Service Test @ DESY

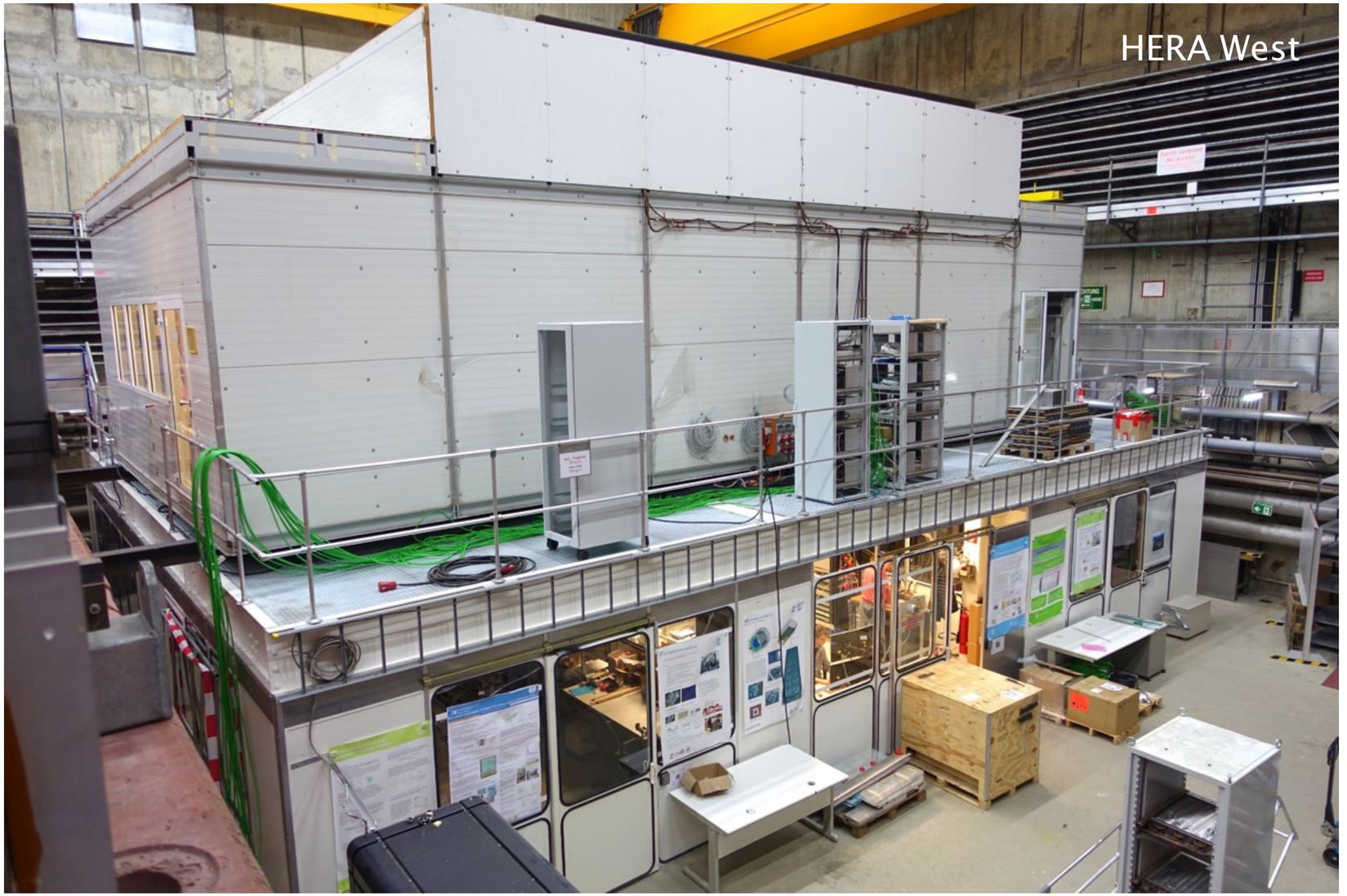
PXD Workshop @ DESY
08–10 October 2018

Service Test at DESY

Systematic test of all final service components for PXD before connecting the final detector

