

Infor Introduction at European XFEL

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21.03.2018 Infor EAM User Group Meetings, CERN

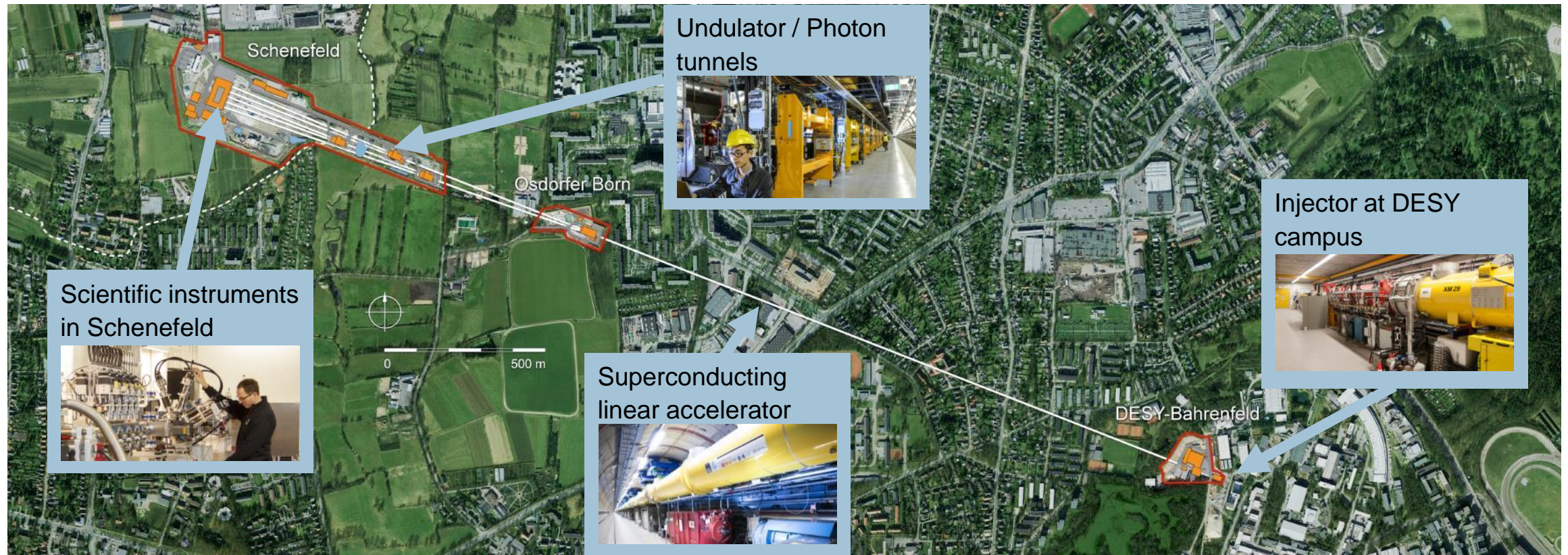


European XFEL

European XFEL—a leading new research facility



General layout of the European XFEL



European XFEL—a leading new research facility



Schenefeld research campus on 14 August 2017

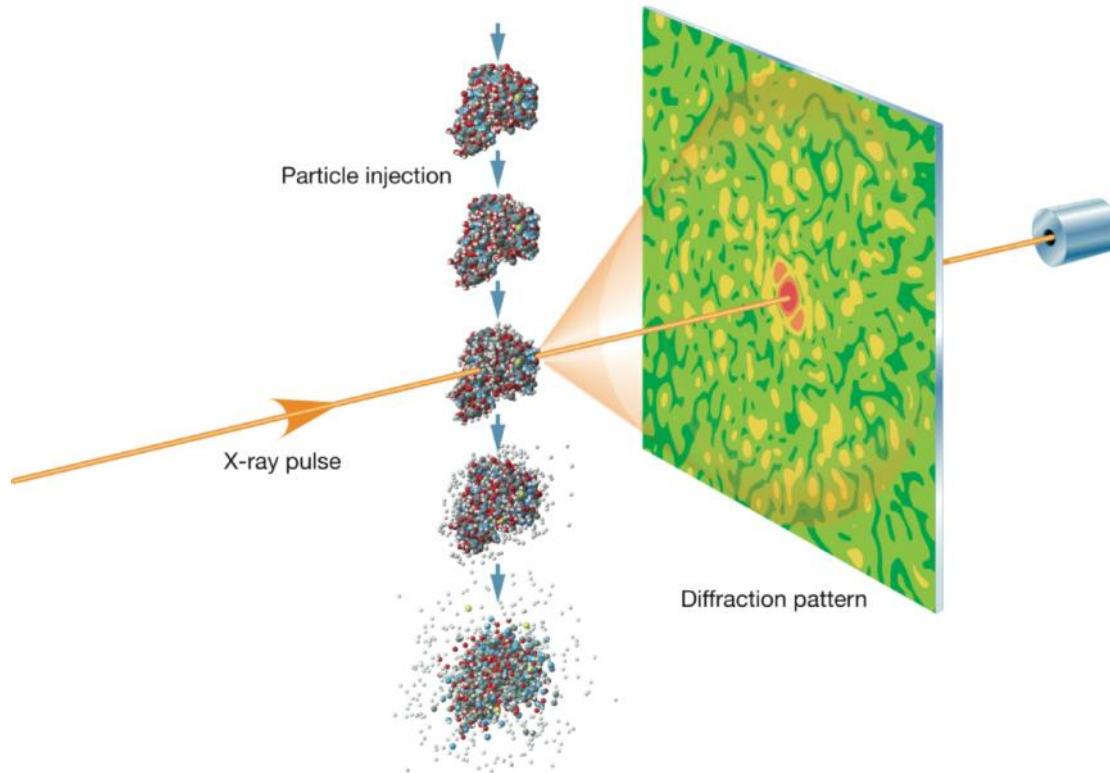
- The European XFEL is a new research facility that uses high-intensity X-ray light to study the structure of matter.
- User facility with more than 350 employees (+250 from DESY)
- Location: Hamburg and Schenefeld, Germany
- September 2017 start of user operation

About European XFEL



- Organized as a non-profit corporation in 2009 with the mission of design, construction, operation, and development of the free-electron laser
- Supported by 12 partner countries
- Germany (federal government, city-state of Hamburg, and state of Schleswig-Holstein) covers 57% of the costs; Russia contributes 26%; each of the other international shareholders 1–3%
