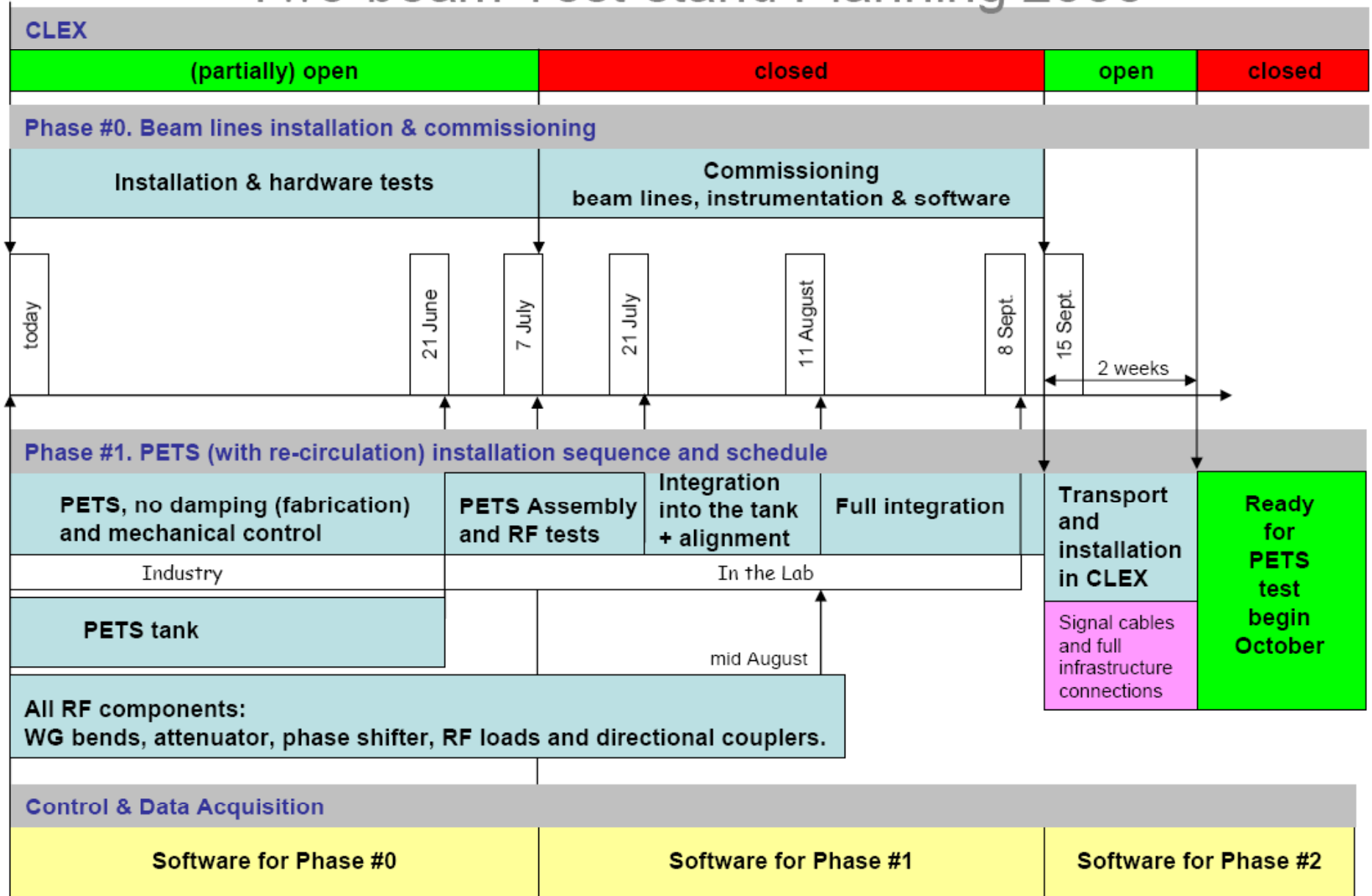
Two beam test stand - Phase 1, PETS with recirculation



