



DESY Status

Matthias Clausen

DESY



Overview

DESY today

- Location
- Machines
- EPICS Applications

DESY Tomorrow

- Machines
- EPICS Applications
- Plans

DESY Today



- High Energy Physics Laboratory
- Main Machine: HERA

- Synchrotron Radiation Laboratory (HASYLAB)
- DORIS
- New Machines: TTF2 / VUVFEL

DESY

View towards the Harbor



DESY

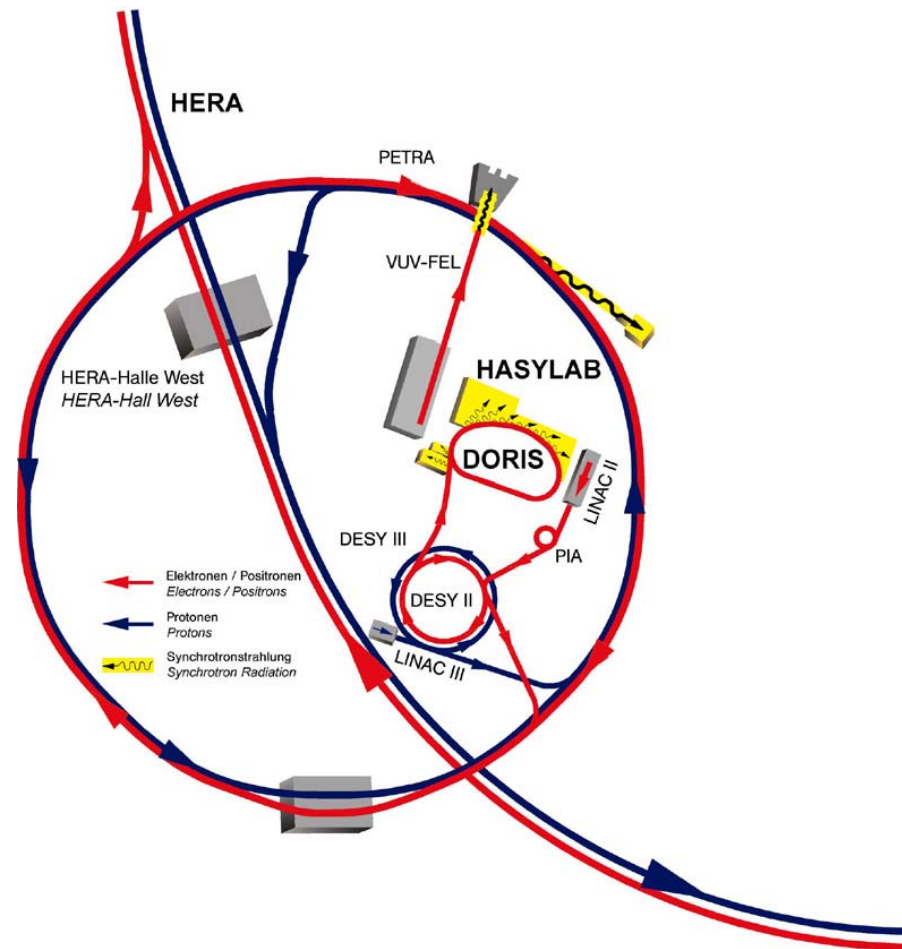


View towards the Airport



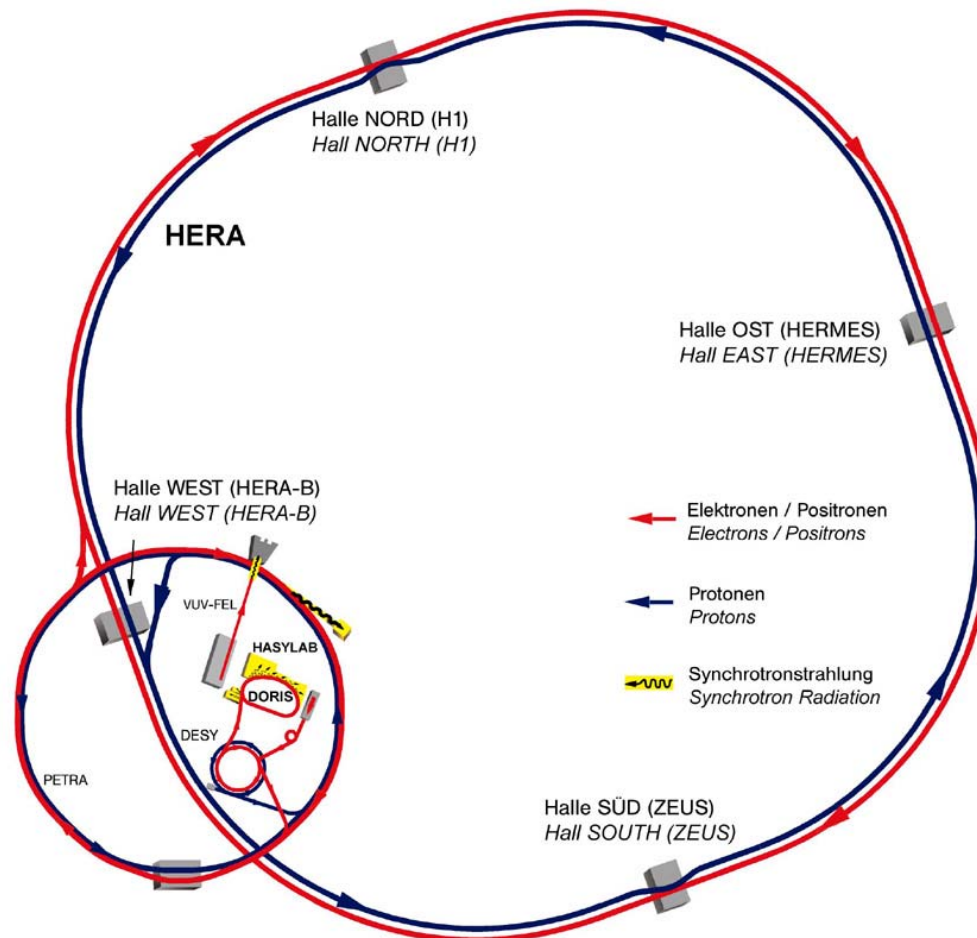
DESY

DESY/ DORIS/ PETRA/ (HERA)