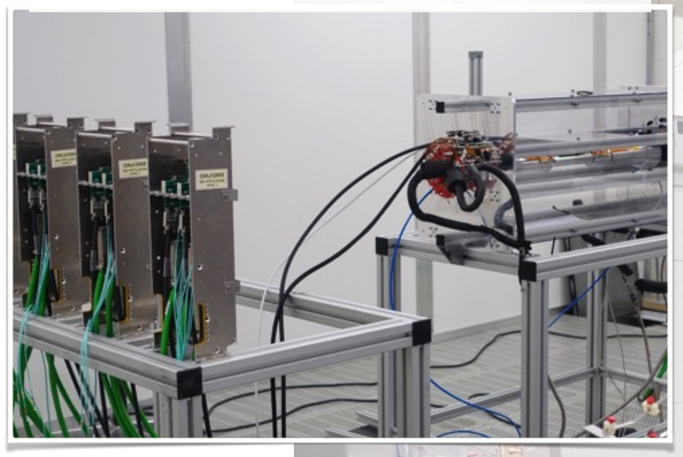
Services which come to DESY are supposed to have passed some basic tests at manufacturer
→ First time operation with modules

Test Setup

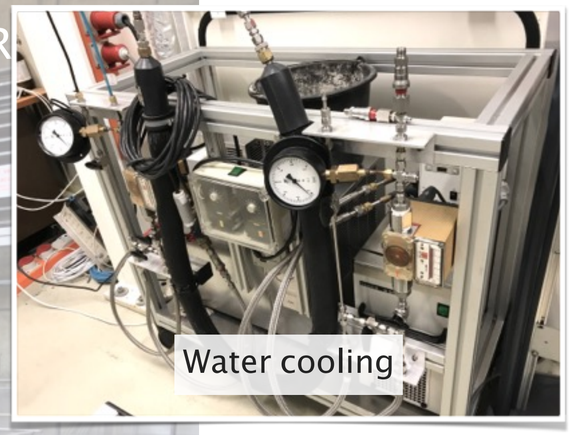


Test Setup

Cleanroom services tested in-situ



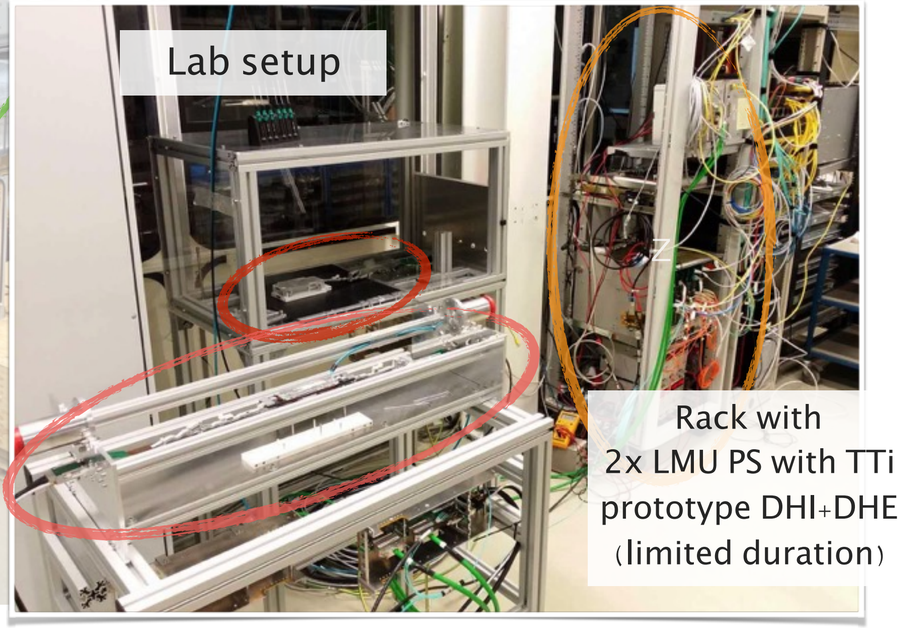
HER



Water cooling

DHH

PS Rack



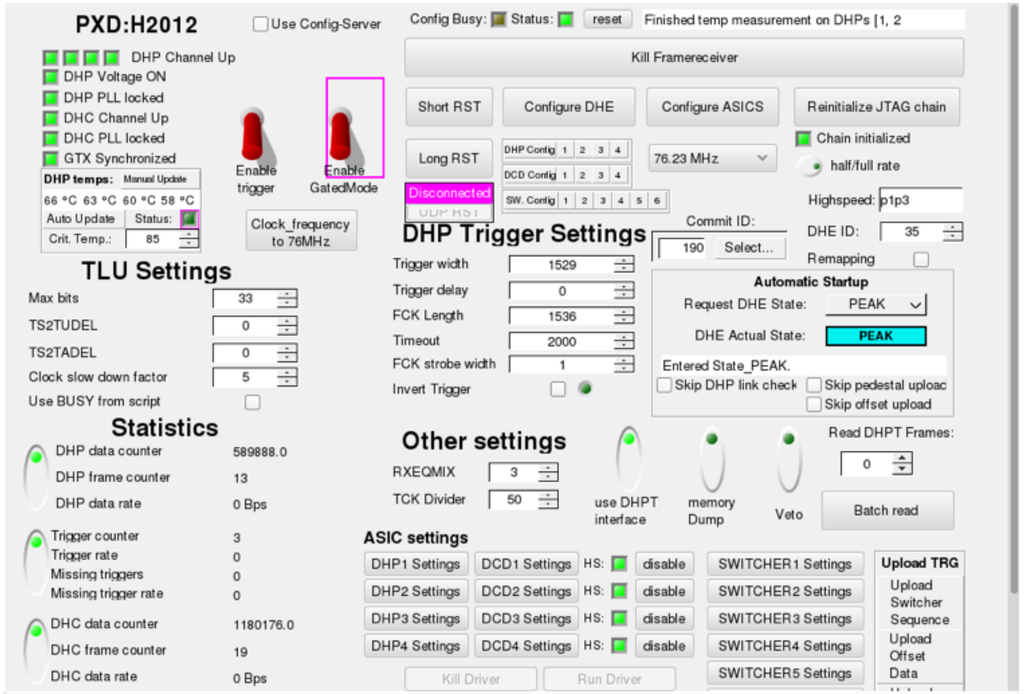
