

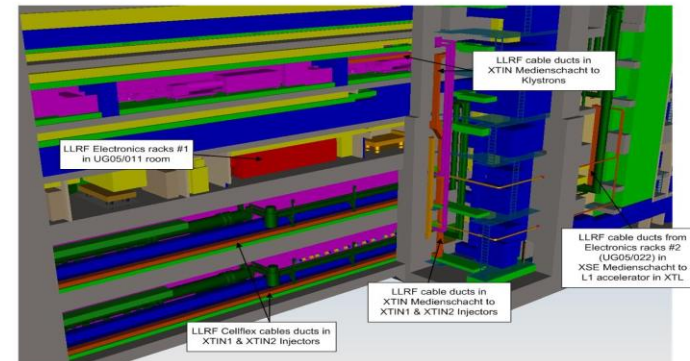
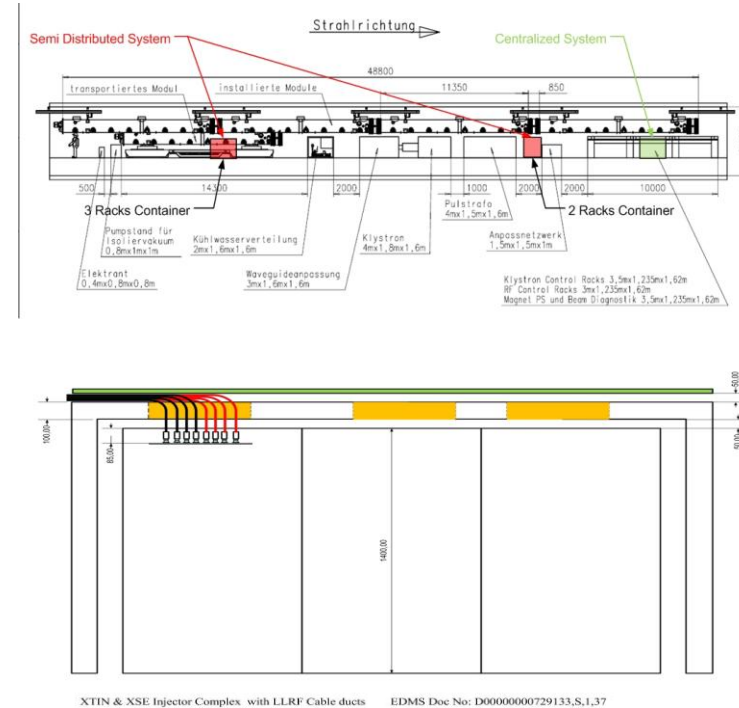