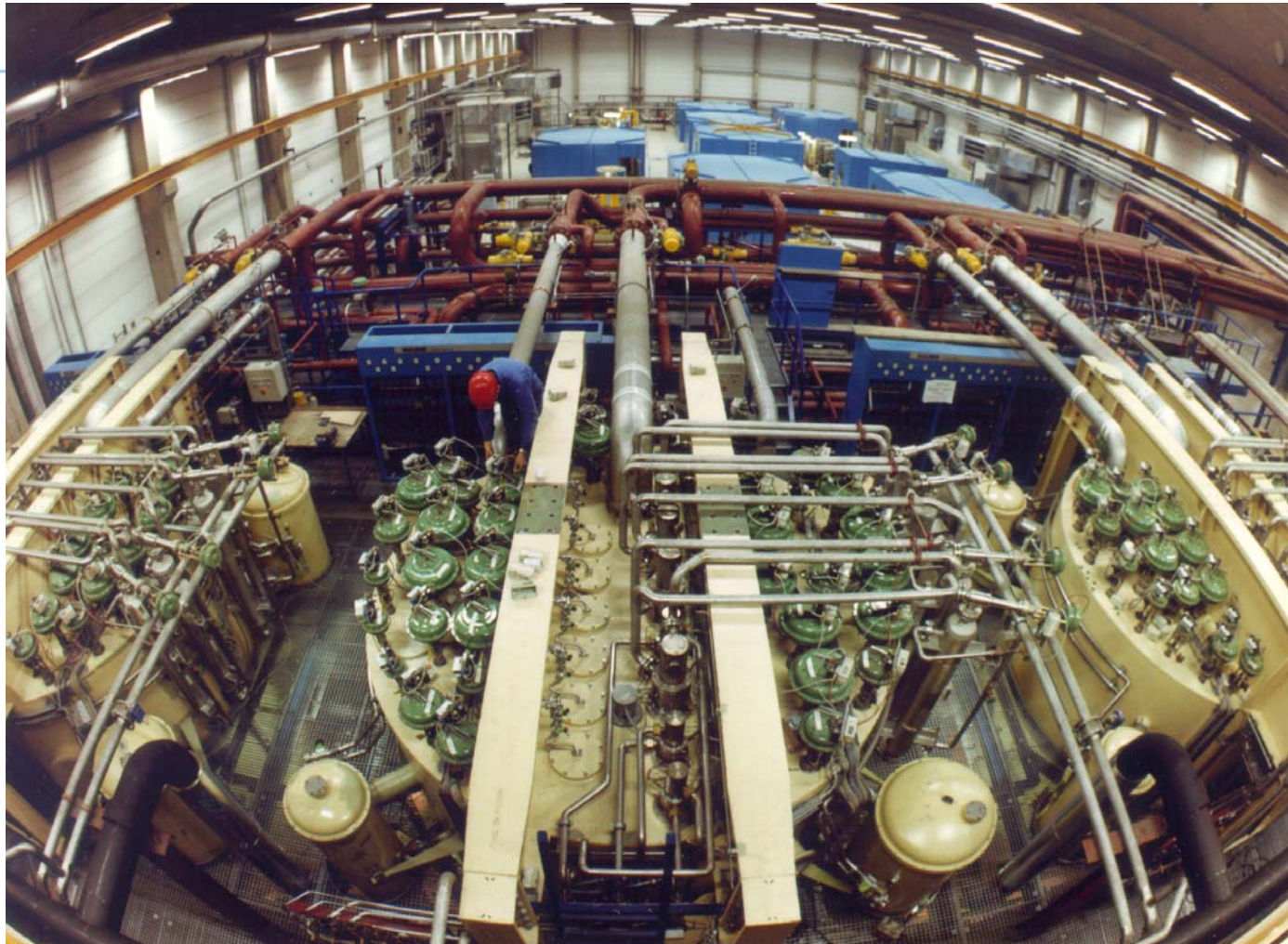


DESY

HERA



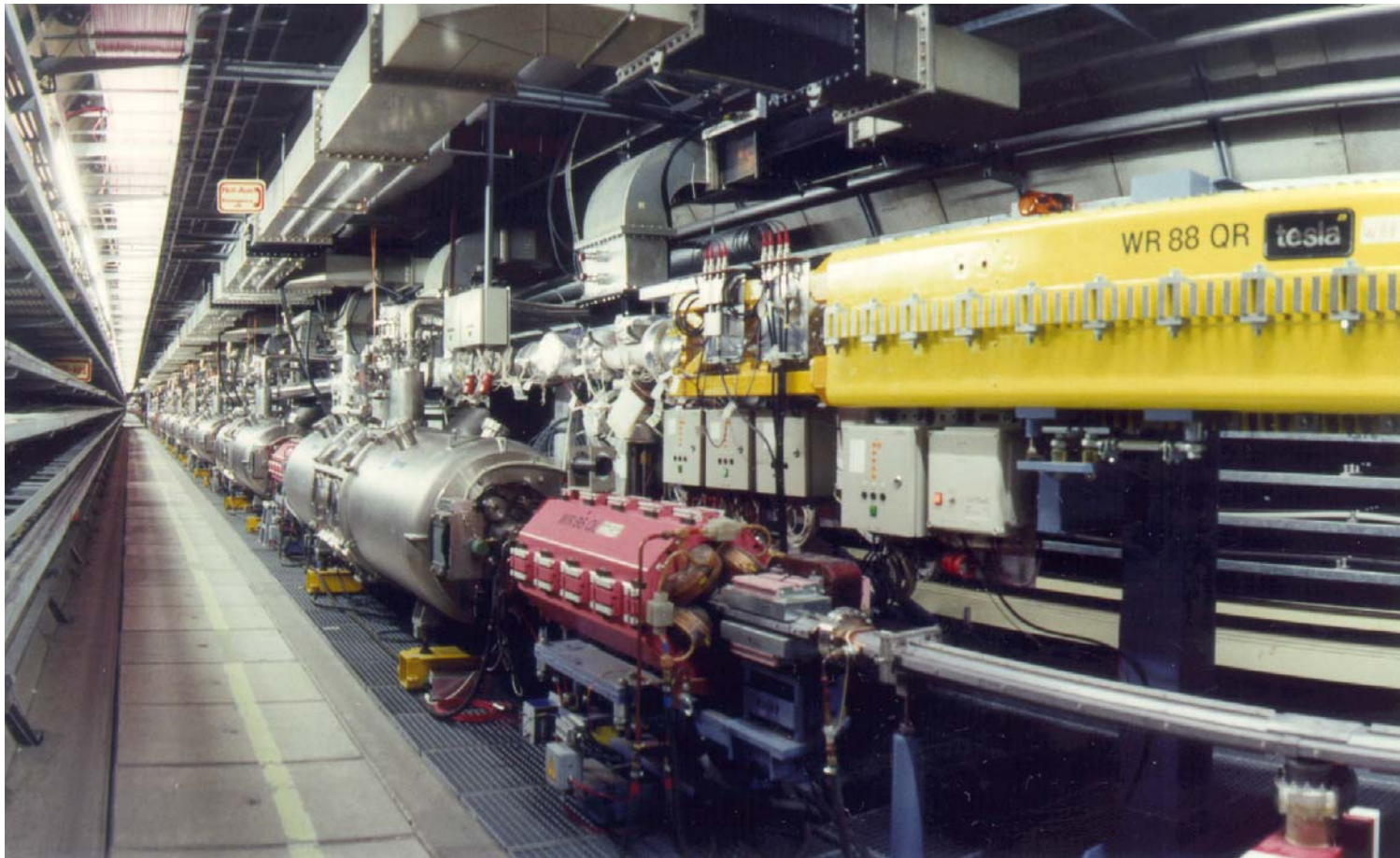
HERA Cryogenic Plant

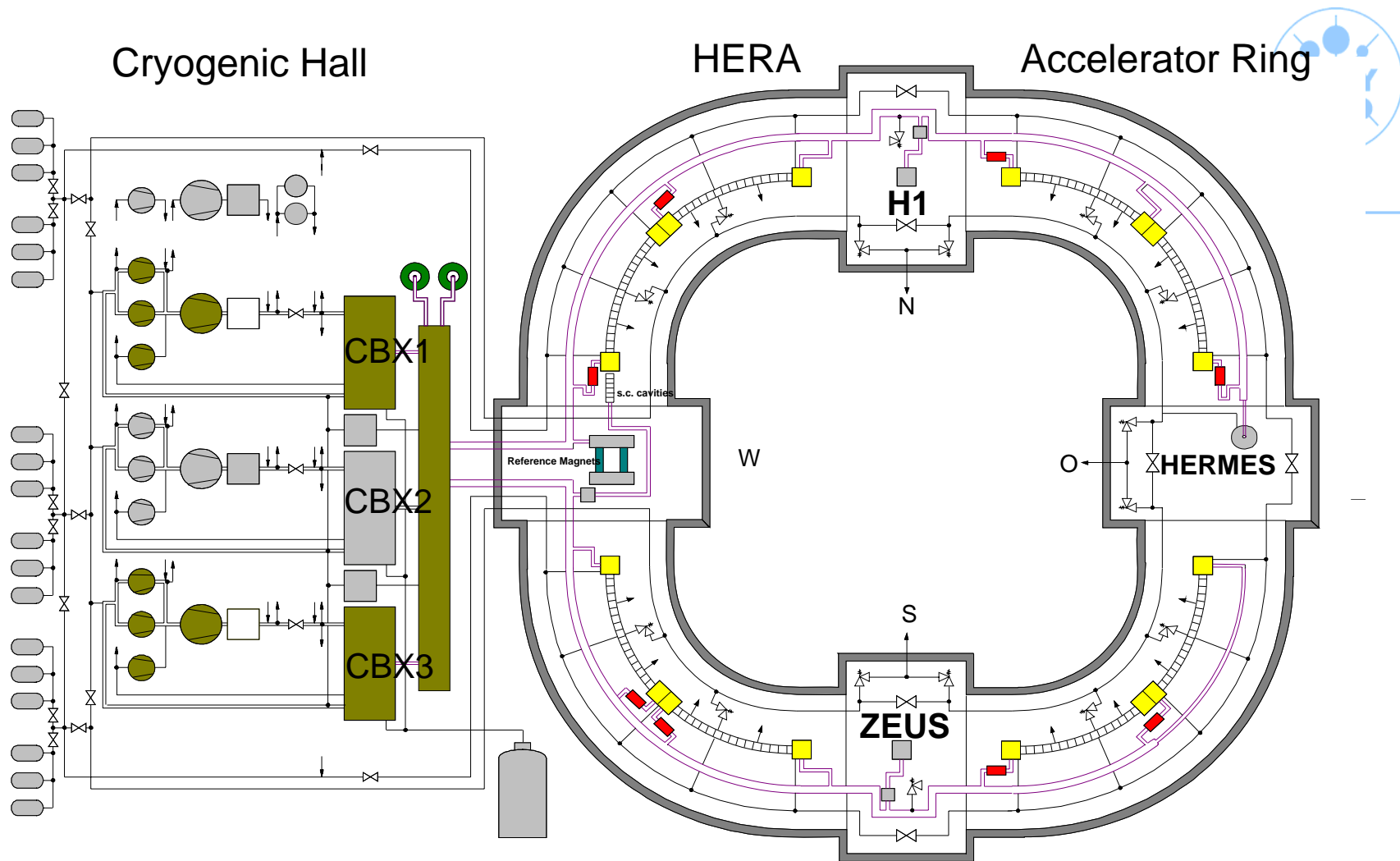


HERA Magnets



Super conducting Cavities for the Electron Ring



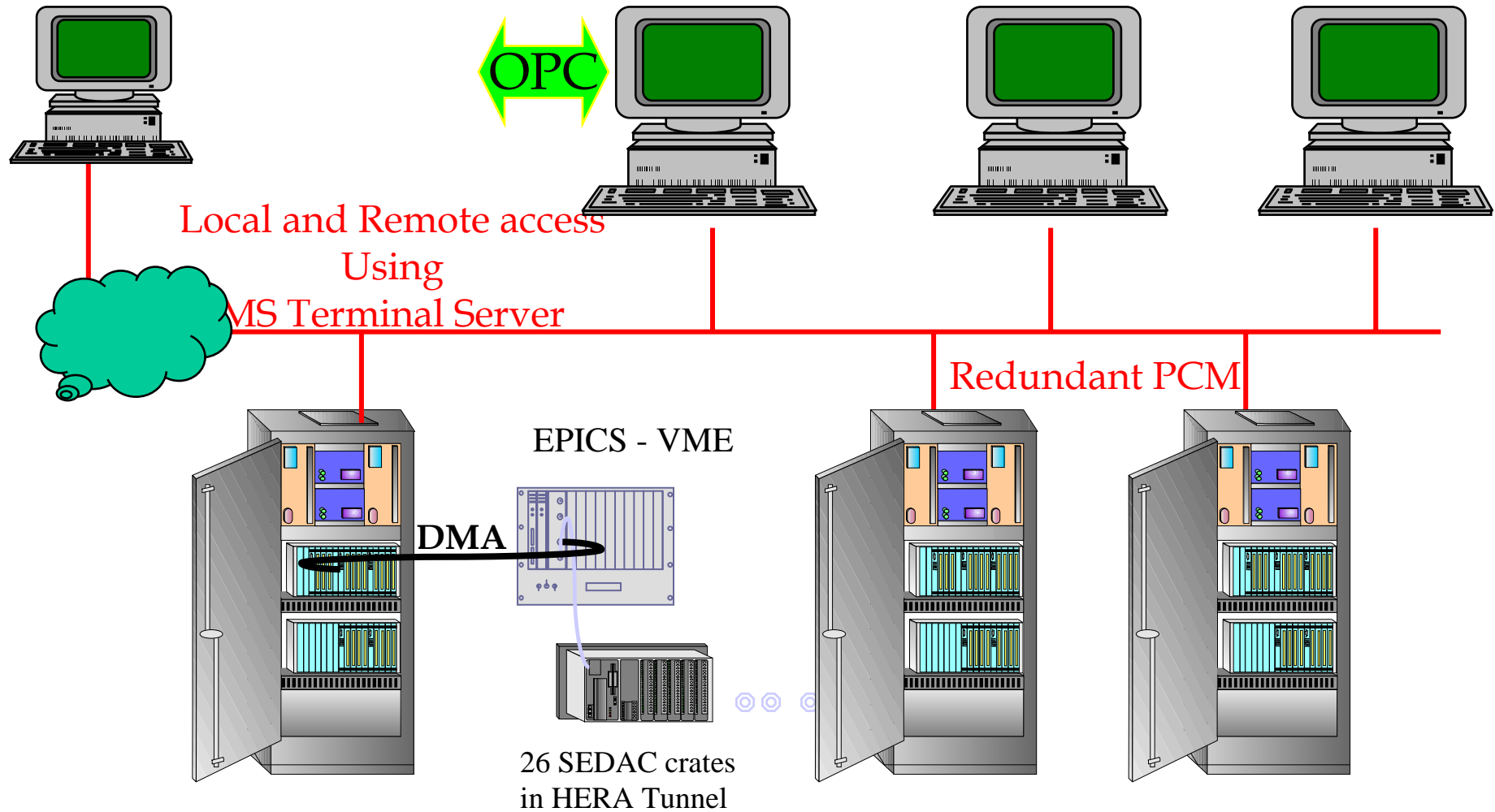


Parameters of each of the three cold boxes:

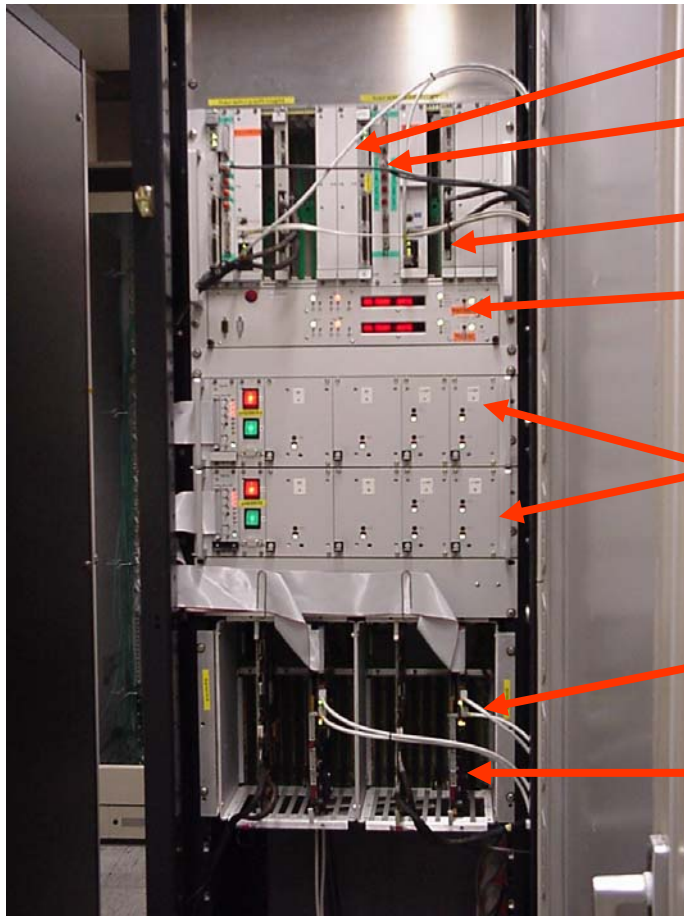
Refrigeration at 4.3 K	6.775 W	Total helium massflow rate	871 g/s
Refrigeration at 40 / 80 K	20.000 W	Max. energy consumption	2.845 kW
Current leads cooling (Liquifaction)	20.5 g/s	Spec. energy consumption	281 W (300K) / W (4K)

HERA Cryogenics

The Commercial Part



D/3 <- DMA -> EPICS <-> SEDAC



MVME 162 running EPICS on VxWorks

SEDAC connection

Multibus <-> VME DMA connection

Split Crate VME
with EPICS CPU and Control Unit

Redundant Power Supply

Redundant Ethernet for D/3 System

D/3 Processor
- Intel 80486/ Multibus

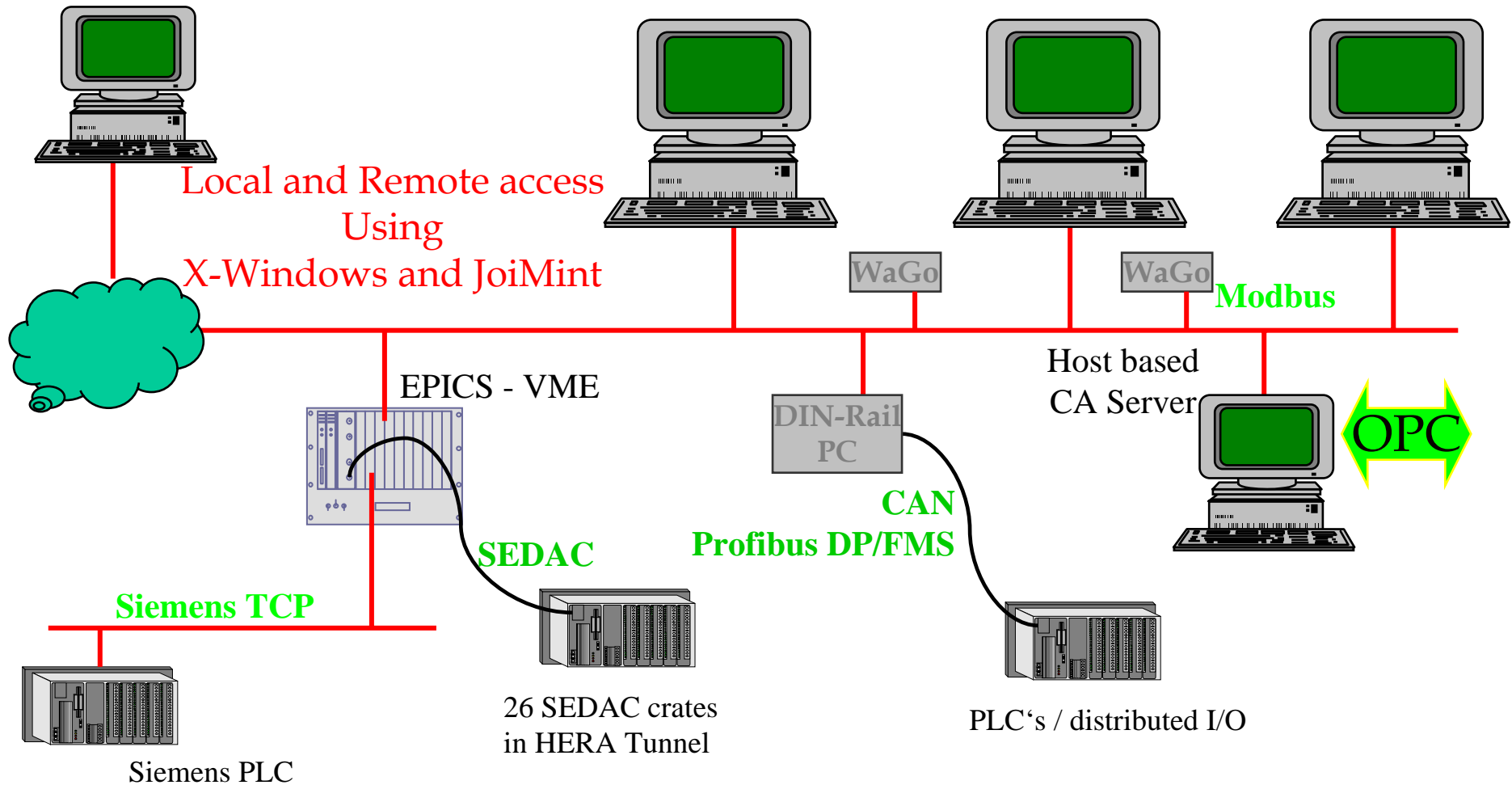
HERA SEDAC Crates



HERA Cryogenic Control Room



Cryogenic and Utility Controlled/ Supervised by EPICS

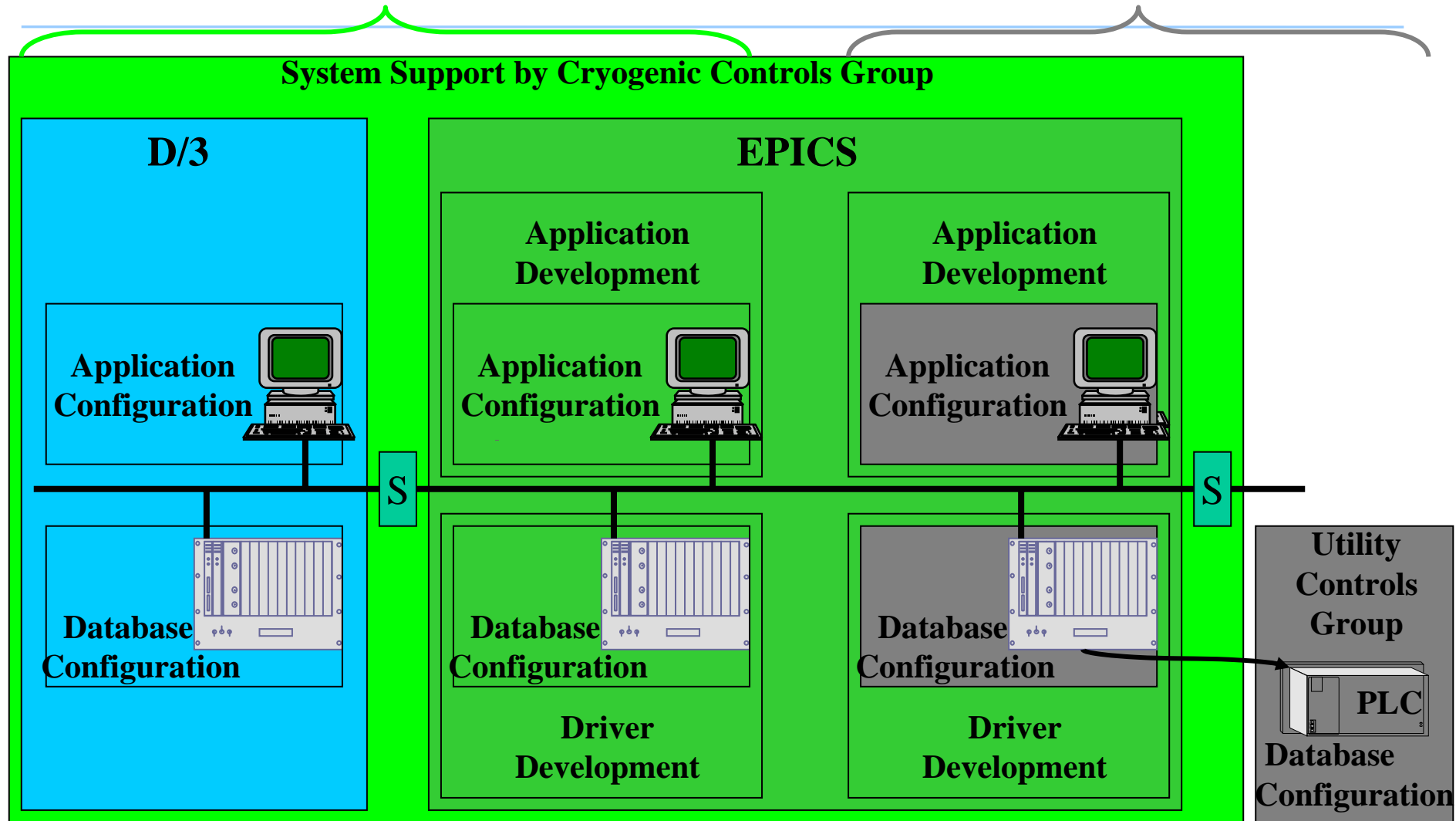


Cryogenic and Utility Controls



Cryogenic

Utility



IOC ,Head Count‘

as of 2004 (add10%/ year)