Lab setup

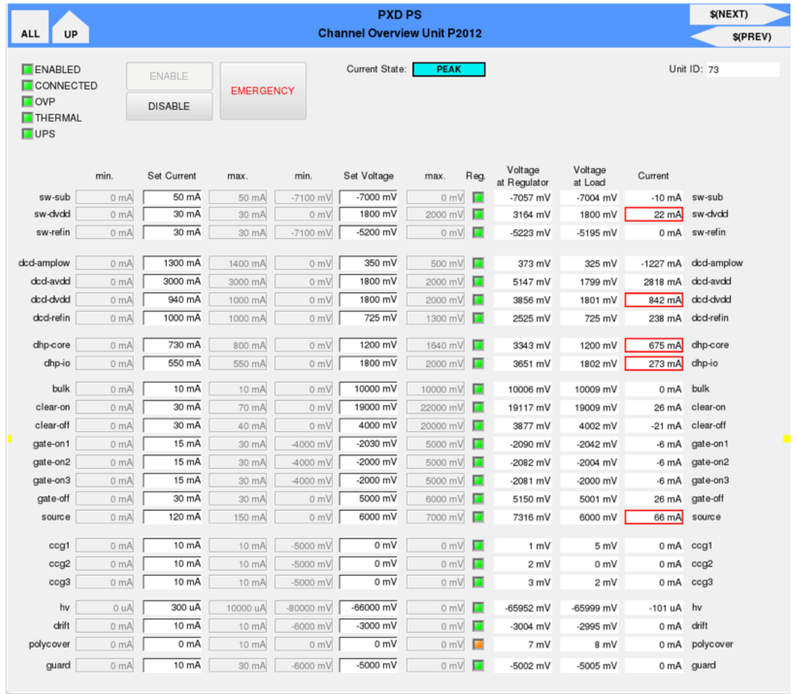
Rack with
2x LMU PS with TTi
prototype DHI+DHE
(limited duration)

Test Sequence

Basic module test to see that a service component functions (based on Mass Testing Handbook)

- Power on DHP's and establish JTAG connections and LINKS
- Power up to STANDBY & PEAK
- Monitor temperature and currents
- Measure Pedestal (not always)