- Total budget for construction (including commissioning)
 - 1.22 billion € at 2005 prices, about 170 M€ operating budget
 - 600 M€ contributed in cash, over 550 M€ as in-kind contributions (mainly manufacture of parts for the facility)

Making pictures without a camera lens



- Samples injected as liquids into vacuum chamber
- X-ray pulse hits sample and diffracts onto detector
- Sample is destroyed, but diffraction pattern is recorded ("Diffract before Destruction")

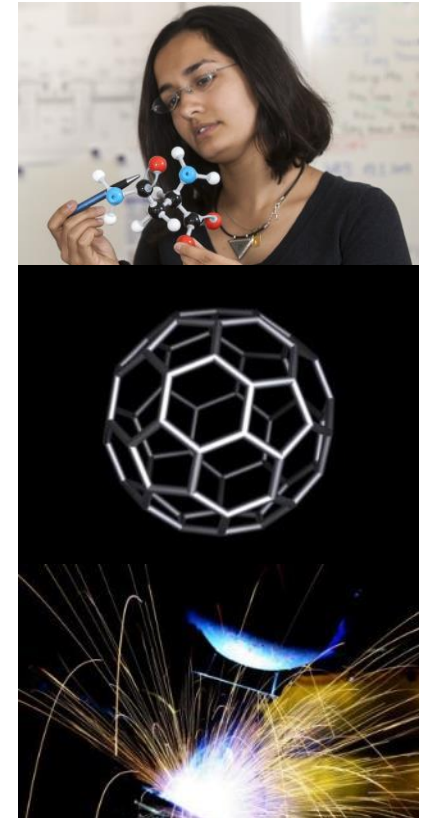
Opportunities: biology, medicine, pharmacology

- Molecular movies reveal biochemical processes
 - Causes of protein misfolding → treatments for Alzheimer's, BSE, etc.
 - Understanding enzymatic action in greater detail → better medicines, fewer side effects
 - Viewing mechanisms of infection
- High intensity X-rays show structures in greater detail
 - Searching for weaknesses in viral and bacterial outer coats

