

Overview and Status of Assembling and Commissioning the RF-System at PETRA III

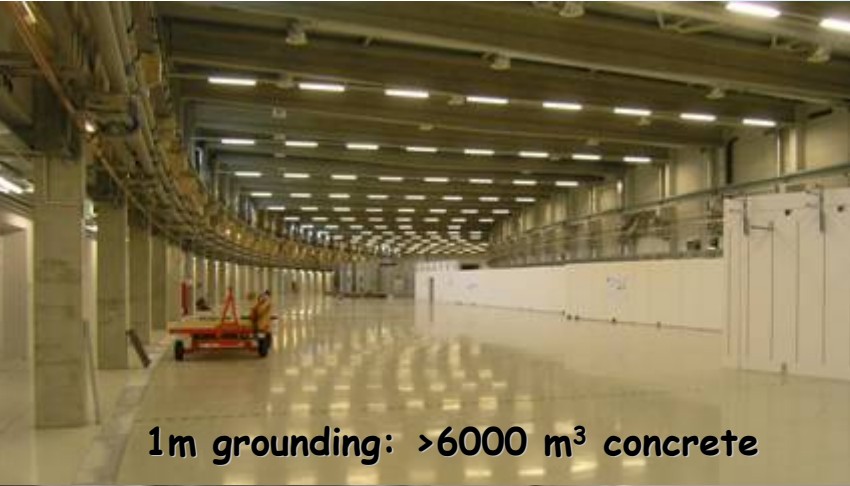
Main parameter:

Mashine:

Beam Energy: $E_0 = 6 \text{ GeV}$
Length: $l = 2304 \text{ m}$
Arc radius 191.73 m and 22.918 m
Beam Current: $I_0 = 100 \text{ mA}$ (200 mA)
loss per turn $U_1 = 7.590 \text{ MeV}$
Emittance (hor) $\epsilon = 1 \text{ nmrad !}$
Topping up

RF:

Frequency: $f_{\text{RF}} = 499.66 \text{ MHz}$
Beam Power (100mA): $P_{\text{beam}} = 759 \text{ kW}$ (dipol, undulators, damping wigglers and HOM losses)
Circumferencial Voltage: $U_c = 20 \text{ MV}$ (in 12 7-cell cavities, power per coupler: 124 kW)
rf-Power (100mA): $P_{\text{rf}} = 1573 \text{ kW}$ (2 transmitter á 786 kW)