Survey of LLRF Installation

Wojciech Wierba, Krzysztof Oliwa
DESY MSK, IFJ PAN

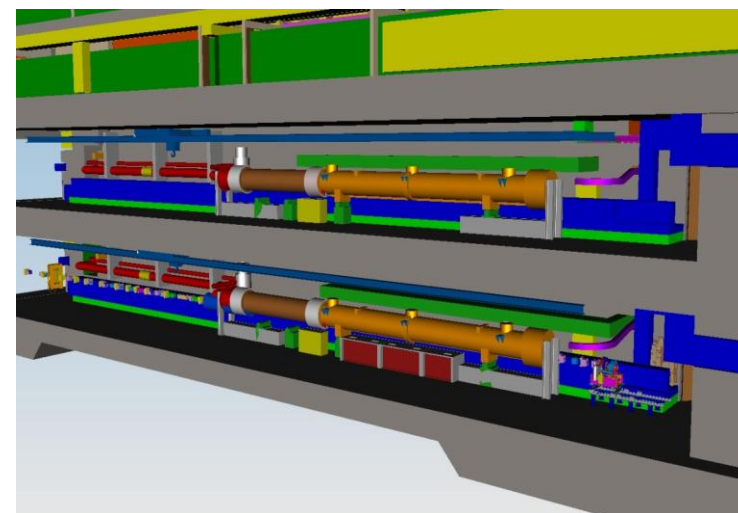
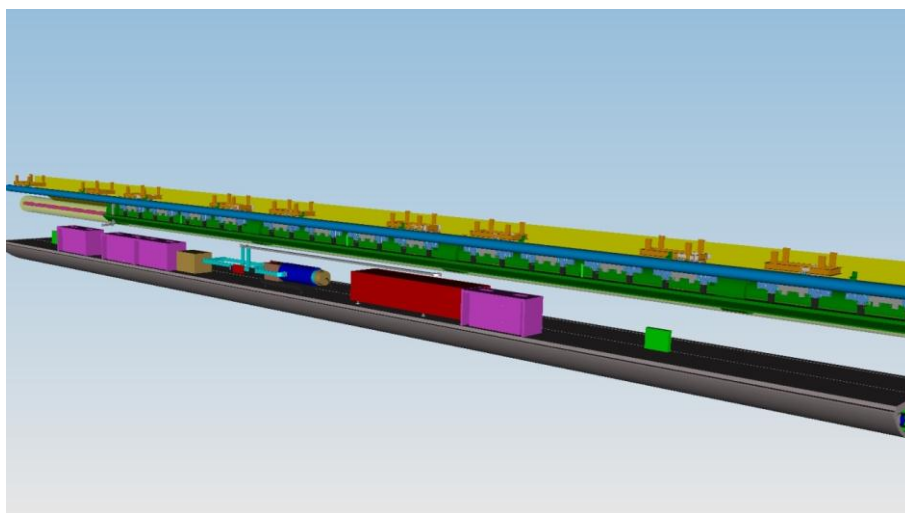
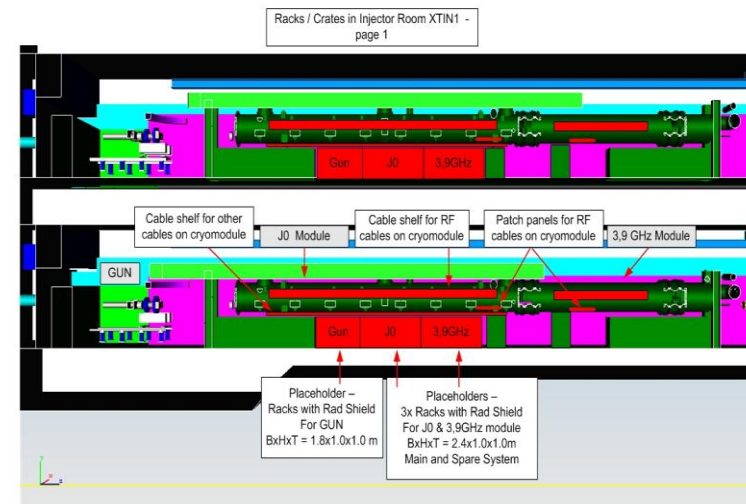


- Semi distributed LLRF systems for L1, L2 & L3
- Short RF signal cables from cavities to electronic
- RF signal cables connected on top of the electronics racks
- Main & Spare LLRF systems for J0, 3.9GHz & L1 close to the Cryo Modules
- Master Oscillator & Laser Synchronization on UG05

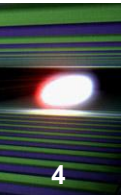


Injector consist of:

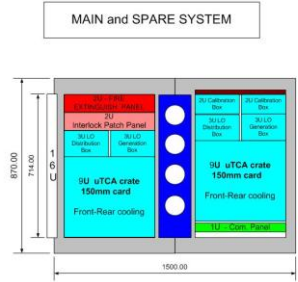
- ❑ Placed in XTIN UG06&7/R002:
 - RF Gun
 - J0 (1 Cryo Module)
 - 3.9GHz (1 Cryo Module)
- ❑ Placed in XTL tunnel:
 - L1 (4 Cryo Modules, 1 RF Station)



Injector LLRF Racks occupation



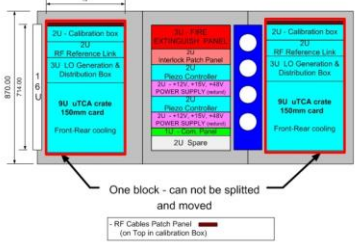
SYSTEM IN INJECTOR FOR GUN - uTCA DESIGN, 16U RACKS



Crates in UG05/011 Electronic racks for Main and Spare Systems



SYSTEM IN INJECTOR FOR J0 - uTCA DESIGN, 16 U RACKS Two Redundant Systems

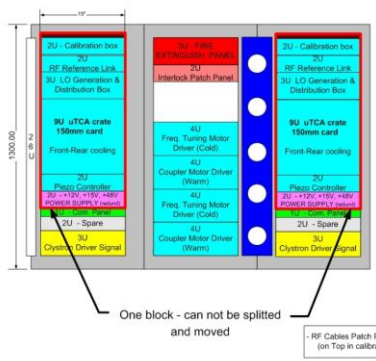


Crates in UG05/011 Electronic racks for Main and Spare Systems

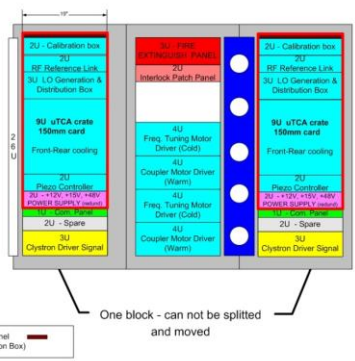


SET OF RACKS FOR RF STATION SYSTEM FOR L1 IN XTL u-TCA DESIGN HALF - DISTRIBUTED (four cryomodules) Two Redundant Systems