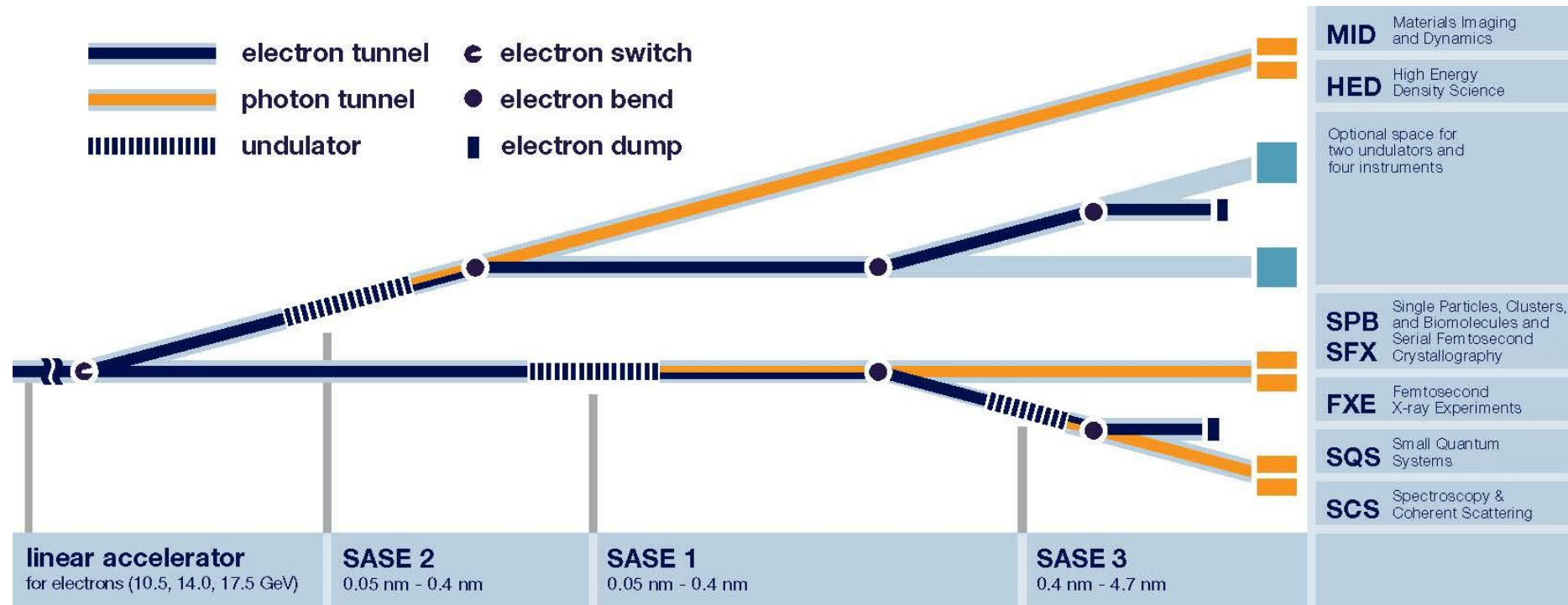


Opportunities: chemistry and materials science

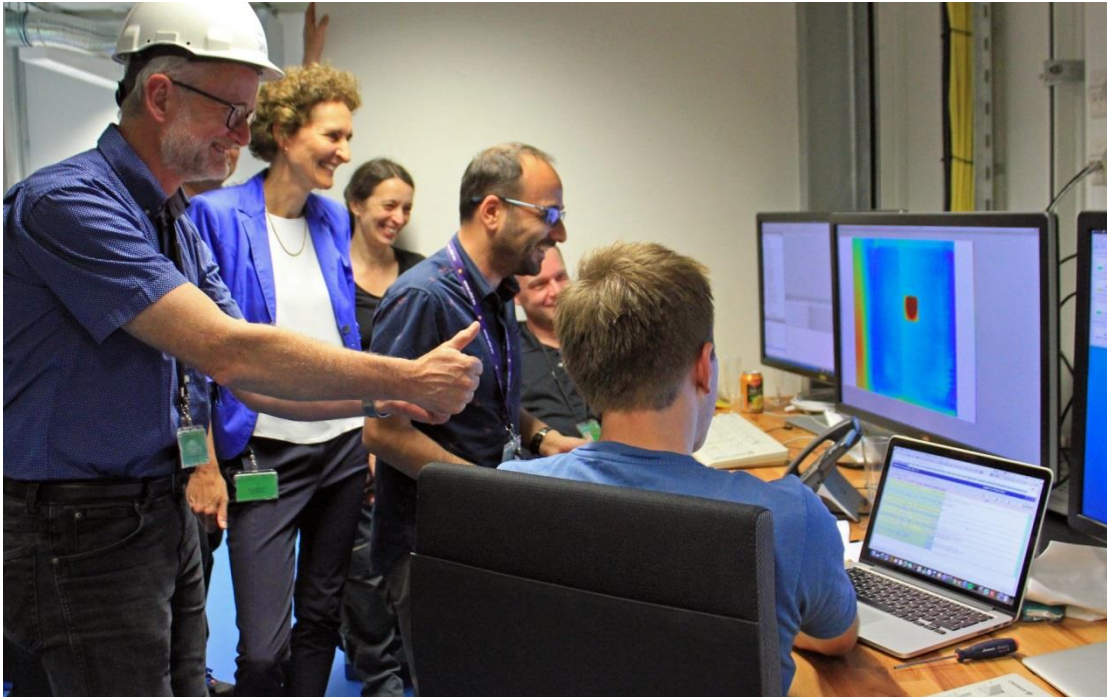
- Atomic-level imaging can uncover action of catalysts
 - Better catalytic converters lessen impact of emissions
 - Less toxic production processes
- Studying structure and properties of materials as never before
 - How properties (e.g., durability, conductivity, magnetism) manifest
 - Reducing atoms needed to store digital information → ultrahigh-capacity hard drives