VME/ IP Hardware:

- Fast ADC/ DAC
- Digital I/O
- Scaler

Field buses:

- SEDAC (DESY inhouse)
- CAN
- Profibus (FMS, DP)

Ethernet Protocols (for PLC’s):

- Siemens
- Modbus

Ethernet to other contr. Systems:

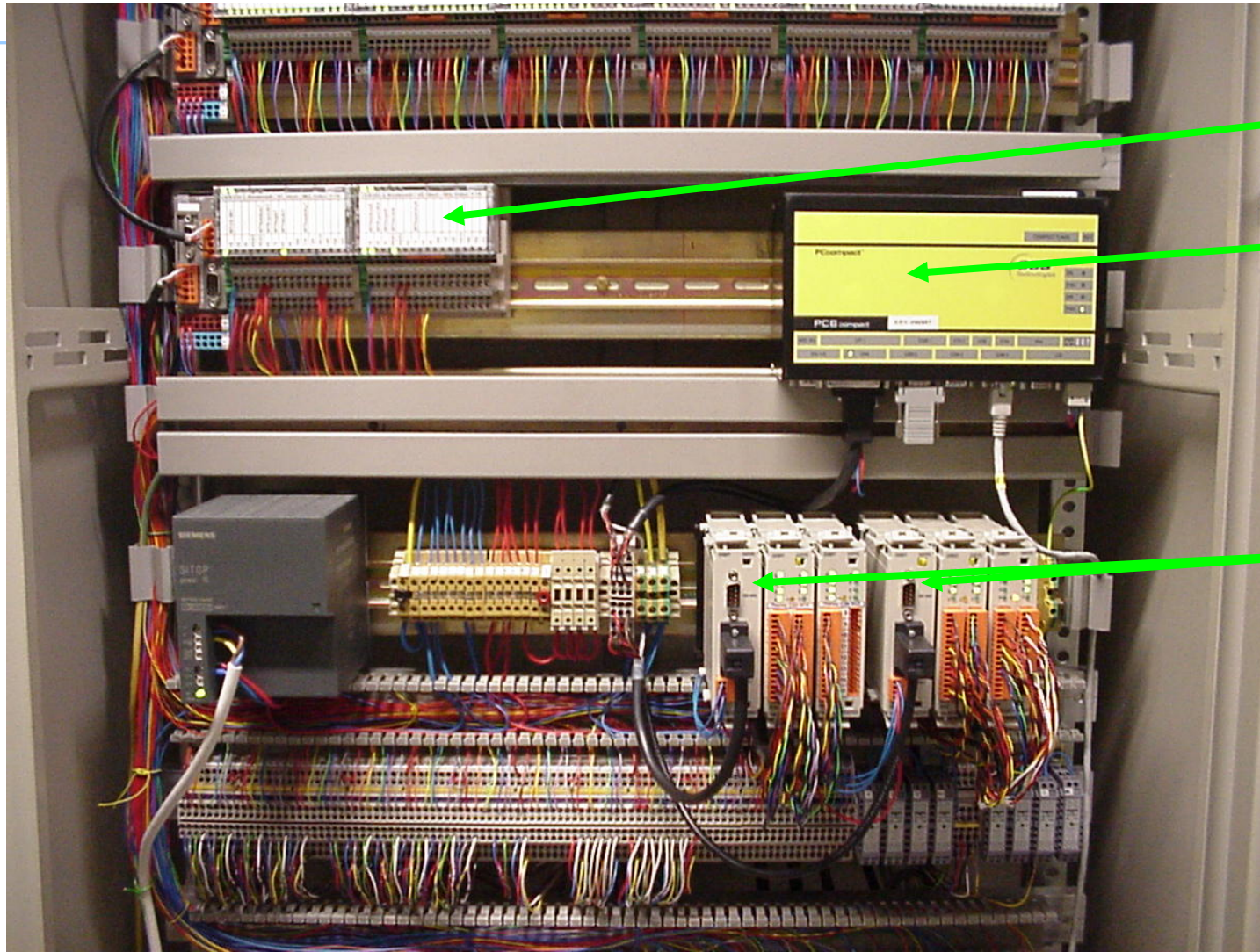
- TINE (DESY)
- DOOCS (DESY)

I/O	Anzahl	Anwendung	Records
FEE-IP	15	Datalogger Senderstrom	3716
CAN	1	CTA	904
CAN	1	LumiTest	154
CAN	1	HERA FEL-Box	169
CAN	1	MagnetTestStand	64
CAN	1	TTF FEL-Box	391
CAN	1	HERA KoMag	154
Profi	3	MKK Klima	2400
H1	4	MKK Systems	6262
IPPIO	1	D/3 Connect	52
ICV914	1	Stepper Motor	4
Sedac	2	HERA Kryo	7172
Sedac	1	Cavities	1012
Sedac	1	Referent Magnets	387
Sedac	1	TTF Kryo	792
STR7201	2	Radiation Measurement	274
TCP/IP (S7)	2	TTF Compressor	350
TCP/IP (S7)	2	Vacuum Compressor	173
TCP/IP (S7)	2	MKK-SPS	300
soft	1	Utility	150
-	1	Timing Master	20
TINE	1	TINE client	120
CAN	3	Cryogenic Control	460
Sedac	6	10KV Anlagen	1192
CAN	1	Test	50
	1	Gasanalyze	78
128D+128A	1	SL Cavities	634
	3	Vibration measurement	792
	3	Power Station	682
Comet	1	Fast Transients	93
	1	TTF	463
	66		29464

2005: 72



Installation at DESY with DIN-Rail PC



CAN I/O

DIN-Rail PC
running
EPICS
(VxWorks)

High prec.
Temperature
Measurement

DESY Tomorrow



-
- High Energy Physics Laboratory
 - HERA -> Shutdown in 2007

 - Synchrotron Radiation Laboratory (HASYLAB)
 - DORIS <? 2010
 - Actual Machines: VUVFEL
 - Upgraded Machine: PETRA III
 - New Machine: XFEL



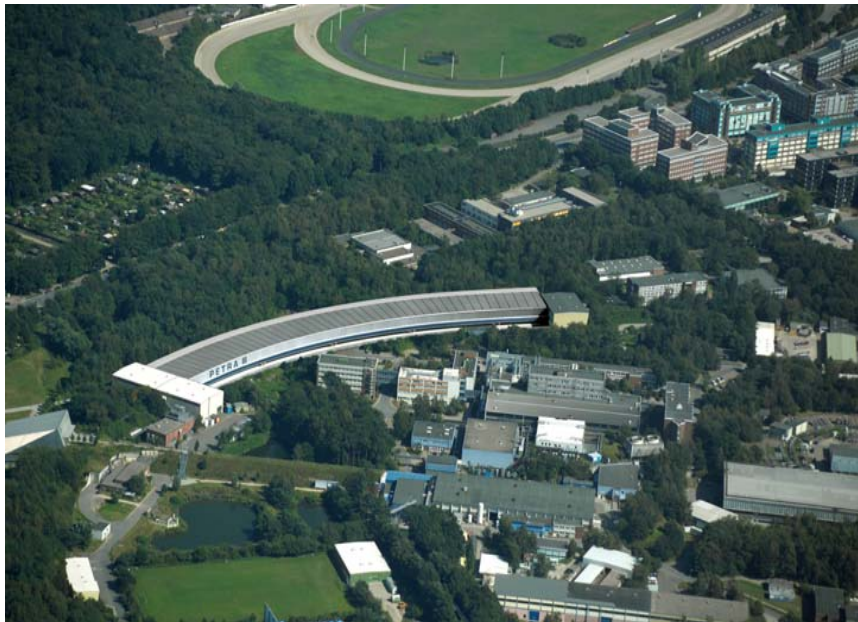
New Projects

- **PETRA-III**
 - Complete change of the previous PETRA-II injector for HERA into a Synchrotron Light Source
- **XFEL**
 - Free-electron laser that operates according to the SASE principle (self-amplified spontaneous emission)

PETRA III



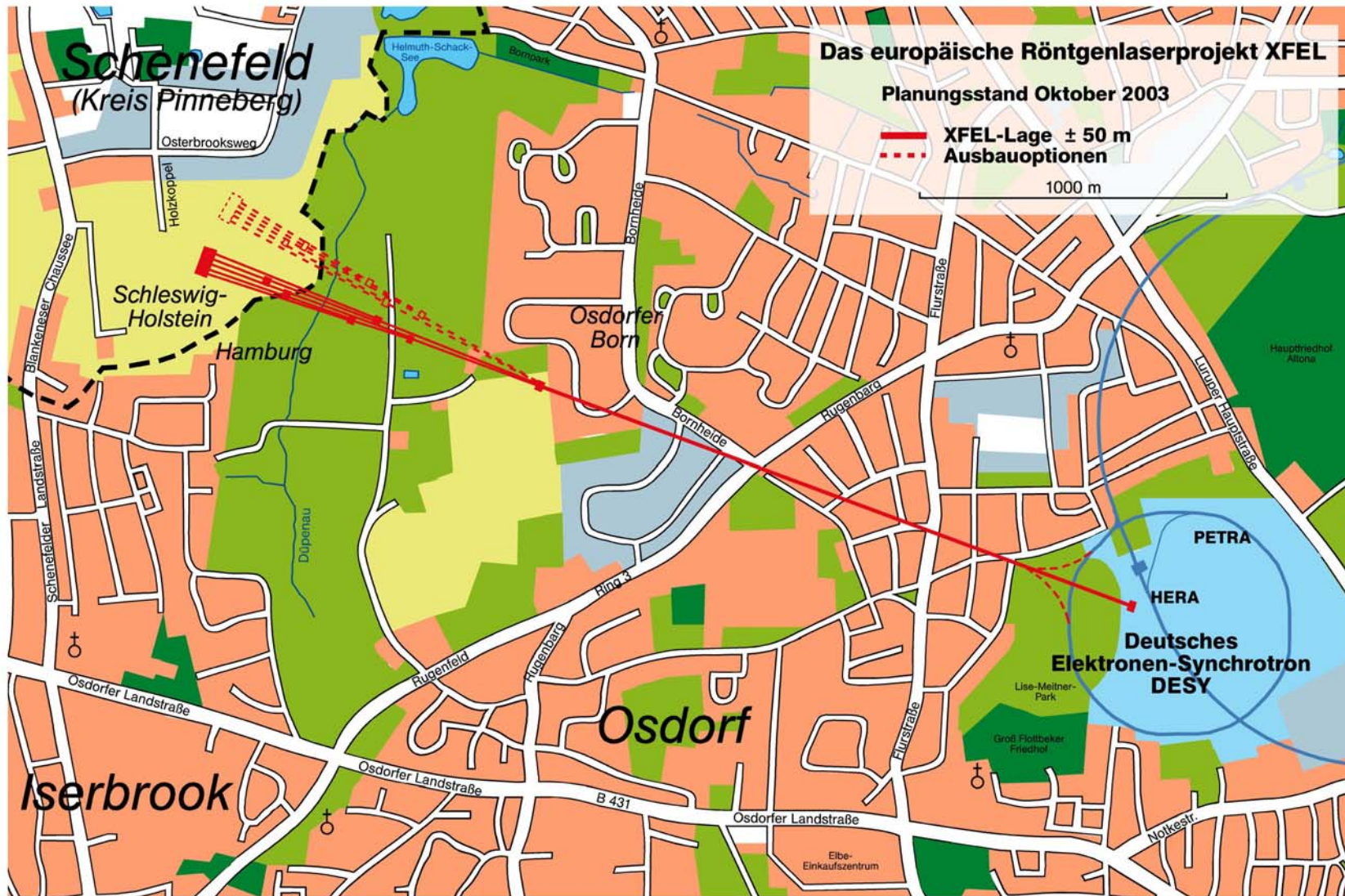
Science with Photonen/Synchrotronradiation