1m grounding: $>6000 \text{ m}^3$ concrete



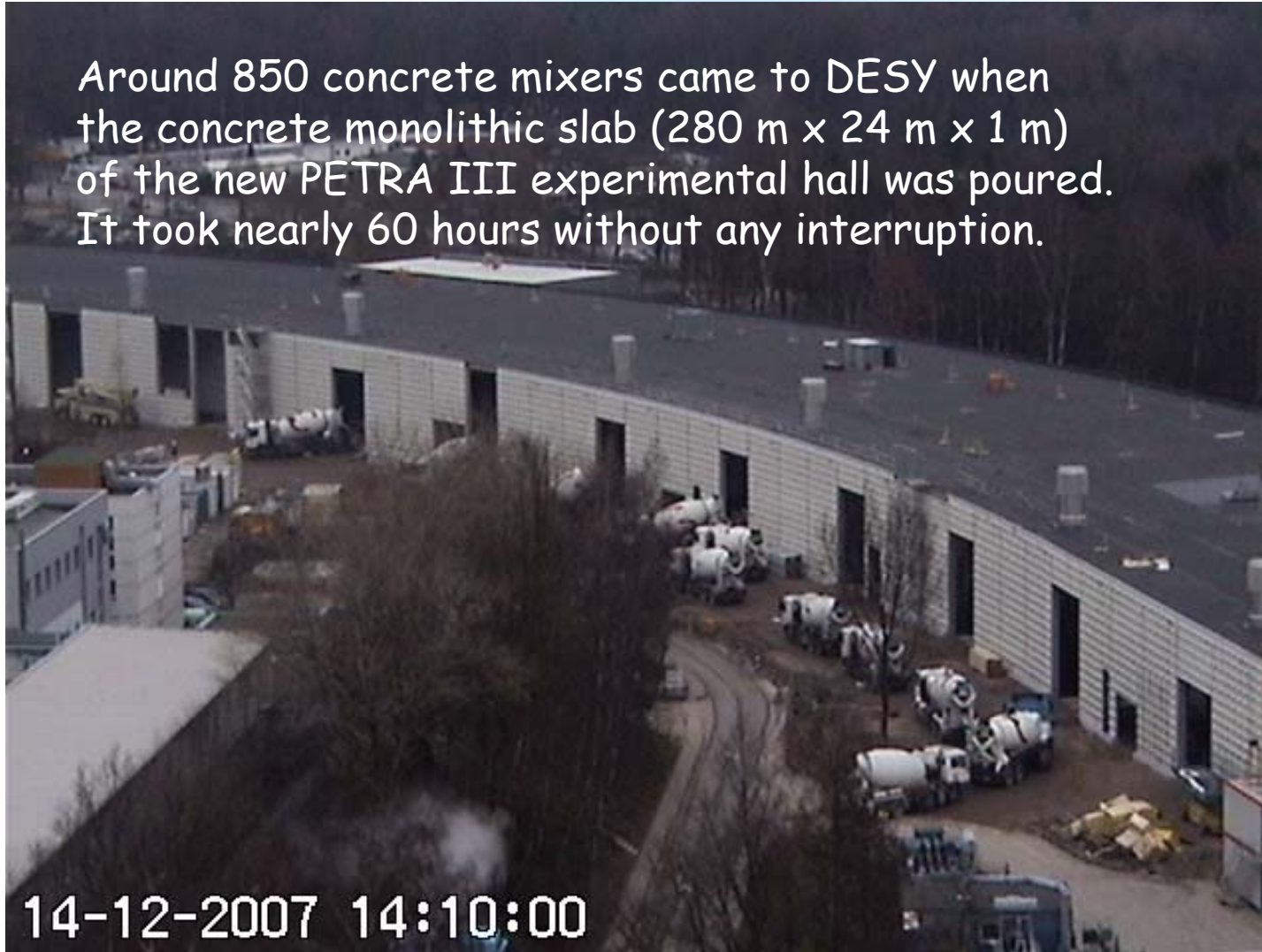
one of 34 moduls on girder



concrete



Around 850 concrete mixers came to DESY when the concrete monolithic slab (280 m x 24 m x 1 m) of the new PETRA III experimental hall was poured. It took nearly 60 hours without any interruption.



