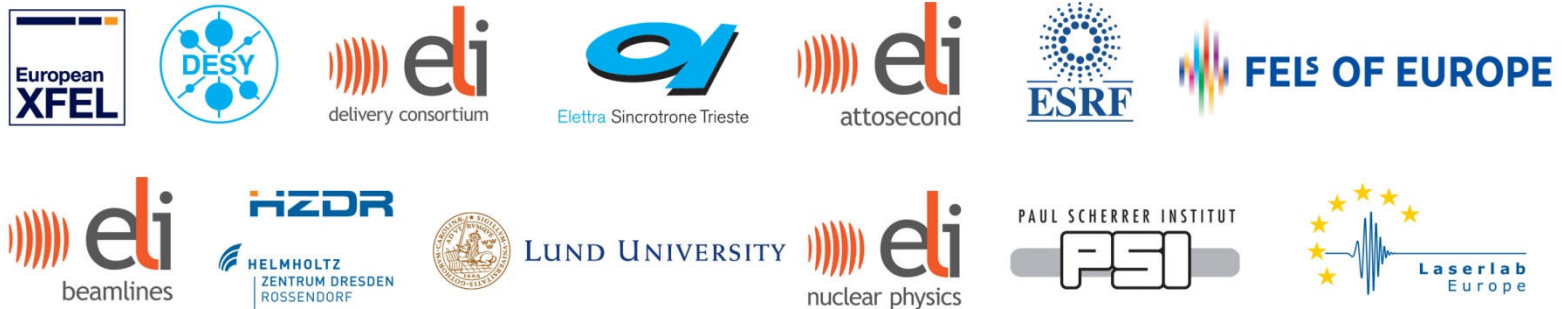


## EUCALL – wayforlight database expansion

Graham Appleby – European XFEL Facility



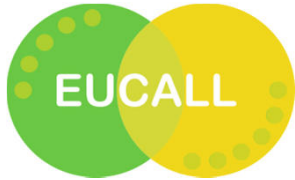
This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 654220



# Light Sources in Europe

- Accelerator-based RIs (SR, FEL)
  - Successful and large user program
  - Increasing complexity (OLs, FELs, ...)
  - X-rays reach diffraction limit & non-linear regime
  - Optical laser methods applied
  
- Optical-laser based RIs (ELI, LLE faci.)
  - High power laser (HPL)
  - New and ramping up
  - HPLs as sources of UV and x-ray beams
  - UV/x-ray methods provided to users





## European Cluster of Advanced Laser Light Sources

### **EUCALL is a network between large-scale user facilities for:**

- free-electron laser (FEL) radiation
- synchrotron radiation (SR)
- optical laser radiation

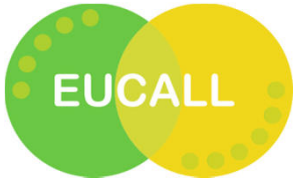
### **Under EUCALL, they work together on:**

- common technologies and research opportunities
- tools to sustain this interaction in the future