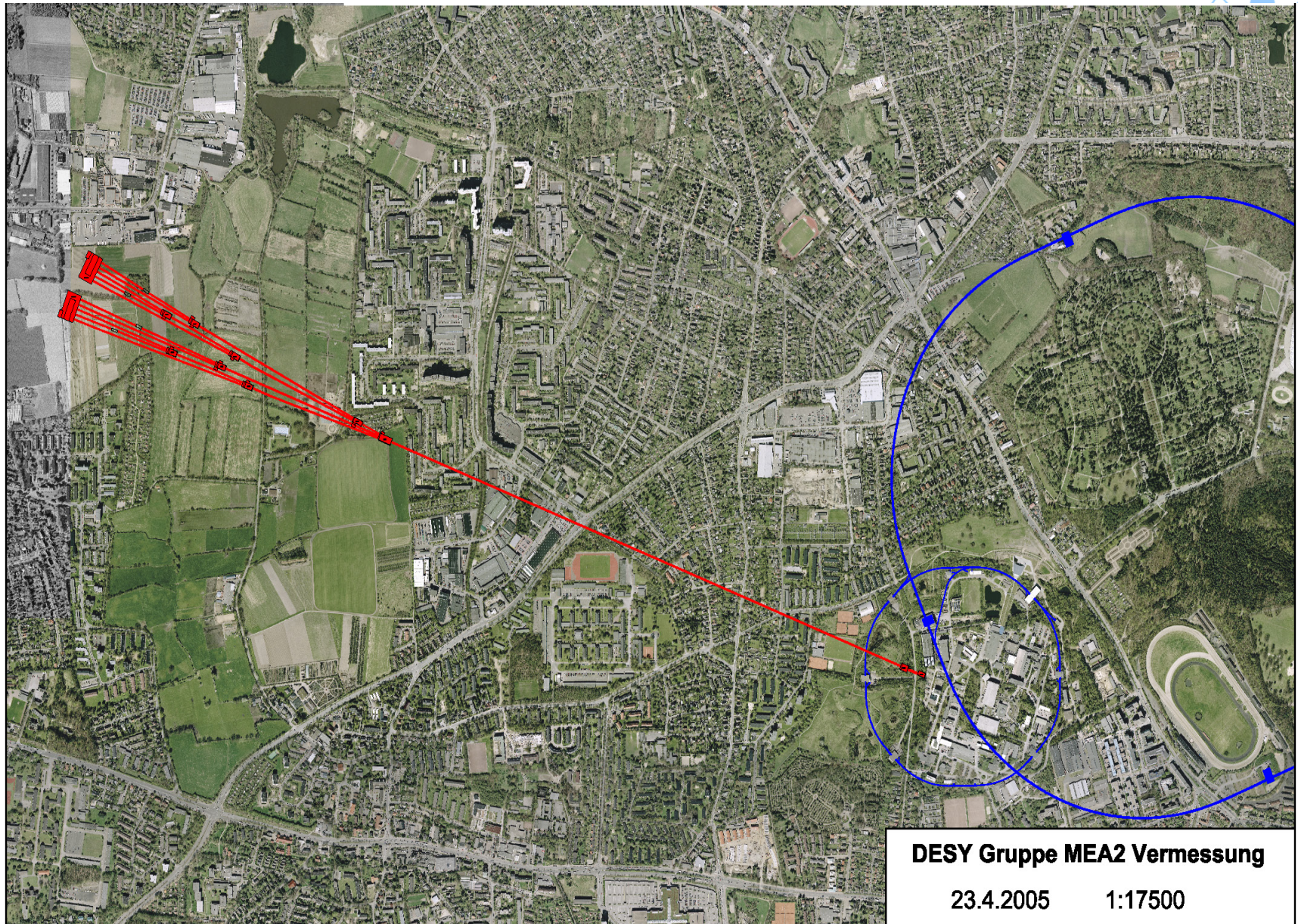


The PETRA III-Project

- Start: 2009
 - 225 Mio. €
(90 % Bund, 10 % HH)
 - Replacement of previous HERA Injektors from Juli 2007
-
- Strongest Synchrotron Source based on a Storage Ring

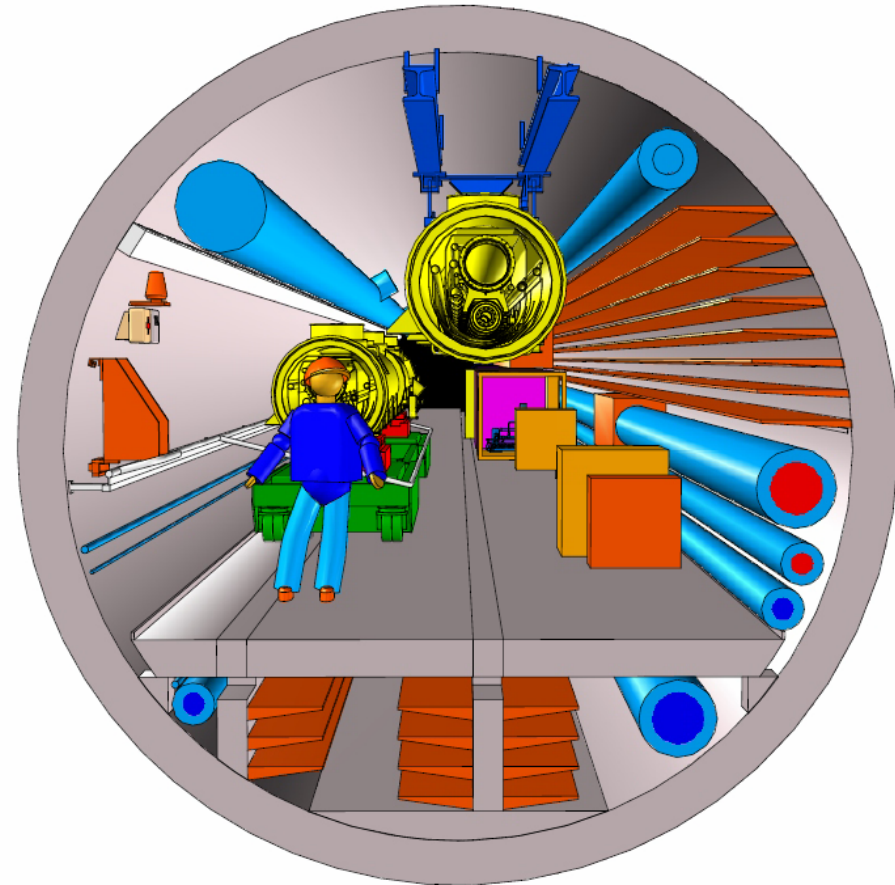
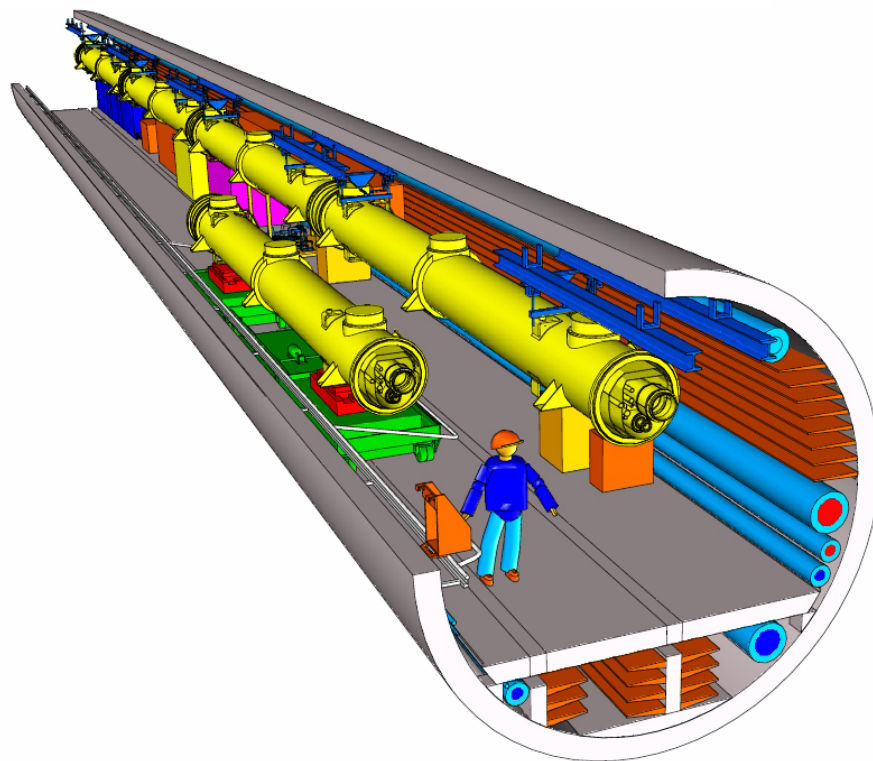
XFEL - Location