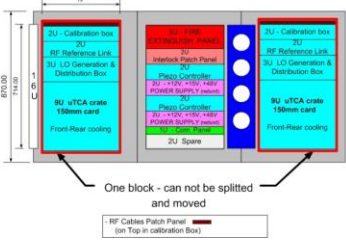
FIRST SET OF RACKS



SECOND SET OF RACKS



SYSTEM IN INJECTOR FOR 3.9 GHz SYSTEM - uTCA DESIGN, 16 U RACKS Two Redundant Systems



Crates in UG05/011 Electronic racks for Main and Spare Systems



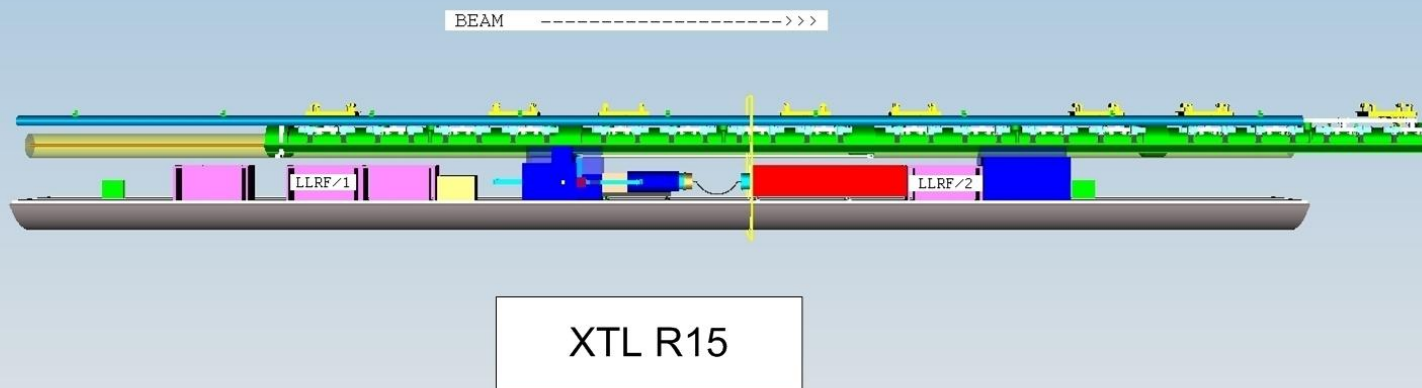
Main accelerating Liniac's:

- ❑ L2 (12 Cryo Modules, 3 RF Stations)
- ❑ L3 (84 Cryo Modules, 21 RF Stations)

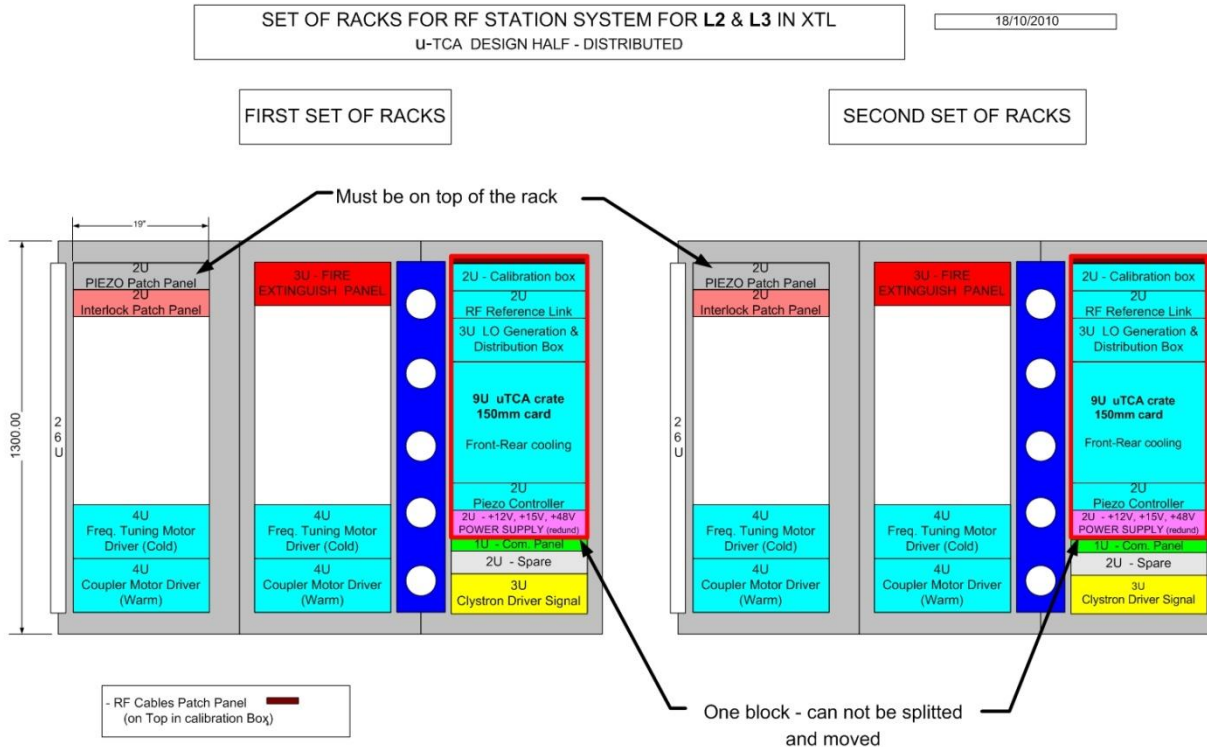
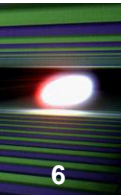
Best possible placement of LLRF racks!