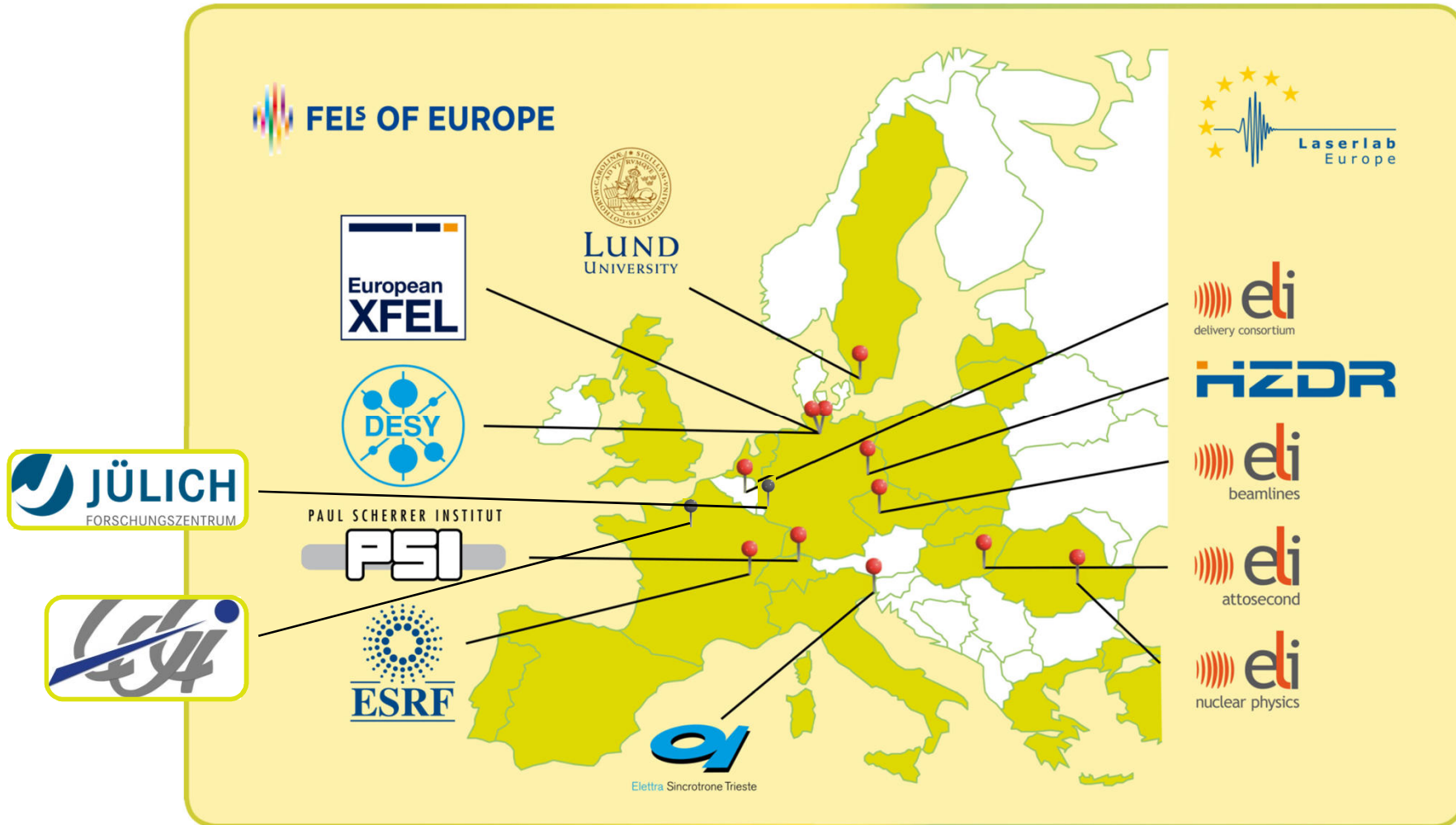
### **Facts and figures:**

- 7M€ from Horizon 2020 for project period Oct 2015 - Oct 2018
- 11 partners from nine countries, two further clusters, two associate partners





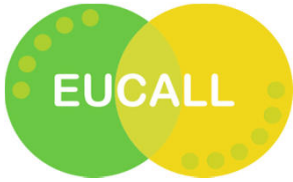
# European Cluster of Advanced Laser Light Sources



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 654220

Graham Appleby, European XFEL, 24/10/2017  
3<sup>rd</sup> European User Offices Meeting, Elite Hotel, Lund





# EUCALL's Strategic Goals and Objectives

## Goals

Develop & implement cross-cutting services for XFEL, ESRF and ELI

Optimize use of advanced laser light sources in Europe.