Beschleunigertunnel

Innendurchmesser ca. 5,20 m

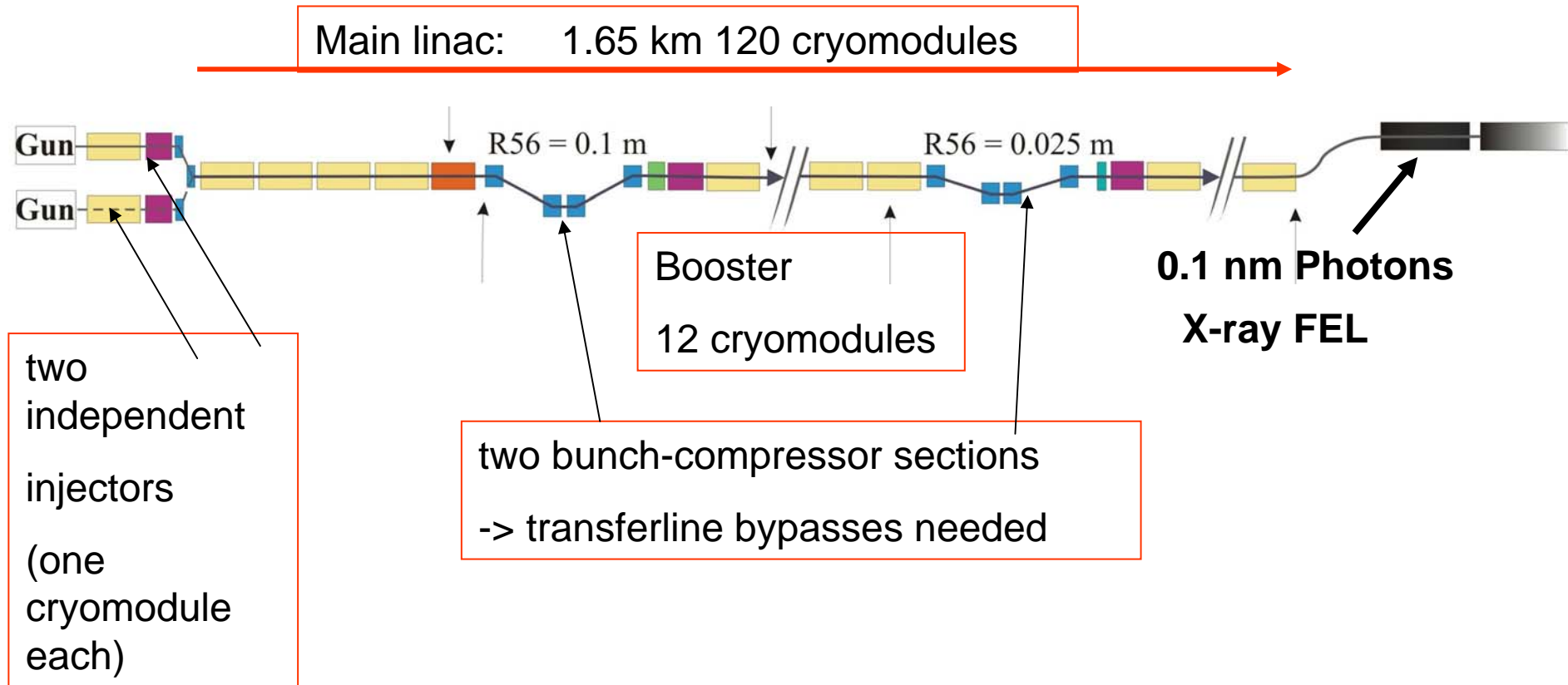




XFEL Principal Layout (cryogenic view)