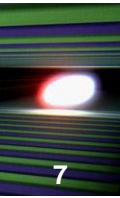
(implemented in 3D model only for R15)

Can we (LLRF) trust, that such a setting will be valid for whole length of XTL?



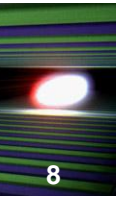
Main Liniac's Racks Occupation





- Space for LLRF racks in Injector and XTL reserved
- Space for LLRF electronics in racks in Injector and XTL checked and reserved
- Cables ducts from MO and Laser Synchronization (UG05) to Injector and XTL designed and reserved
- Cryo Module cabling preliminary agreed
- Requirements for infrastructure (TGA)

But...



A Devil is in Details

- Design of cables meander through radiation shielding
- Design of patch panels on CryoModules with space for splitters for J0, 3.9 GHz and L1
- Influence of proposed Fire Protection Units to the LLRF installation in containers
- Design of cable path for connection between two sets of LLRF racks within one RF Station
- Design of inner racks cabling
- System components (racks, patch panels, crates, boards) modeling for Kabel Documentation System
- Design of external LLRF cabling using KDS
- Design of preliminary time schedule for LLRF installation
- Solve collisions with other WP in Injector Complex and XTL

- Identification of all components/devices receiving RF synchronization with exact position in Injector, XTL and Photon Lines (BAM's !)
- Synchronization RF cables in Injector Comple, XTL, Photon Lines inventory
- Design of MO racks space and occupation in XTIN
- Special air conditioned racks standard requirements
- Cooling and infrastructure requirements
- Redesign of Synchronization RF cables ducts in Injector Complex
- Design of RF Synchronization cables ducts to the XTL an Photon Lines (entrance to XTL problems)
- Design of Synchronization RF cables layout on shelf in XTL and Photon Lines
- Negotiations of space for RF splitters/pickup devices in XTL
- 3D modeling of placeholders for RF cables and splitters/pickup devices
- Design of RF cables duct from splitters to the RF Station racks
- Investigation of air conditioning in XTL influence to the synchronization phase stability
- Design of temperature stabilization of synchronization cables – cost estimation
- Design of time schedule system installation
- Agreements with other working groups

- Synchronization fiber optic (FO) cables in Injector Complex, XTL and Photon Lines inventory
- Design of LSS racks space in XIN (Laser Room)
- Simple 3D modeling of components (placeholders) in Laser Room
- Racks occupation design
- Special air conditioned (temperature stabilized) racks standard requirements
- Cooling and infrastructure requirements (for storage rooms also)
- Design of LSS FO cables ducts in Injector Complex, XTL and Photon Lines
- Design of floor openings for LSS FO cables to the components
- Design of LSS FO cables ducts from floor opening to the components racks
- Investigation of air conditioning in XTL influence to the synchronization phase stability
- Proposal of temperature stabilization of LSS FO cables in XTL (water pipe or heating cable)
– cost estimation
- Design of time schedule system installation
- Agreements with other working groups

- Design of some XFEL components is evolving quite fast
- Lack (or difficulties to get) of information – no written sources/proposals
- Lack of some decisions => necessity to prepare alternative solutions
- ‘Difficult’ cooperation with some peoples/groups
- Very conservative designs of some components => space ‘consuming’ designs
- Delay of some designs (i.e. radiation shielding)

Where we are? Where we are going to?

- The LLRF Installation design is well advanced
(in my opinion we are within 3-4 most advanced WP's)
- Major problems have been solved (but we have to look after)
- Installation design prepared for the 'worst case'
- More detailed design has started, but in some points we are waiting for prototypes/decisions

Thank you