Stimulate & support common long-term strategies & research policies

## Objectives

Analyze & promote efficient use of facilities

Identify & develop combined research potential

Analyze & promote innovation potential by the ensemble of facilities

**Identify joint foresight topics in science & research policy**

Develop & implement a simulation platform

Develop ultrafast data acquisition

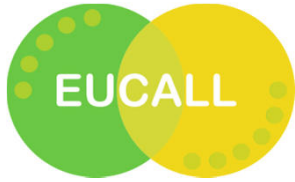
Develop ultrafast sample handling systems

Develop advanced beam diagnostics

WP 3

WP 4 - WP 7





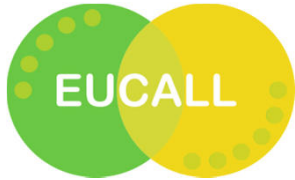
## EUCALL's recent highlights

30 September 2017 (24/36 Months) → 4 Deliverables, 4 Milestones completed on this date

- First example simulation (WP4 - SIMEX)
- Simulations interoperable (WP4 - SIMEX)
- Performance evaluation of data transfer and injection algorithms (WP5 - UFDAC)
- Construction of prototype XGM finished (WP7 - PUCCA)
- 2<sup>nd</sup> EUCALL Annual Meeting (WP1 - Management)
- Interoperability of simulation workflows (WP4 - SIMEX)
- Generation of simulated coherent scattering data from plasma and non-plasma samples (WP4 - SIMEX)
- EMP-compatible stages (WP6 - HIREP)

In total: 19 Deliverables and 20 Milestones completed on time until Oct 2017





# WP3 – [www.wayforlight.eu](http://www.wayforlight.eu)

## EUCALL spreadsheet "Instrumentation at Advanced Laser Light Sources"

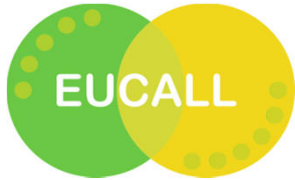
		RI operational											
		RI in preparation											
			Instrument details	Properties of generated X-ray/UV photons			Properties of associated laser source			Experimental Support			
Type	Facility	Land		E range, spot size, time resolution etc			E range, rep. rate, time res, Energy per pulse etc			Labs, Data acquisition, support			
FELs	European XFEL	DE	FXE	...	...	...	...	...	...	...	...	...	...
			...	...	...	...	...	...	...	...	...	...	...
	FLASH	DE	FL1	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...
Synchrotrons	PETRA III	DE	P01	...	...	...	...	...	...	...	...	...	...
			...	...	...	...	...	...	...	...	...	...	...
	ESRF	FR	ID01	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...
	ELI Beamlines	CZ	PXS	...	...	...	...	...	...	...	...	...	...



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Graham Appleby, European XFEL, 24/10/2017  
3<sup>rd</sup> European User Offices Meeting, Elite Hotel, Lund