I. Syratcev, G. Riddone, last update 20080317



Two-beam Test-stand Planning 2008



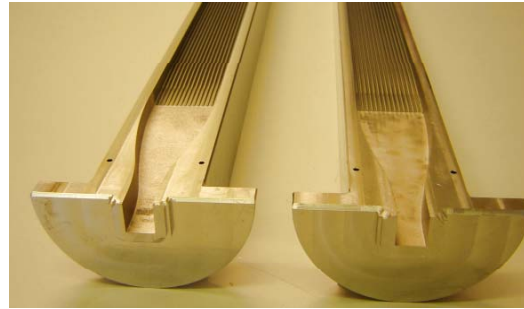


12 GHz RF components status (to date)

Directional coupler

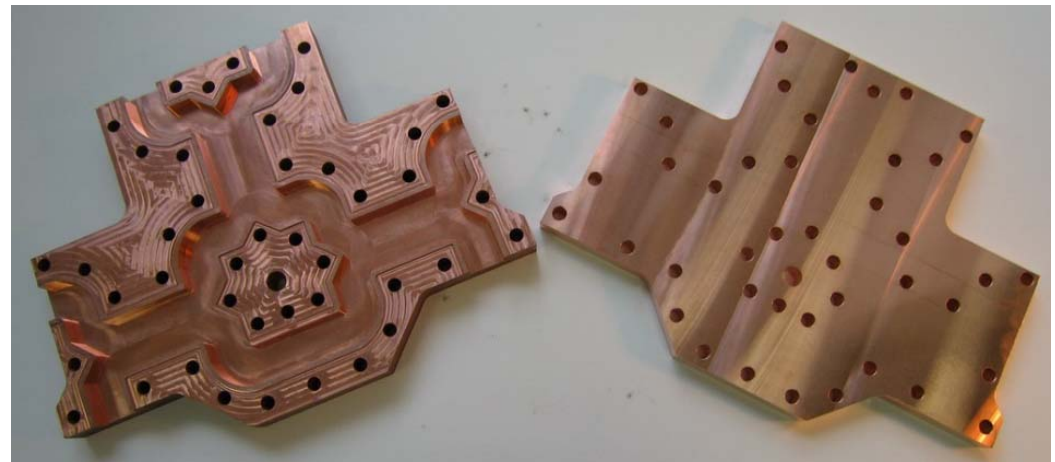


Dry (stainless steel) RF load



RF and mechanical design, CERN
Fabrication in CINEL, Italy and VDL, Holland
Prototypes under completion
Series (x8) at CERN in July

Attenuator/splitter

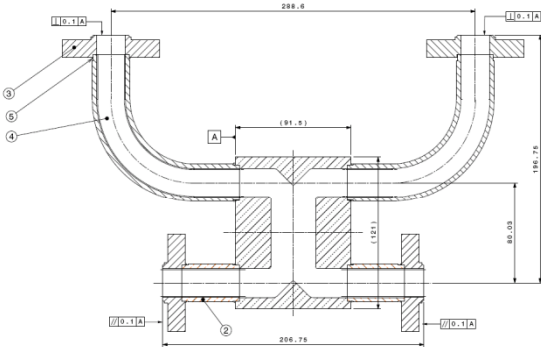


Scaled from 30 GHz CERN version. Origin - 11.424 SLAC version.