Accelerator requirements: 20 GeV electron beam energy

About 1000 superconducting RF cavities at 23 MV/m -> TESLA -technology

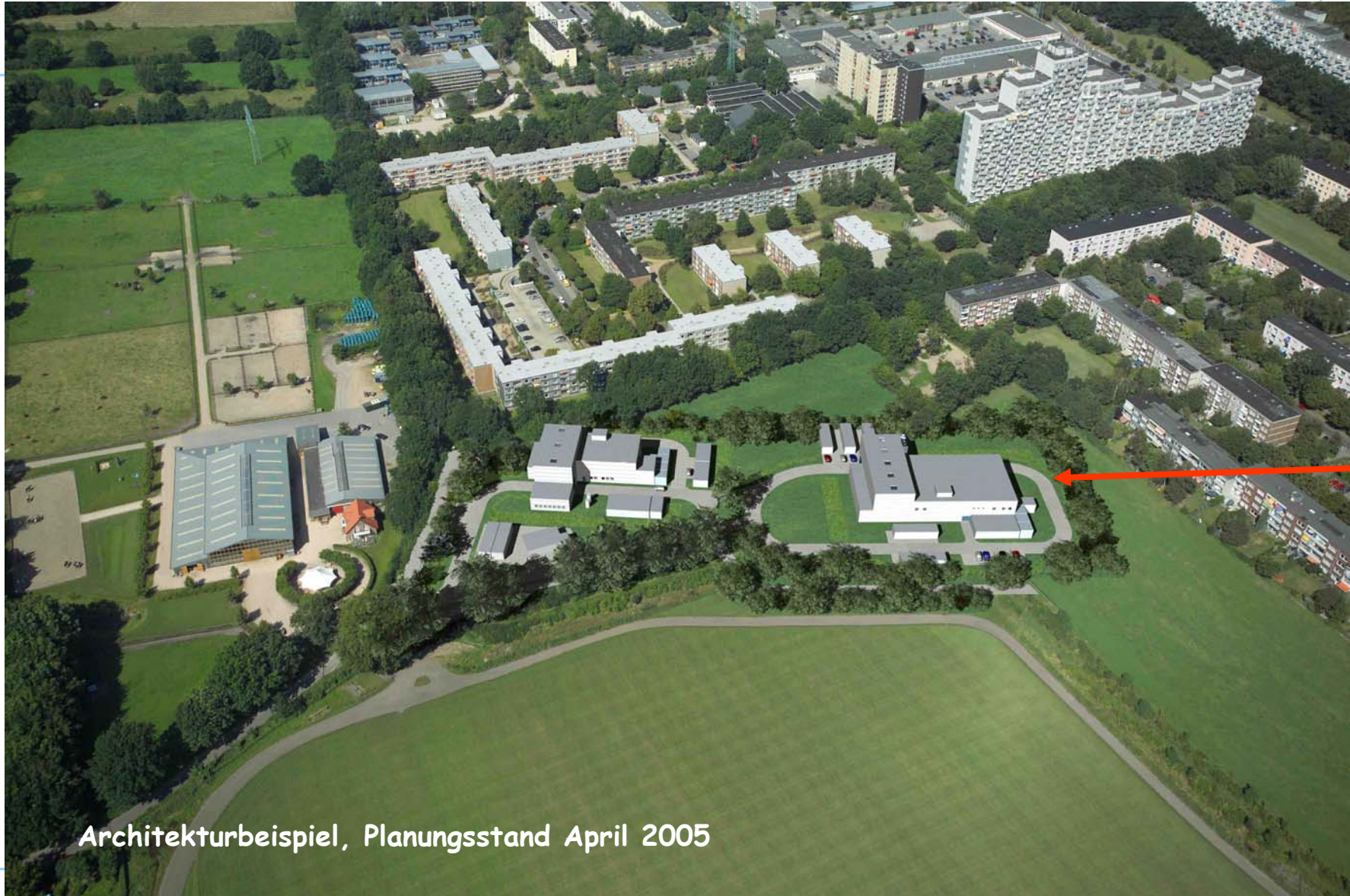


XFEL-Betriebsgelände Osdorfer Born



EPICS meeting

XFEL-Betriebsgelände Osdorfer Born



Architekturbeispiel, Planungsstand April 2005

EPICS meeting

XFEL-Betriebsgelände Schenefeld



EPICS meeting

XFEL-Betriebsgelände Schenefeld



Architekturbeispiel, Planungsstand April 2005

EPICS meeting

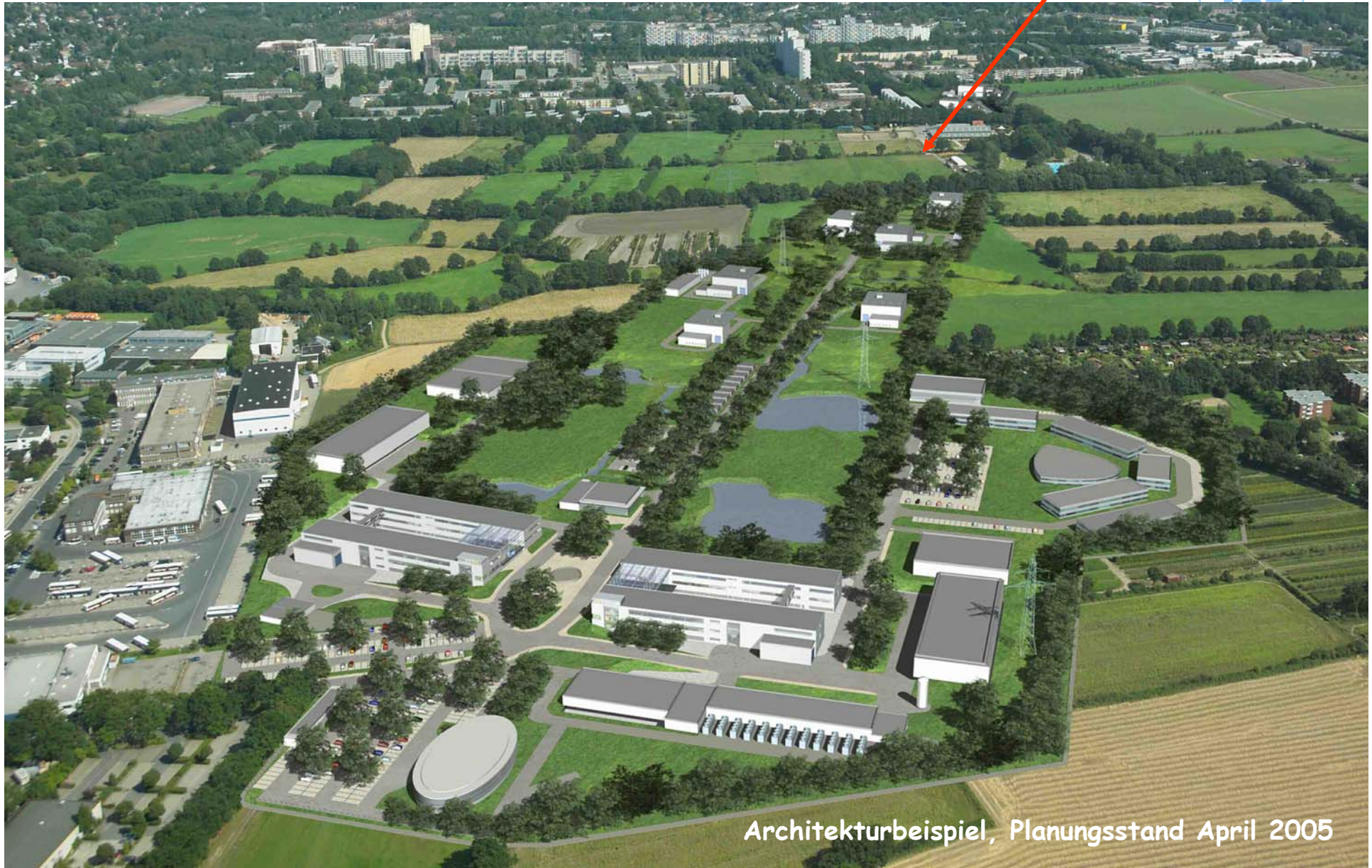
XFEL-Betriebsgelände Schenefeld



Architekturbeispiel, Planungsstand April 2005

EPICS meeting

XFEL-Betriebsgelände Schenefeld



Architekturbeispiel, Planungsstand April 2005

EPICS meeting

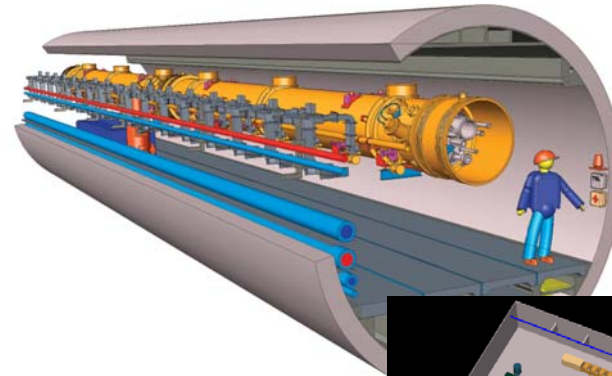
Ausblick 2005/2006 ... 2012

aus heutiger Sicht

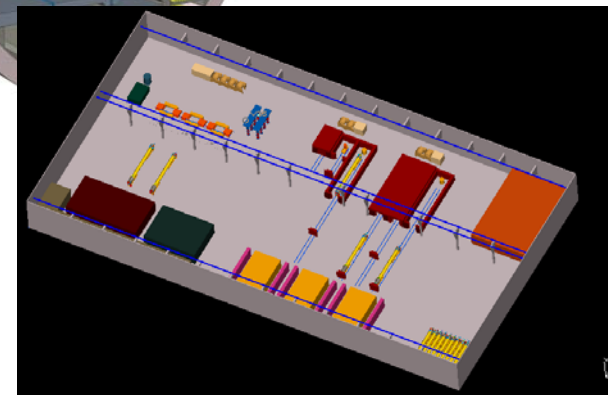


-
- Entwicklung der Anlage (TESLA-Testanlage) 1992 bis 2004
 - Technische Planung XFEL abgeschlossen 10.12.2004
 - Antrag auf Planfeststellung 27.04.2005
 - Auslegung der Unterlagen 17.05.2005
Bezirksamt Altona, Rathaus Schenefeld
 - Abschluss der Einwendungsfrist 30.06.2005
 - Erörterungstermin Ende Oktober 2005
 - Erster Spatenstich ca. Herbst 2006
 - Beginn der Inbetriebnahme des XFEL 2012

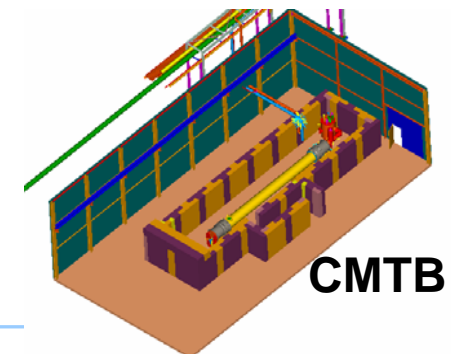
- **XFEL-linac**



- **XFEL-Serial-Module-Test-Facility**



- **VUV-FEL-linac**

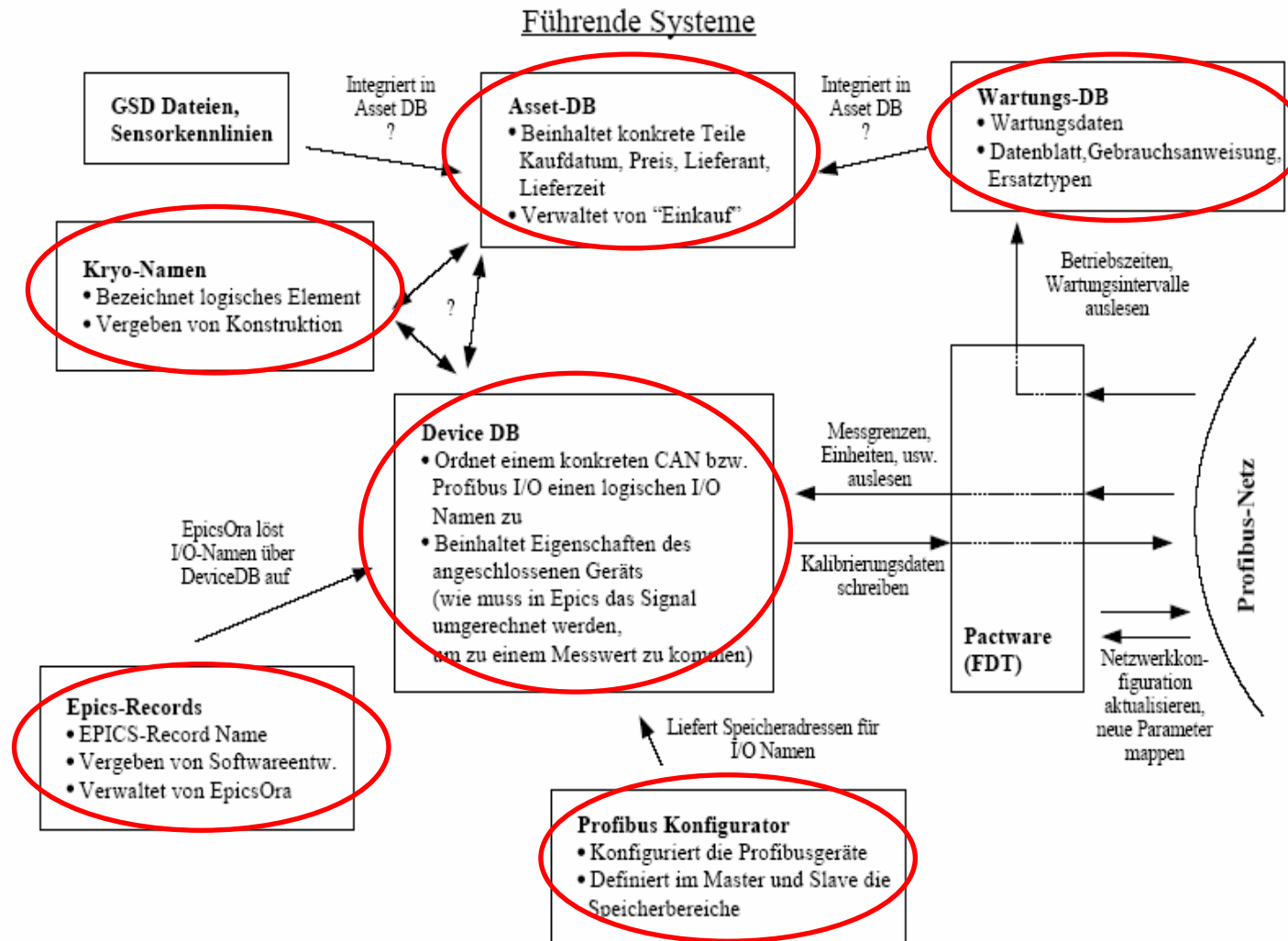




Current Developments

- Network analysis (Albert)
- Database
 - EPICS-Ora (Christian)
 - Device DB
 - Namespace
 - Field bus configuration
 - Maintenance DB
 - Integration of intelligent devices (FDT/DTM)
- EPICS-V4
 - EPICS-Office (Matthias)
 - Redundant IOC (Bob)
 - Authentication (Matthias)

Databases



Information at your fingertip



<u>EPICS-Ora</u> <u>Records</u> <i>IO_Name</i>	<u>Device DB</u> <u>IO_Name</u> <i>Kryo_Name</i> <i>Asset #</i>	<u>Kryo Name</u> <u>Kryo_Name</u>	<u>Asset DB</u> <u>Asset #</u> <i>Location</i>	<u>LocationDB</u> <u>Location</u>	<u>Purchase</u> <u>Asset #</u>	<u>Maintenance</u> <u>Asset #</u> <u>Maintenance</u> <u>specificati</u> <u>on</u> Current state of device Last Maintenan ce
DTYP INP (from Device DB)	create DTYP and INP	Store for unique cryo names		Building Room Component ...	<u>Order #</u> ...	

Cryo-Name Browser



The screenshot shows a Mozilla browser window titled "KryoName Browser - Mozilla" with the address bar set to "http://localhost:8080/kryoName/NewKryoName.jsp". The browser's bookmark bar includes "Home", "Bookmarks", "Java", "Eclipse", "Epics", "FDT", "DESY", "LEO", "EPICS-Office", "Electronic LogBook", and "KryoName Browser".

The application interface features the X-FEL logo (X-Ray Free-Electron Laser) and the title "KryoNameBrowser". A "Reset session" button is located in the top right. Below this, there are several form sections:


- Project Plant Section:** Includes dropdowns for "Project" (set to "XFEL") and "Plant" (set to "Linac"), and input fields for "No.", "Sub Plant 1" (set to "String"), "No.", "Sub Plant 2" (set to "Module"), "No.", and "Sub Plant 3" (set to "-----").
- Object Type Section:** Includes dropdowns for "Object Type" (set to "Valve"), "Function" (set to "Safety Valve"), "Sub function" (set to "-----"), "Process part" (set to "2K FLOW"), and an "If No." checkbox.
- KryoName Label Section:** A text area containing "Remarks for the 2K Flow Safety Valve" and "XLST5MO4:VS1121", with a "Save label" button below.
- Search Kryo Name Section:** A list box showing a scrollable list of identifiers: XLST5MO4:VS1109, XLST5MO4:VS1121, XLST5MO4:VS1123, XLST5MO4:VS1124, XLST5MO4:VS1150, XLST5MO4:VS1151, XLST5MO4:VS1152, XLST5MO4:VS1154, XLST5MO4:VS1162, XLST5MO4:VS1163, XLST5MO4:VS1164, and "-----".
- Save Kryo Name Section:** Includes a "Save Kryo Name" button, a "Delete Kryo Name" button, a "KryoName:" label, a text input field containing "XLST5MO4:VS11", and a "Reset all entries" button.