### EUCALL spreadsheet "Instrumentation at Advanced Laser Light Sources"

#### Goal:

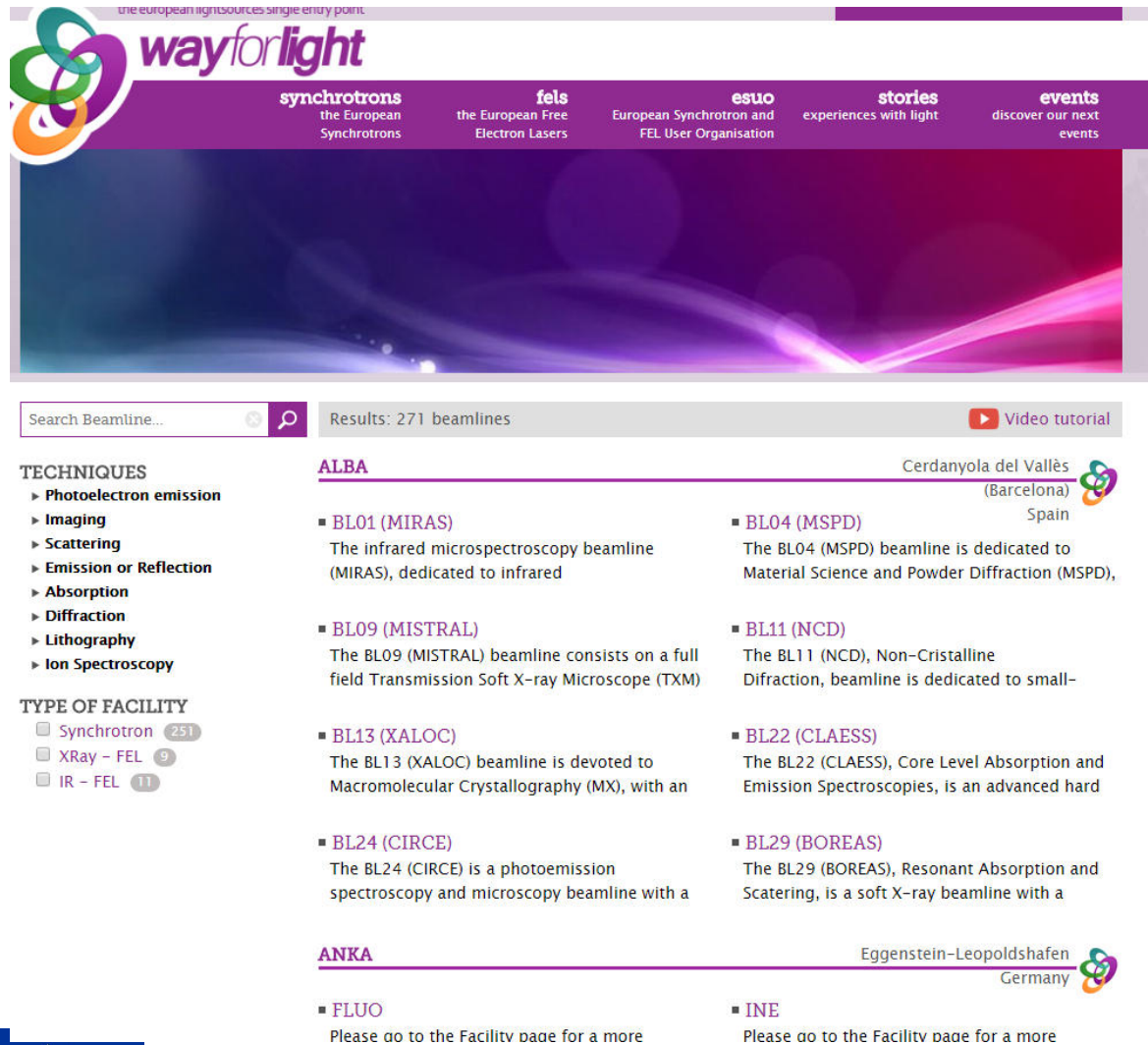
- allowing the identification and analysis of duplications and missing elements
- new research opportunities arising from the combination of offers by different RIs
- Include international RIs for an assessment of the international scientific competitiveness of the Europe in this field.
  - Comprehensive list of EUCALL facilities and their application areas
  - x-ray, laser(-like) [pump-probe, coherence, fs-scale, etc]
  - 124 facilities/beamlines with each 22 properties
  - ~2700 entries

**New goal:** EUCALL's SAC recommended to make the spreadsheet into a searchable database available for external users. WP3 now extends to Elettra and the [www.wayforlight.eu](http://www.wayforlight.eu) database [include ELI, LLE facilities]





# WP3 – [www.wayforlight.eu](http://www.wayforlight.eu)



The screenshot shows the 'wayforlight' website interface. At the top, there's a navigation bar with links for 'synchrotrons', 'fels', 'esuo', 'stories', and 'events'. Below this is a search bar with the text 'Search Beamline...' and a magnifying glass icon. To the right of the search bar, it says 'Results: 271 beamlines' and 'Video tutorial'. The main content area is divided into two sections: 'ALBA' and 'ANKA'. Under 'ALBA', there are several beamline entries: BL01 (MIRAS), BL09 (MISTRAL), BL13 (XALOC), BL24 (CIRCE), BL04 (MSPD), BL11 (NCD), BL22 (CLAESS), and BL29 (BOREAS). Each entry includes a brief description of the beamline. Under 'ANKA', there are two entries: FLUO and INE, both with a note to 'Please go to the Facility page for a more'. On the left side of the screenshot, there are two vertical menus: 'TECHNIQUES' with options like Photoelectron emission, Imaging, Scattering, etc., and 'TYPE OF FACILITY' with checkboxes for Synchrotron (251), XRay - FEL (9), and IR - FEL (11).