14-12-2007 14:10:00

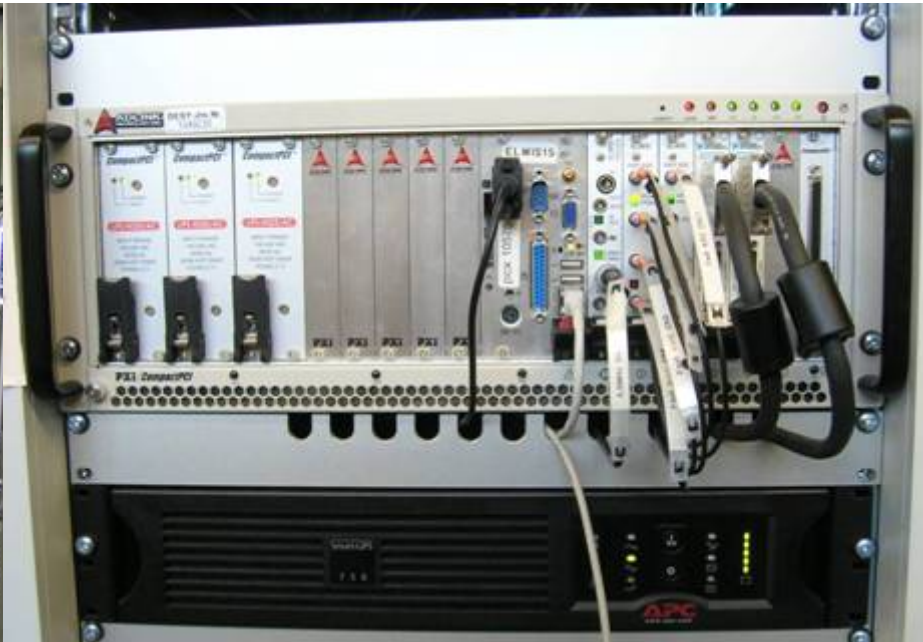
Changes at the RF system



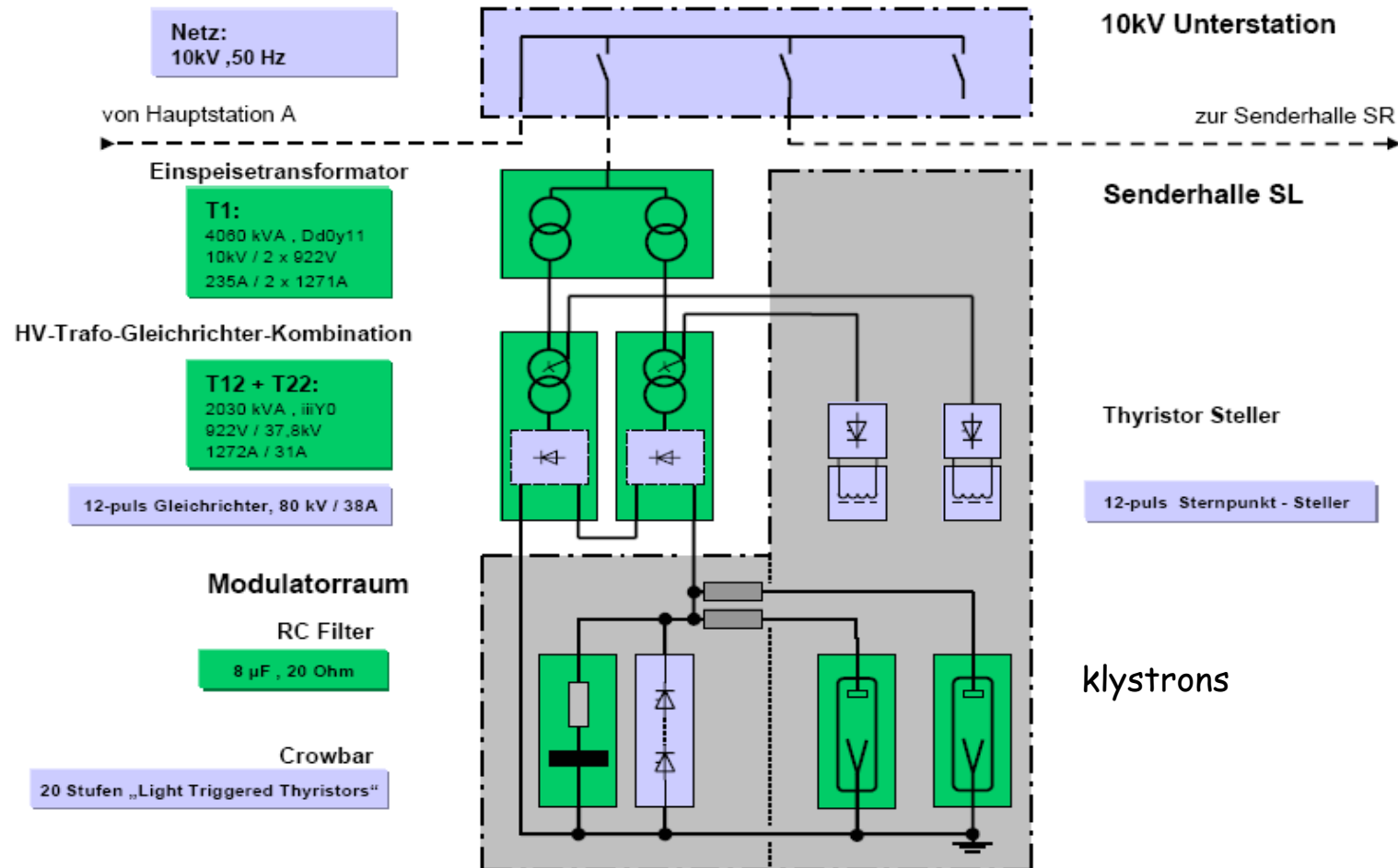
- removal of all 16 cavities and reinstallation of 12 cavities
- assembly of new klystron modulators (HV power supplies instead of tubes)
- removal of all old electronic and cables and replace by new technique (ELWIS)
- reconstruction of the waveguide distribution system
- development, test, assembly and commissioning of new control-, regulation- and diagnostic technique
- new high voltage power supply
- commissioning of both 500 MHz systems