- Many more applications in photonics, environmental sciences, plasma research, astrophysics, energy research (such as artificial photosynthesis)



Beamline layout and experiment stations



23 June 2017—first X-rays in the experiment hall!



1 September 2017—Inauguration and start of user operation

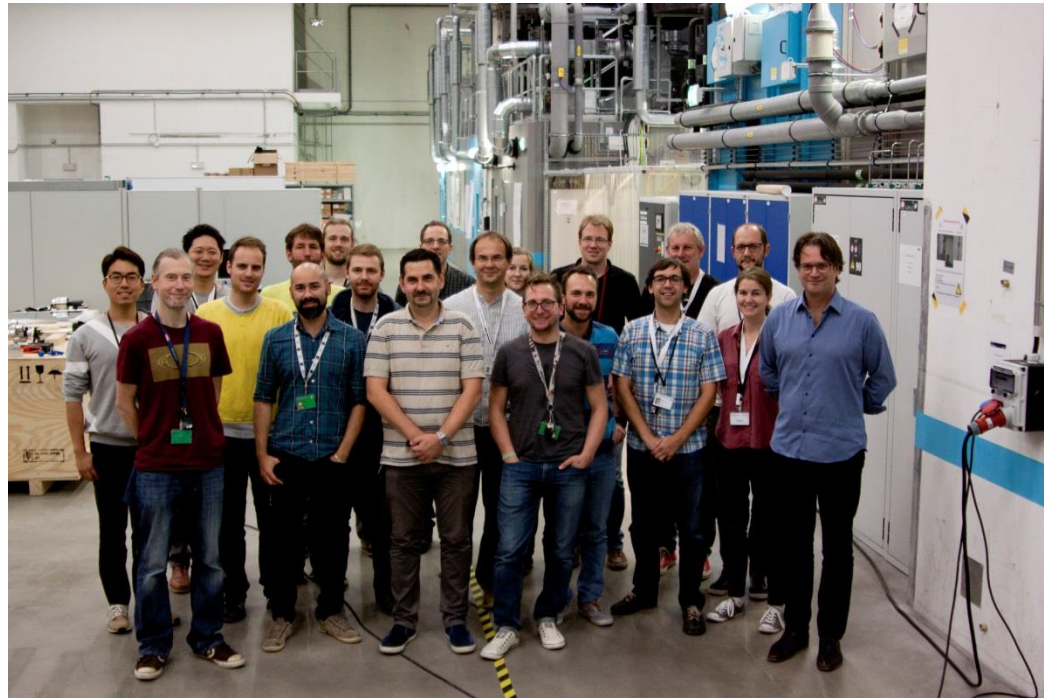


A strong laser from Elbphilharmonie greets European XFEL in the languages of the partner countries