## EUCALL expansion:

- Include ELI and selected Laserlab-Europe instruments
- Improve visibility of optical lasers at SR/FEL instruments
- Improve interface for beamline scientist to keep data up-to-date
- Demonstrate prototype for EUCALL RIs in 2018



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# WP3 – www.wayforlight.eu

Search Beamline...

Results: 28 beamlines

**TECHNIQUES**

- ▶ Photoelectron emission
- ▶ Imaging
- ▶ Scattering
- ▶ Emission or Reflection
- ▶ Absorption
- ▶ Diffraction
- ▶ Lithography
- ▶ Ion Spectroscopy

**TYPE OF FACILITY**

- Synchrotron
- XRay - FEL 9
- IR - FEL 11

**FACILITIES**

- ▶ Synchrotrons

**GENERAL PROPERTIES**

- Energy Resolution
- Resolving Power
- Energy Range

**Spot Size on Sample**

- Vertical
- Horizontal

**PHOTON SOURCE**


- ▶ Type
- ▶ Available Polarization
- Energy Range

0 eV      20,800 eV      140,000 eV


**ENDSTATIONS**

- ▶ Type
- ▶ Detected particle
- ▶ Coincidence
- Base Pressure

**MONOCHROMATORS**

**ASTRID2** Aarhus Denmark 

- **ASTRID2 AU-AMO**  
The aim of the AMO beamline at ASTRID2 is to conduct photo-physics investigations of
- **ASTRID2 AU-SGM2**  
The SGM2 beam line was designed to produce photons with high resolution at 15.76 eV for
- **ASTRID2 AU-SGM3**  
The SGM3 beamline is designed to operate in the 12-150 eV photon energy range with a

**BESSY II** Berlin Germany 

- **BAMline (nondestructive testing in analytical chemistry)**  
The first hard x-ray beamline at BESSY II has been installed by BAM and PTB at a
- **CoESCA (COincidence Electron Spectroscopy for Chemical Analysis)**  
The COincidence Electron Spectroscopy for Chemical Analysis station is at a plane grating
- **MX-14-1 (Macromolecular Crystallography 14.1)**  
Macromolecular Crystallography station of BL14.1 The experimental station is installed at
- **MX-14-2 (Macromolecular Crystallography 14.2)**  
Macromolecular Crystallography station of BL14.2 The experimental station is installed at
- **MX-14-3 (Macromolecular Crystallography 14.3)**  
Macromolecular Crystallography station of BL14.3 The experimental station is installed at
- **PHOENEXS ((Spin Resolved) Photoemission and Near Edge X-ray Station)**  
Built as a system for photoemission and near-edge X-ray absorption, the PHOENEX station is
- **POLARIMETER (Polarimetry)**  
- Polarimetry, Ellipsometry, Reflectometry - Development of ML-optics for Polarisation
- **Resonant Scattering**  
UHV chamber for soft x-ray scattering experiments with in-vacuum CCD detector.
- **So-Li-AS (Solid Liquid Analysis System)**  
Station data Monochromator Experiment in vacuum yes Temperature range 77 - 700 K
- **UE52\_SGM beamline**  
UE52\_SGM Undulator SGM variable polarisation Soft X-ray beamline for flexible end stations

## EUCALL expansion:

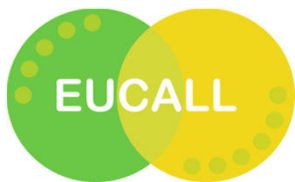
- Include ELI and selected Laserlab-Europe instruments
- Improve visibility of optical lasers at SR/FEL instruments
- Improve interface for beamline scientist to keep data up-to-date
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Graham Appleby, European XFEL, 24/10/2017  
3<sup>rd</sup> European User Offices Meeting, Elite Hotel, Lund





# WP3 – www.wayforlight.eu

the european light sources single entry point

**wayforlight**

**synchrotrons** the European Synchrotrons | **fels** the European Free Electron Lasers | **esuo** European Synchrotron and FEL User Organisation | **stories** experiences with light | **events** discover our next events