- design and construction of feedback-cavities
- assembly and commissioning of the feedback-system









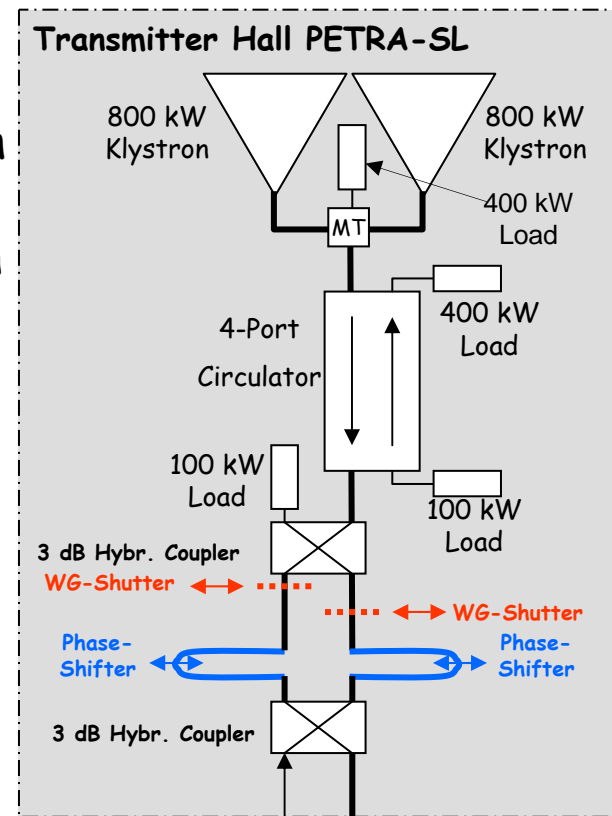
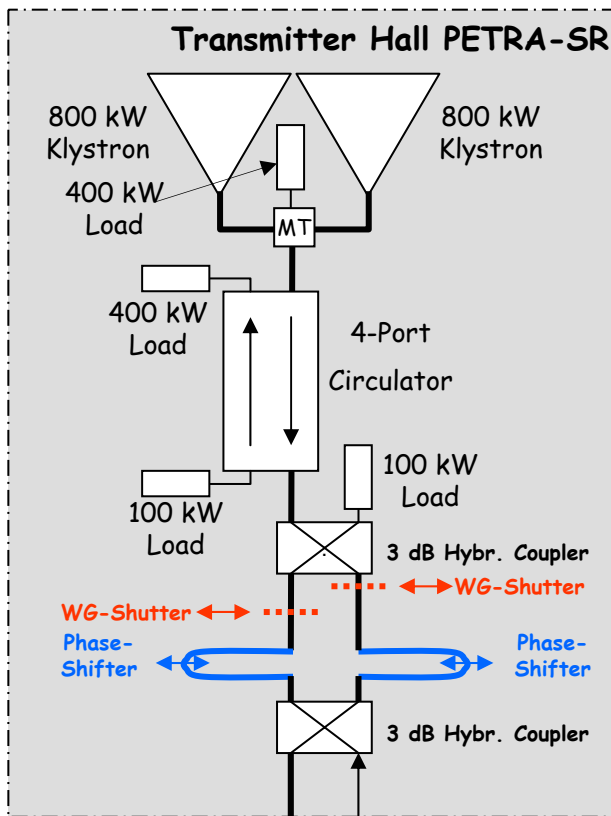