The Windows taskbar at the bottom shows the system tray with the time "13:45" and the date "6. Oct. 2005". The taskbar includes icons for Start, Windows Explorer, LEO Er..., EPICS..., Unben..., ToDoLI..., Downl..., Java..., KryoN..., KryoN..., kopier..., SQL N..., Total..., UltraE..., Daten..., Führe..., and DE.



Device DB

Home | Bookmarks | Mozilla Community | Welcome to SLAC | HVV - Mehr als ein Ziel



DEVICES, PROPERTIES, LINKS

Database schema: krykman

DEVICE TYPE DEFINITIONS

[Add new device type](#)
Edit/View device type: PROFIBUS_CHANNEL Find

DEVICE INSTANCES

Edit/View device instance: PBDP_MASTER:1 Find
Module instance + channels: PBDP_MODULE:1 Find

TREE LISTS

Device Type tree: PROFIBUS_CHANNEL Find
Device tree: PBDP_SUBNET:1 Find

[Dump Object+Properties \(old\)](#)

PBDP_MASTER:1	Find
PBDP_MODULE:1	
PBDP_MODULE:1:PROFIBUS_CHANNEL:308	
PBDP_MODULE:1:PROFIBUS_CHANNEL:309	
PBDP_MODULE:1:PROFIBUS_CHANNEL:310	
PBDP_MODULE:1:PROFIBUS_CHANNEL:311	Find
PBDP_SLAVE:1	
PBDP_SUBNET:1	Find
XI1VB:VA011	
XI1VB:VA012	Find

REPORTS

IO_NAME Device
Devices of Device Type
Devices in Device Category

DATABASE UPDATES

Update Instance Property Lists: PROFIBUS_CHANNEL Find

[Kryo Name Browser](#)

Device DB

Profibus Module Device Type



Back Forward Reload Stop http://localhost:5000/deviceapp/obj/objecttype.jsp?selectobjecttype=PROFIBUS_MODULE&Action=Find Search Print

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[Back to Device Page](#)

DEVICE TYPE: PROFIBUS_MODULE

To add a property fill in at least a property name

Click [Save All] to save object type + its properties

Save All Instantiate with unique device name [Key Name Browser](#)

Device Type:

Obj Type ID	361
Device Type Name	PROFIBUS_MODULE
Description	Profibus module
Category (supertype)	MODULE

Sub-Devices

to delete a subdevice select "--none--" as the Sub Device Type and Save All

Sub Device Identifier	Sub Device Type (select)	Sub Device Type (url)	Sub Device Type ID	Link ID
Channel1	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	348	342
Channel2	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	348	343
Channel3	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	348	344
Channel4	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	348	345
	--none--		0	0
	--none--		0	0
	--none--		0	0
	--none--		0	0
	--none--		0	0
	--none--		0	0
	--none--		0	0

Properties

Prop Type Name	Description	UI Label	UI Order	Default Value	Prop Type ID
PROFIBUSMODULE_BF	name of module	Name	0		570
CFG_DATA	slot configuration data	Slot Config	1		571
NUMBER_INPUT	number of input bytes	Input Bytes	2		572
NUMBER_OUTPUT	number of output bytes	Output Bytes	3		573

Device DB

Profibus Module Device Instance



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PBDP_MODULE:1

Save All

Module

Obj Instance ID	307
Device Type	PROFIBUS_MODULE
Device Category (supertype)	MODULE
Device Name	PBDP_MODULE:1

Property Name	Description	Value	Property ID
CONSISTENCE	consistence over the modules	d	1055
DATE_INSTALLATION	date of install	30-Sep-2005	1054
NUMBER_OUTPUT	number of output bytes	2	1053
NUMBER_INPUT	number of input bytes	2	1052
CFG_DATA	slot configuration data	abc	1051
PROFIBUSMODULE_BEZ	name of module	PBDP_MODULE:1	1050

Channels and their links

Channel object	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	PROFIBUS_CHANNEL	PROFIBUS_C
url	Name	I/O	Words	Offset	Channel Num	Low	Hig
PBDP_MODULE:1:PROFIBUS_CHANNEL:308	Chan 1	I	2	0	1	0	32767
PBDP_MODULE:1:PROFIBUS_CHANNEL:309	Chan 2	I	2	33	2	0	32767
PBDP_MODULE:1:PROFIBUS_CHANNEL:310	Chan 3						
PBDP_MODULE:1:PROFIBUS_CHANNEL:311	Chan 4						

Save All

Device DB

Profibus Module Channel Instance



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Save All

Module

Obj Instance ID
Device Type
Device Category (supertype)
Device Name

Property

CONSISTENCE
DATE_INSTALLATIO
NUMBER_OUTPUT
NUMBER_INPUT
CFG_DATA
PROFIBUSMODULE_B

Channels and th

Channel
u
PBDP_MODULE.1.PR
PBDP_MODULE.1.PR
PBDP_MODULE.1.PR
PBDP_MODULE.1.PR

Save All

Device Instance - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop http://localhost:8080/deviceAppProj/objectInstance.jsp?SelectObjectInst=PBDP_MODULE:1:PROFIBUS_CHANNEL:308

Home Bookmarks Mozilla Community Welcome to SLAC HWV - Mehr als ein Ziel

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DEVICE: PBDP_MODULE:1:PROFIBUS_CHANNEL:308

Click: [Save All] to save device + its properties

Save All Update Property List from Type

Device:

Obj Instance ID	308
Device Type	PROFIBUS_CHANNEL
Device Category (supertype)	CHANNEL
Device Name	PBDP_MODULE:1:PROFIBUS_CHANNEL:308

No Sub-Devices Defined

Linked Devices

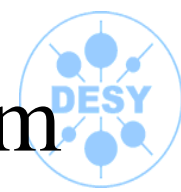
to delete a link select "--none--" as the Device and Save All

Link Description/Identifier	Device (select)	Device (url)	Object ID	Link ID
Water Valve Measureme	XI1VB:VA011	XI1VB:VA011	312	297
	--none--		0	0
	--none--		0	0
	--none--		0	0
	--none--		0	0
	--none--		0	0
	--none--		0	0

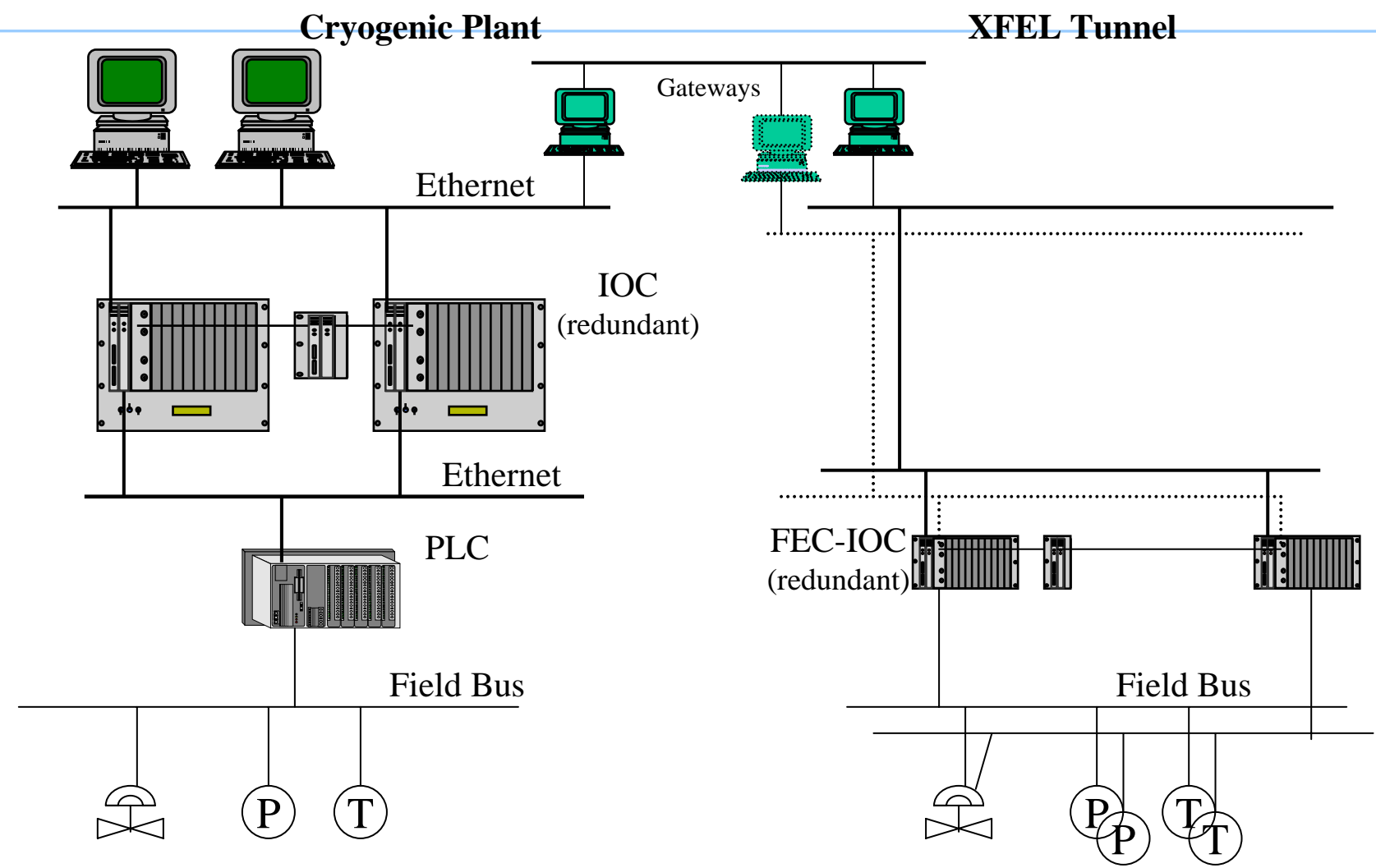
Properties

Property Name	Description	Value

http://localhost:8080/deviceAppProj/objectInstance.jsp?SelectObjectInst=XI1VB:VA011



Principle Layout of the Control System





EPICS V4

- IOC
 - Reduncancy (Bob)
 - Executive
 - Continuous Control
 - SNL (Ron Chestnut)
- Workstation
 - EPICS-Office (next session)
- Authentication/ Authorization (tomorrow)

**Final design and beta implementations necessary
until autumn 2006
(ground braking of XFEL)**