Search Beamline... Results: 271 beamlines Video tutorial

**TECHNIQUES**

- ▶ Photoelectron emission
- ▶ Imaging
- ▶ Scattering
- ▶ Emission or Reflection
- ▶ Absorption
- ▶ Diffraction
- ▶ Lithography
- ▶ Ion Spectroscopy

**TYPE OF FACILITY**

- Synchrotron 251
- XRay - FEL 9
- IR - FEL 11

**ALBA** Cerdanyola del Vallès (Barcelona) Spain

- **BL01 (MIRAS)**  
The infrared microspectroscopy beamline (MIRAS), dedicated to infrared
- **BL04 (MSPD)**  
The BL04 (MSPD) beamline is dedicated to Material Science and Powder Diffraction (MSPD),
- **BL09 (MISTRAL)**  
The BL09 (MISTRAL) beamline consists on a full field Transmission Soft X-ray Microscope (TXM)
- **BL11 (NCD)**  
The BL11 (NCD), Non-Crystalline Diffraction, beamline is dedicated to small-
- **BL13 (XALOC)**  
The BL13 (XALOC) beamline is devoted to Macromolecular Crystallography (MX), with an
- **BL22 (CLAESS)**  
The BL22 (CLAESS), Core Level Absorption and Emission Spectroscopies, is an advanced hard
- **BL24 (CIRCE)**  
The BL24 (CIRCE) is a photoemission spectroscopy and microscopy beamline with a
- **BL29 (BOREAS)**  
The BL29 (BOREAS), Resonant Absorption and Scattering, is a soft X-ray beamline with a

**ANKA** Eggenstein-Leopoldshafen Germany

- **FLUO**  
Please do to the Facility page for a more
- **INE**  
Please do to the Facility page for a more

Optical Laser



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Graham Appleby, European XFEL, 24/10/2017  
3<sup>rd</sup> European User Offices Meeting, Elite Hotel, Lund



Optical Laser

You are in: Home / FELs / FLASH / BL1

## FLASH BL1

general optics endstations

This beamline delivers non-monochromatic FEL photons and is currently being retrofitted with KB focusing optics that will provide a focal spot of  $\sim 3 \mu\text{m} \times 4 \mu\text{m}$ . After the retrofit, which is **expected to be finished in mid-2014**, the CAMP endstation [1] will be installed as a permanent user endstation at BL1. CAMP is a multi-purpose instrument that provides two sets of large-area, fast-readout pnCCD photon detectors (1 Megapixel,  $75 \mu\text{m}$  pixel size,  $\sim 8 \text{ cm} \times 8 \text{ cm}$  active area, 120 Hz frame rate), several velocity map imaging (VMI) and COLTRIMS-style electron-ion spectrometers, and a supersonic gas jet. A wide range of user-provided spectrometers, sample injectors, and sample holders can also be implemented. Colinear incoupling optics for the FLASH femtosecond-laser to perform laser-FEL pump-probe experiments are available. A split-and-delay unit for XUV pump - XUV probe experiments is under development and is **expected to be available for the next proposal cycle**.

[1] L. Strüder et al., Nucl. Instr. Meth. A 614, 483 (2010).

[FLASH BL Beamlines »](#)

You are in: Home / Synchrotrons / PETRA III / P02

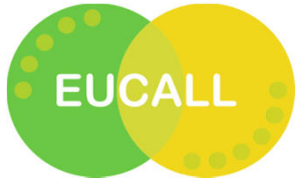
## PETRA III P02

general

P02 is the hard X-ray diffraction beamline at PETRA III. The beamline focuses on harvesting very brilliant X-ray beam of PETRA III to conduct diffraction experiments at relative high energies on both single crystal and powders and extreme conditions of high/low temperatures as well as high pressures and simultaneous high/low temperatures. The high brilliance in combination with fast area detectors enables furthermore time resolved diffraction experiments at the ms time scale.