outdoor
equipment
hall SL

- data of 1 system: 80kV / 38A
- work largely done
- system tested as possible yet
- tested with klystrons at 60kV / 20A

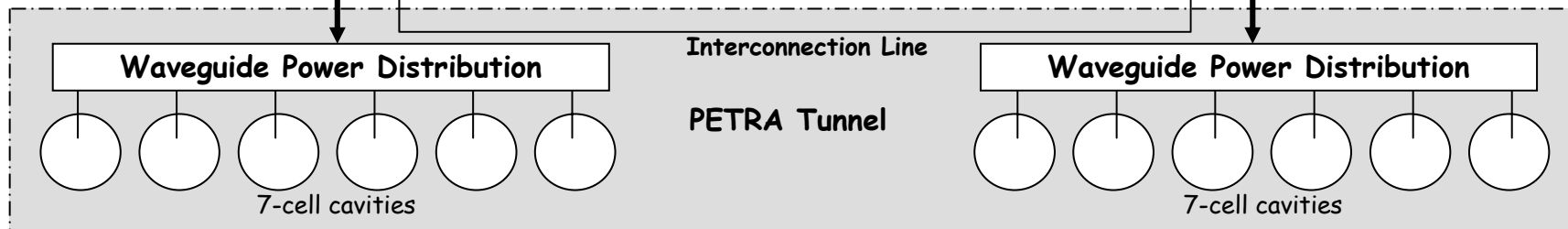


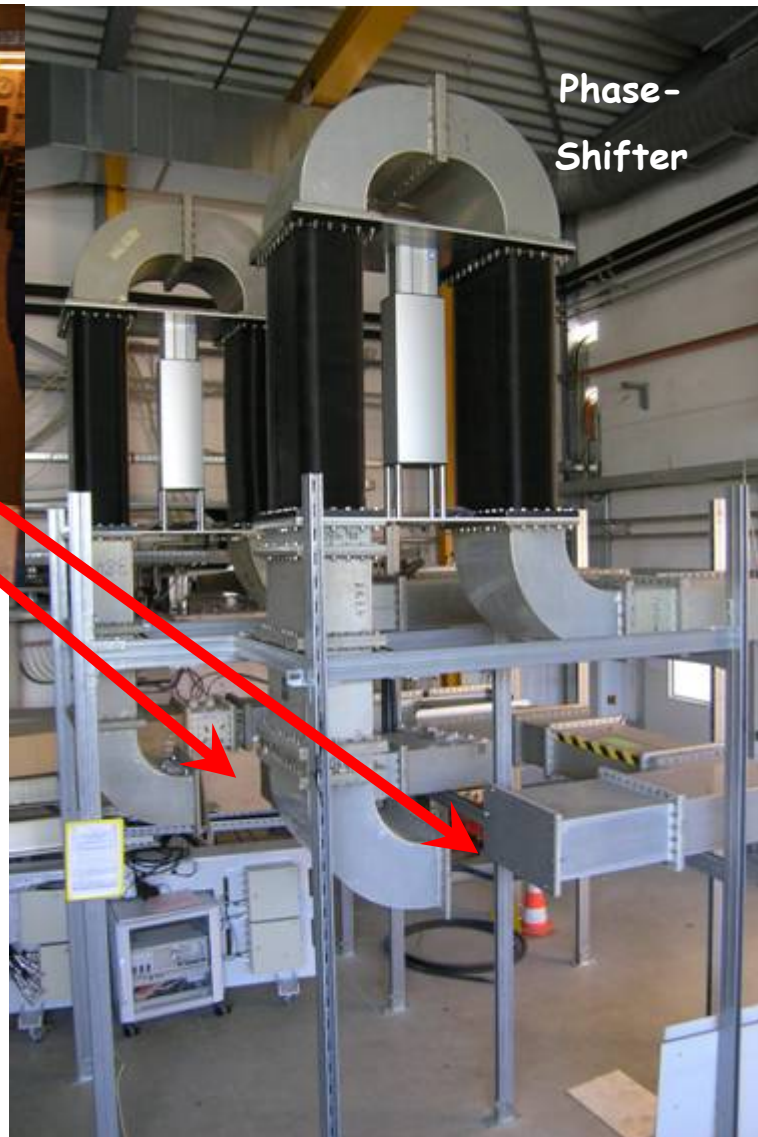
new crowbar



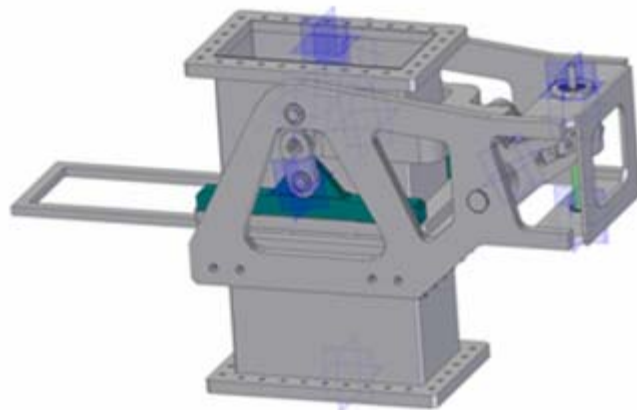
Normally each transmitter drives its own 6 cavities.