GYCOM Russia.
First prototype in may
Second unit in Jul
Series (x2) in Aug

GYCOM, Russia

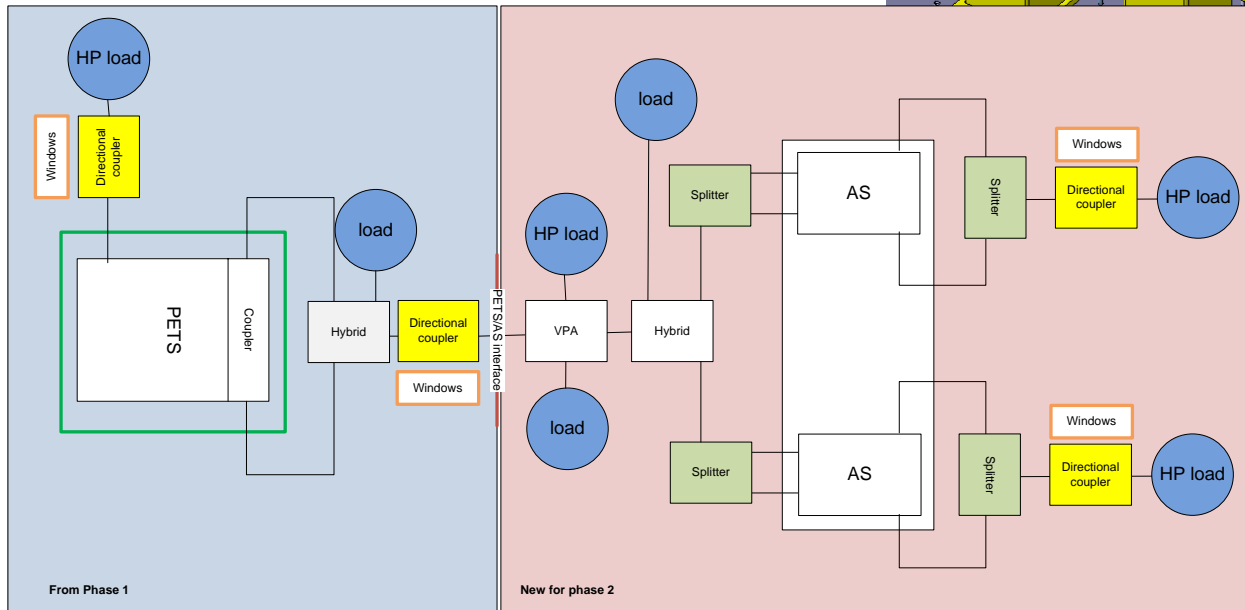
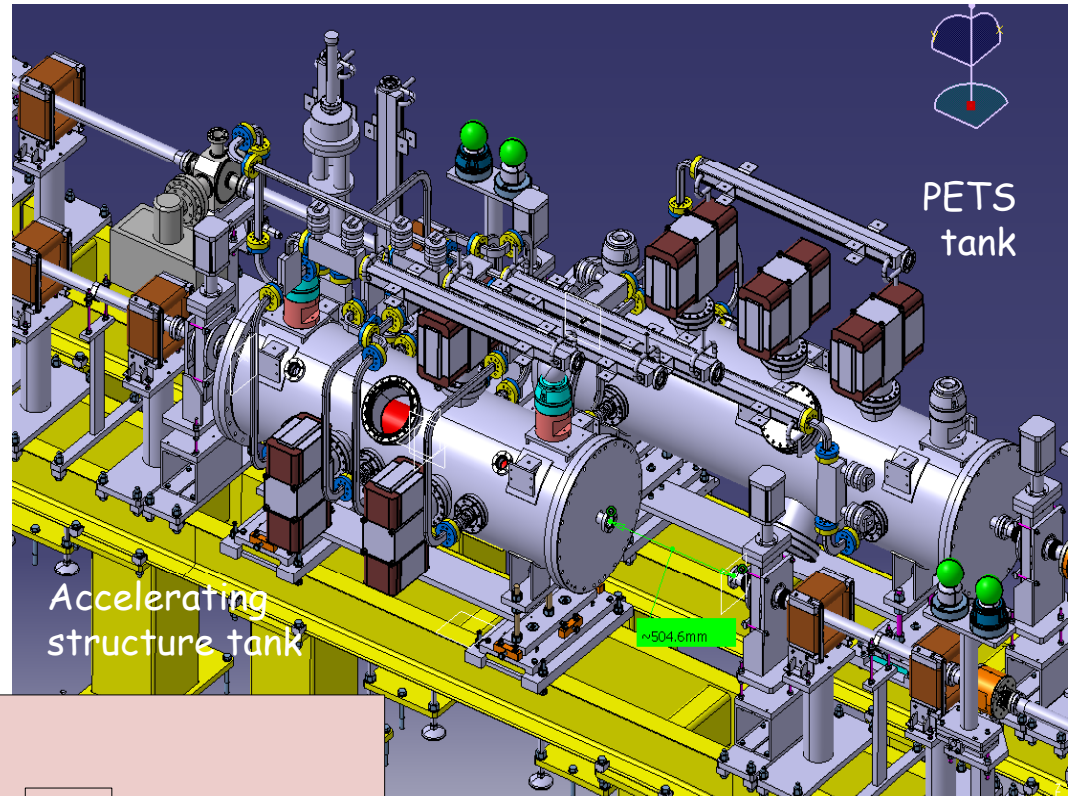
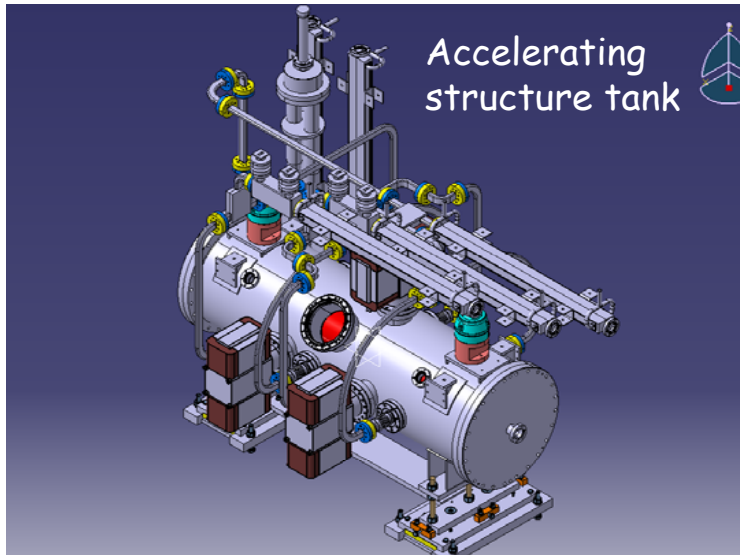
Hybrids



RF and mechanical design, CERN
Fabrication in CINEL, Italy
First prototype in May
Series (x4) in June



PHASE 2: Two-beam acceleration



I. Syratcev, G. Riddone, last update 20080417