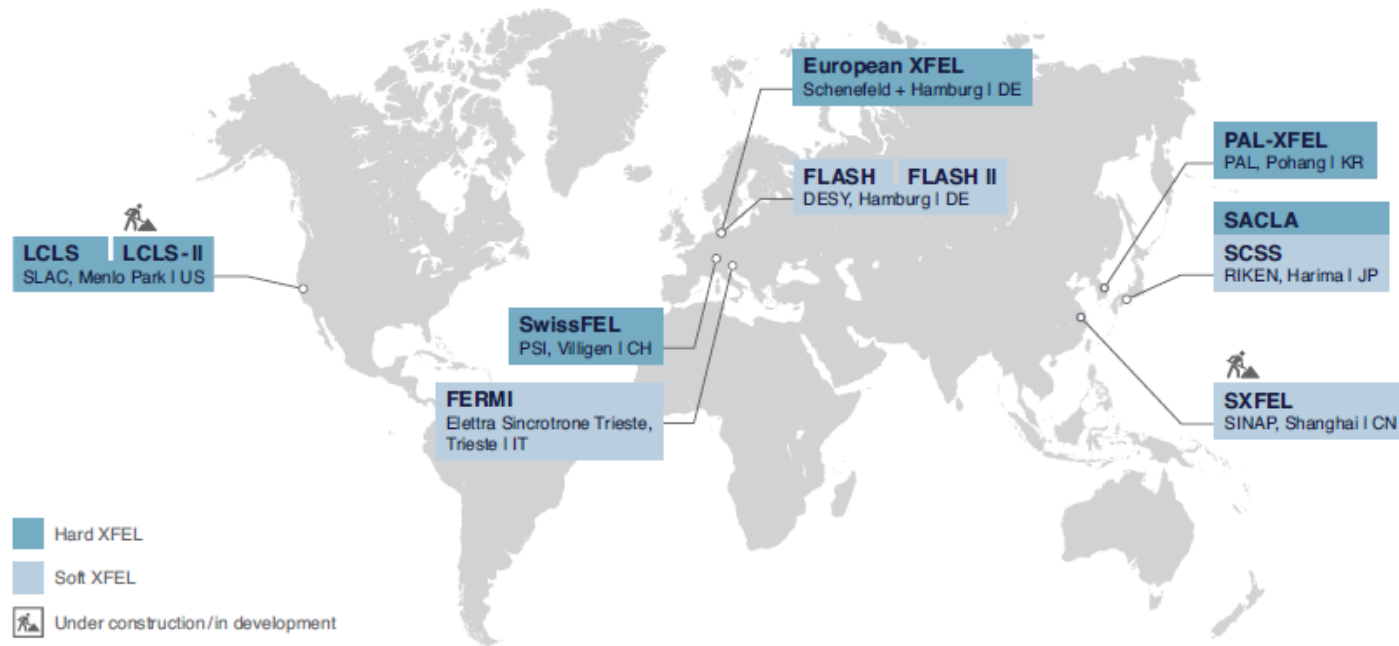


Ribbon-cutting with high-ranking representatives of the partner countries

September 2017—first users at FXE and SPB/SFX!