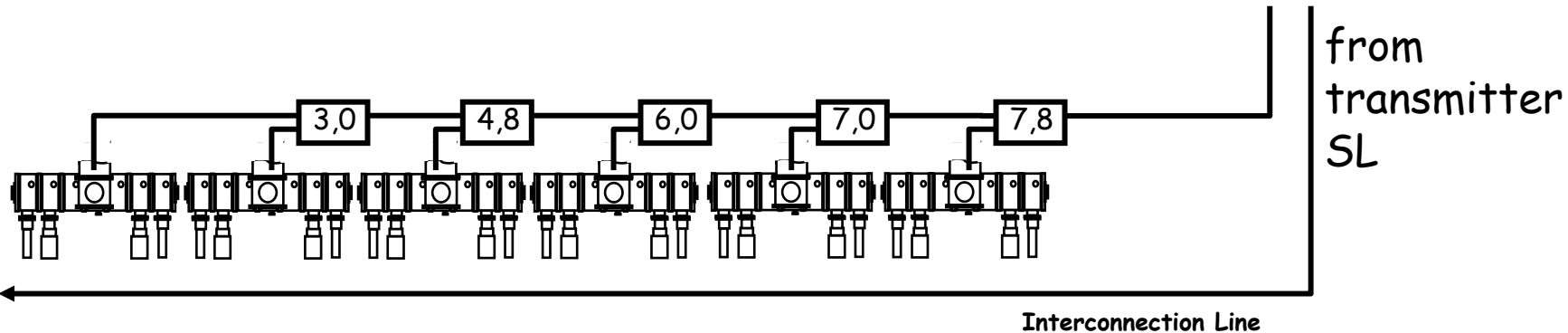
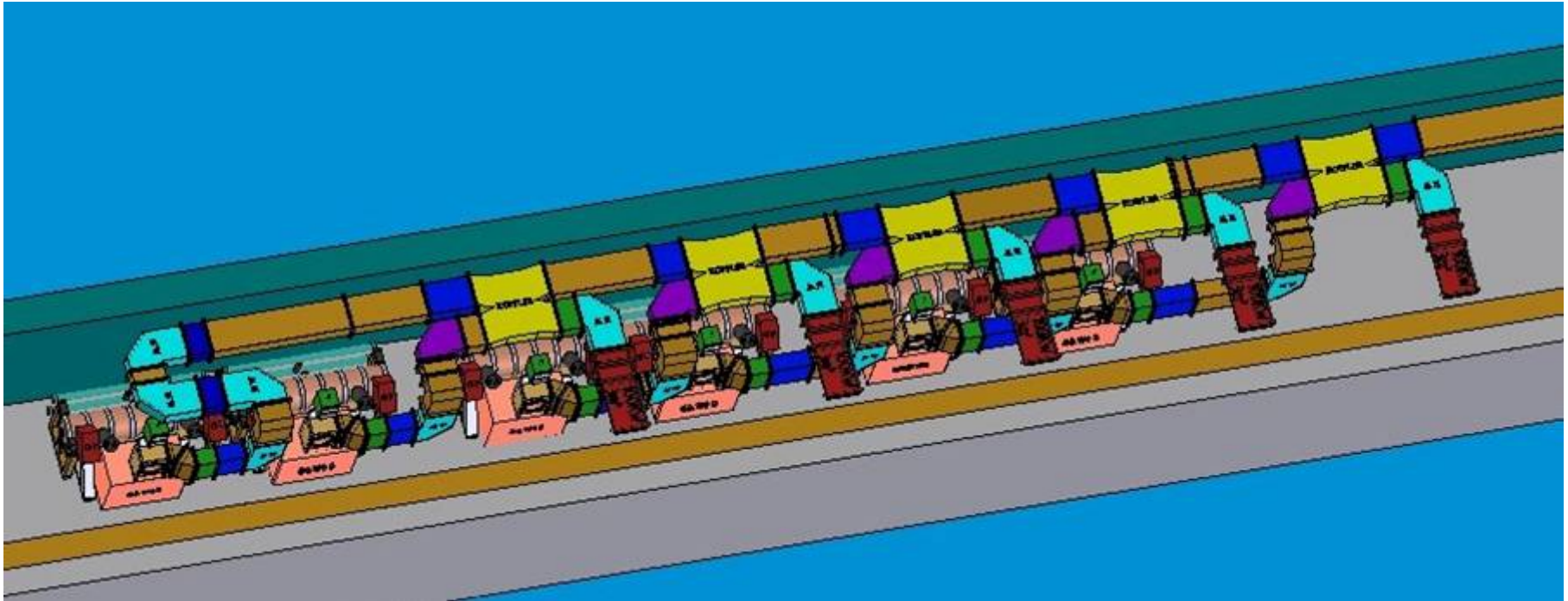
Option to run one transmitter on all 12 cavities.