Services from Final Production Tested @ DESY (1st batch)

	total	tested	failed	min. requirement
Patch Panel	11xIF, 13xIB, 6xOF, 7xOB	5xIF, 13xIB, 2xOF, 7xOB	1xOF, 2xOB	pedestal
PCB	35	35	0	pedestal
LMU PS	35	35	0 (but some issues)	PEAK
PS cable	76	76	0	PEAK
Camera Link	58	55 (3 with issues)	0	LINKS
Optical Fibre [*]	16x8-pin, 17x12-pin	~5 x 8-pin ~5 x 12-pin	0	-

[*] not all optical fibres were tested – considered quality trusted and harmless even if they fail

Issues (?) with LMU PS, Dockbox PCB, Camera Links

LMU PS: OVP issue ? (PS #73) – now at KEK

- OVP is triggered when powered
  (lab setup with TTi, firmware as of April, other PS were fine)
- Taken to LMU but issue not confirmed, and returned as is
- Worked fine with TDK Lambda primary PS (+ updated firmware)

LMU PS: HV issue ? (PS #64) – now used at DESY

- HV showed high voltage & current at STANDBY
- Not reproducible, happened ~3 times out of many tries
- Similar behaviour observed once (?) with another PS
  → resolved by restarting power up sequence IOC

Dockbox PCB: floating voltages observed at KEK (2x PCB's, but not sure which ones)

- Worked fine with modules at DESY
- Similar voltage test was __not__ carried out at DESY
- Is this a real issue? Should it be always checked?
- NEW INFO: one PCB was actually fine

Camera Link cables with "physical" issues

- One bent screw on the connector
- 2 cables with inconsistent labels on cable and connectors which side should be "Camera" and "Frame Grabber"
- No repair / further investigation as we had enough cables

Issues with Patch Panels

Problematic (?) patch panels & broken (?) modules (L2-FWD-12, L2-BWD-05, L2-BWD-08)

- Test modules (L2 ladder) showed abnormal behaviour when connected with these PP's
- Similar thing observed with two L2-BWD PP's and also with one L2-FWD PP → stopped testing with this ladder (more next slide)
- Three PP's sent to MPP (08.10), L2-FWD-12 now at KEK (09.05)
- Issues not fully understood
- NEW INFO: the L2 ladder was known to be faulty, probably no problem with PP's

Lost JTAG connection (L1-FWD-10)

- Passed service test (May), used with 1st half-shell (June), but no JTAG at first attempt with 2nd half-shell (July)
- After swapping to another PP everything worked fine
- No further investigation done at DESY, and PP was returned to MPP (07.24)
  - apparently this was known with an earlier test but was not detected with later tests
- Now at KEK since Oct 2nd

Test Modules

L1_014 (W01_IB, W45_IF): March – June 2018 @DESY, now part of HS1p3

- First one to be used for service test, used to test cleanroom setup

L2_024 (W44_OB1, W12_OF1): April – Aug 2018 @DESY, now at MPP, status unknown

- Last operation of OF in 29 March 2018 after ladder etching, OB in 12 March 2018 before ladder assembly
- OB showed abnormal behaviour (sw_sub, sw_refin, clear_off) and OVP triggered while testing new Patch Panels, OF similar
- Sent to MPP, OB used for patch panel testing
- NEW INFO: both modules were known to be faulty, observation at DESY was nothing new

W05_OB1: June – currently @DESY, going to Bonn for irradiation study

- Used frequently for service test & study of GM operation

W43_IF: June (?) – currently @DESY, not operational

- Last confirmed working in May 2018 after a repair (see e-log & talk from Christian Koffmane)
- Problem from the first power-up @DESY: losing links and JTAG connection, often before reaching STANDBY
- After few tries, higher temperature observed (~60 C with DHP's on, ~85 C before losing JTAG towards STANDBY)
- Still at DESY, consult with Christian Koffmane today/tomorrow

Summary

A large fraction of services from final production tested at DESY

Few issues encountered – some of them are still not understood

Improvement for the future?

Next batch is partially here

- PS cables (80)
- Camera links (30 ? tbc)
- PCBs (7) for DAQ test setup