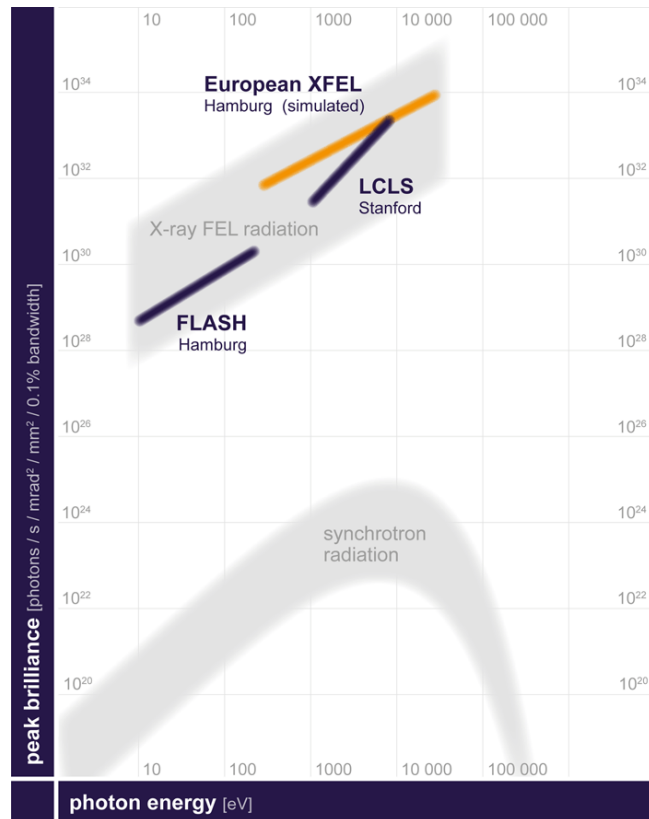


X-ray free-electron lasers worldwide



The European XFEL puts Europe in the lead among industrialized nations in a highly competitive scientific and technical environment.

Free-electron lasers worldwide in comparison



- The peak brilliance of X-ray free-electron lasers exceeds that of the most modern synchrotron radiation sources by several orders of magnitude
- The European XFEL will be capable of generating more pulses per second and more intense X-rays than any other X-ray free-electron laser in the world.

X-ray free-electron lasers worldwide

Project	LCLS (USA)	LCLS-II CuRF	LCLS-II SCRF	SACLA (Japan)	SwissFEL (CH)	PAL-XFEL (S. Korea)	European XFEL
Max. electron energy (GeV)	14.3	15	5.0	8.5	5.8	10	17.5
Wavelength range (nm)	0.1–4.6	0.05–5.0	0.25–5.0	0.06–0.3	0.1–7	0.06–10	0.05–4.7
Photons/pulse	$\sim 10^{12}$	2×10^{13}	3×10^{13} (soft X-rays)	2×10^{11}	$\sim 5 \times 10^{11}$	10^{11} – 10^{13}	$\sim 10^{12}$
Peak brilliance	2.7×10^{34} (with seeding)	2.7×10^{34} (with seeding)	1×10^{32}	1×10^{33}	1×10^{33}	1.3×10^{33}	5×10^{33}
Pulses/second	120	120	1 000 000	60	100	60	27 000
Date of first beam	2009	2019	2020	2011	2016	2016	2017

The Infor ERP Project at European XFEL

Time Scale of the Infor ERP Project

- Kick-off: 23rd April
- Inception Phase
 - Defining Processes and Data Structure
- Elaboration Phase
- Construction Phase
- Acceptance and performance testing
- Go-Live is planned for early 2019