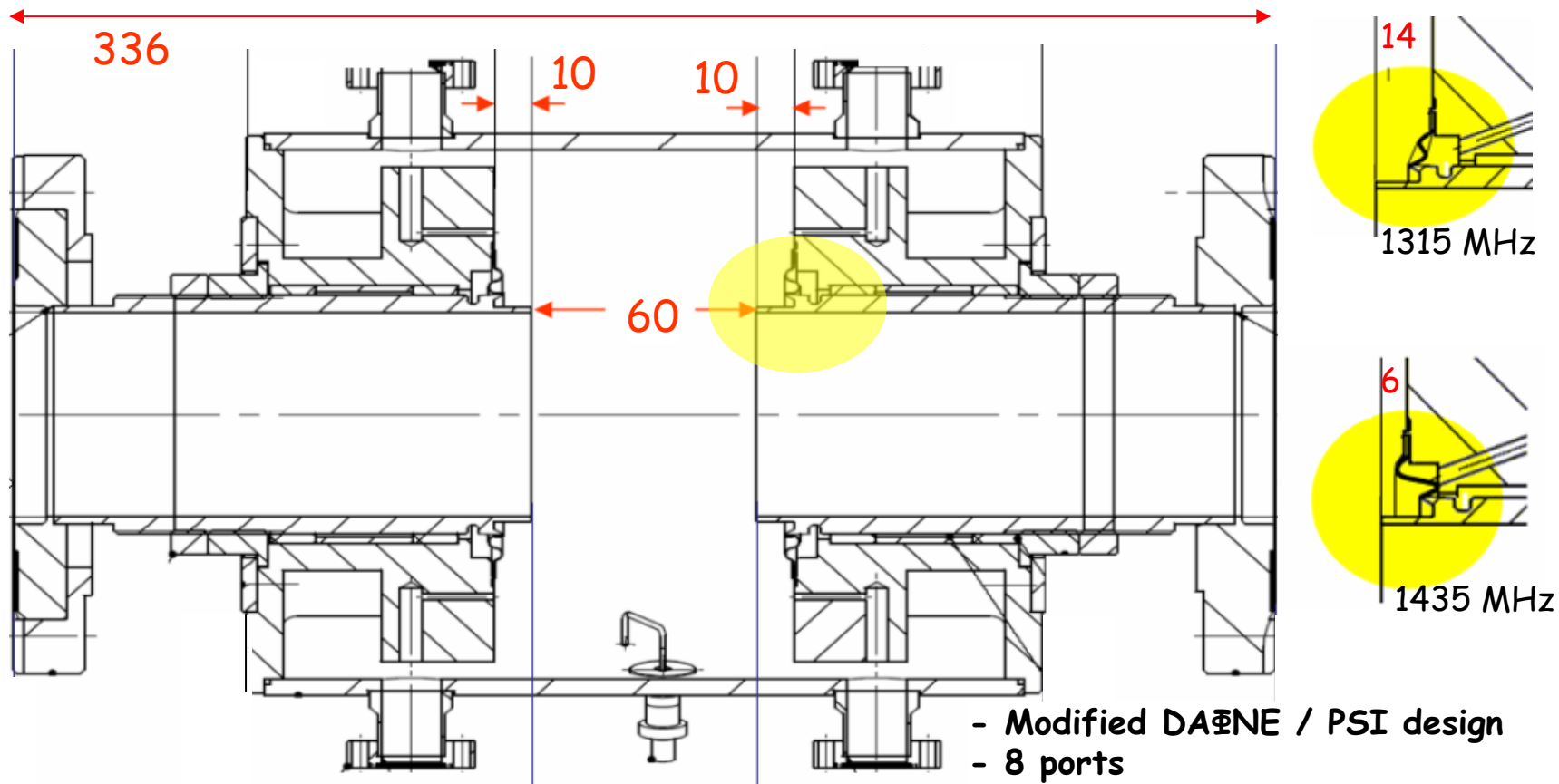


Waveguide-Shutter





Feedback Kicker-Cavity



- Modified DAΦNE / PSI design
- 8 ports
- tuneable: 1315 - 1435 MHz
- bandwidth: 140 MHz
- R/Q: 73 Ω
- quality factor (unloaded): 230
- 8 pieces made at DESY







- tunnel closed: 27st oct. (for magnet power supply tests)
- testing the software system
- commissioning of llrf system
- interlock tests
- conditioning of the cavities
- high power tests
- adjustment of waveguide system at high power
- 2009: feedback adjustment with beam
- beam for users

The MHF-e team



thank you

2007-04-25