Scope of the Project

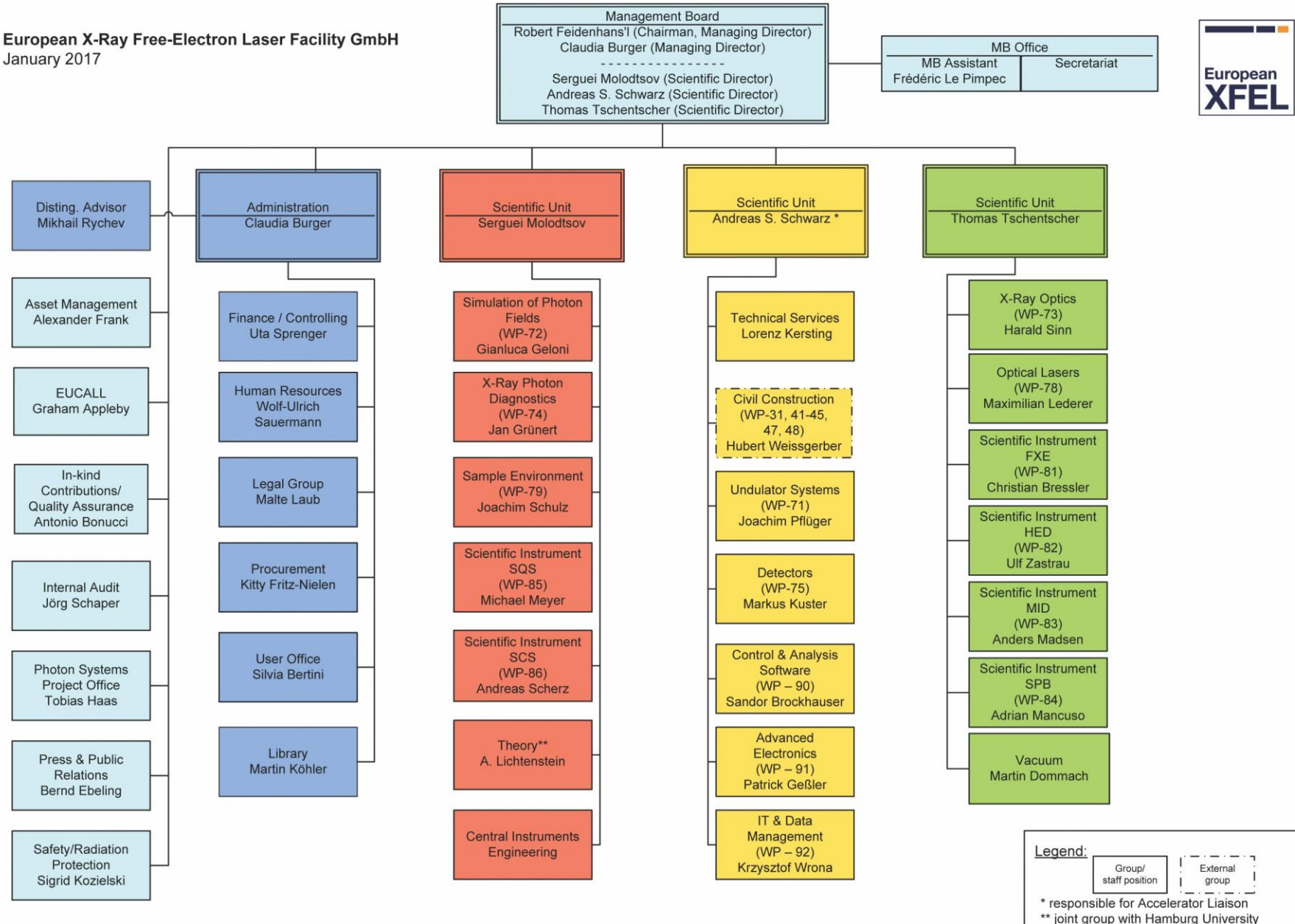
- Finance (Infor LN, Infor DMS)
- Controlling (Infor LN)
- Procurement (Infor LN, iProcure)
- Warehouse Management (Infor LN, Factory Track)
- Possible future extensions:
 - Infor EAM
 - Infor HMS
 - Infor XM
 - Hansalog

Asset Management at European XFEL

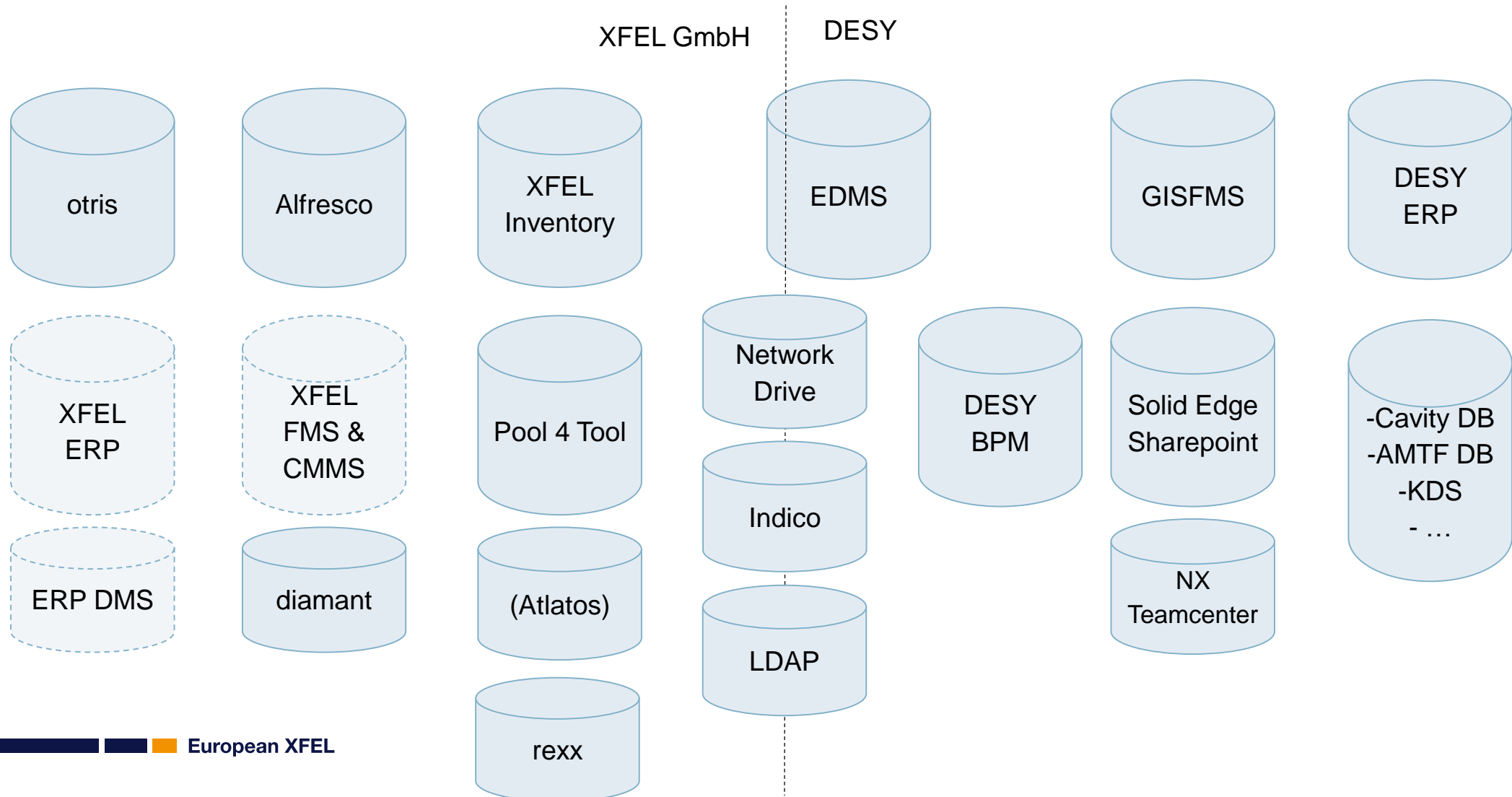
Asset Management Definition (ISO55000)

- Asset Management is “the coordinated activity of an organization to realize value from assets“.
- An asset is defined as: "An asset is an item, thing or entity that has potential or actual value to an organization“.
- One view of working on the organizational objectives
- Make sure everything of value to the organization is properly managed in an efficient and goal targeting way
- systematic and integrated approach

European X-Ray Free-Electron Laser Facility GmbH
January 2017



Landscape of AM relevant Tools at European XFEL



Challenges in AM at European XFEL

- Transition from construction to operation
- Structuring of the Fixed Asset Register – Financial Inventory
- Collection of Asset Knowledge – Technical Inventory
- Connection between financial and technical view
- ERP Introduction
- Technical AM is performed in the technical groups
 - Wide range of different approaches to asset and maintenance management exists among the groups
- It is task of the central AM to minimize the amount of different IT tools in order to enable every group to efficiently perform the required asset and maintenance management

Evaluation of Infor EAM

- Intensive FMS including BIM is required
 - This includes infrastructure maintenance
 - FMS from DESY fulfills parts of our requirements

- A self developed database is used as technical inventory software
 - Interface or migration is required

- Maintenance of the accelerator is planned by DESY

- Operation and maintenance management of the photon systems is not performed in a well structured IT system

Thank you for your attention