Need improved interface to motivate RI operators to keep info up to date





## WP3 – [www.wayforlight.eu](http://www.wayforlight.eu)

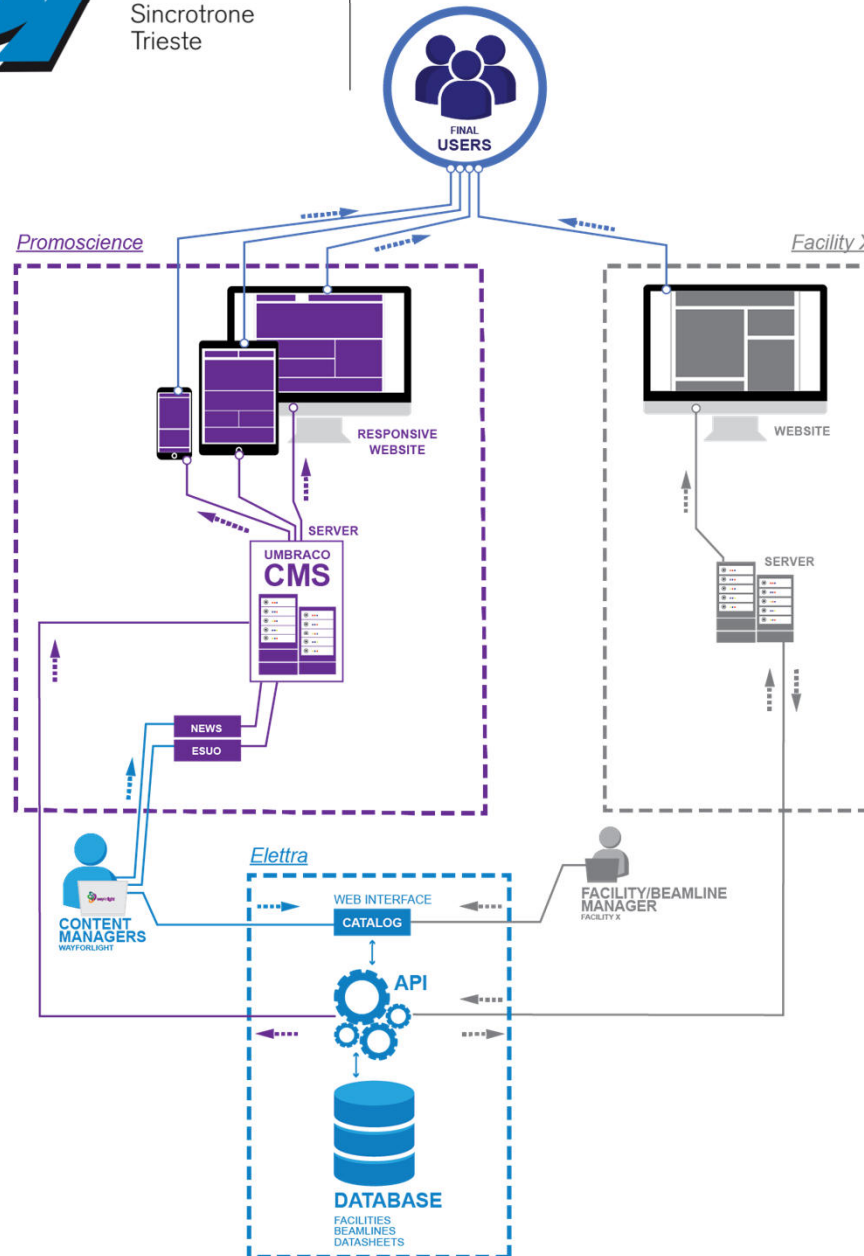
- Beam-scientists also don't keep their own RI website up-to-date!
- Not easy to convince them to keep info on TWO databases up-to-date

EUCALL concept for updated wayforlight capabilities:

- Improve interface for beamline scientist to keep data up-to-date
  - Beamline scientist enters data to wayforlight datasheet
  - Data automatically displayed on wayforlight page for that instrument
  - Data can also be automatically displayed on scientist's own RI site
- Demonstrate prototype for EUCALL RIs in 2018



# Proposed workflow

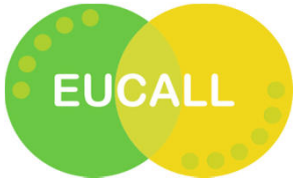


*The beamline scientist will enter the technical data into the new wayforlight database interface ("CATALOG" in our scheme); this is the catalog to be developed by Elettra in the first half of 2018.*

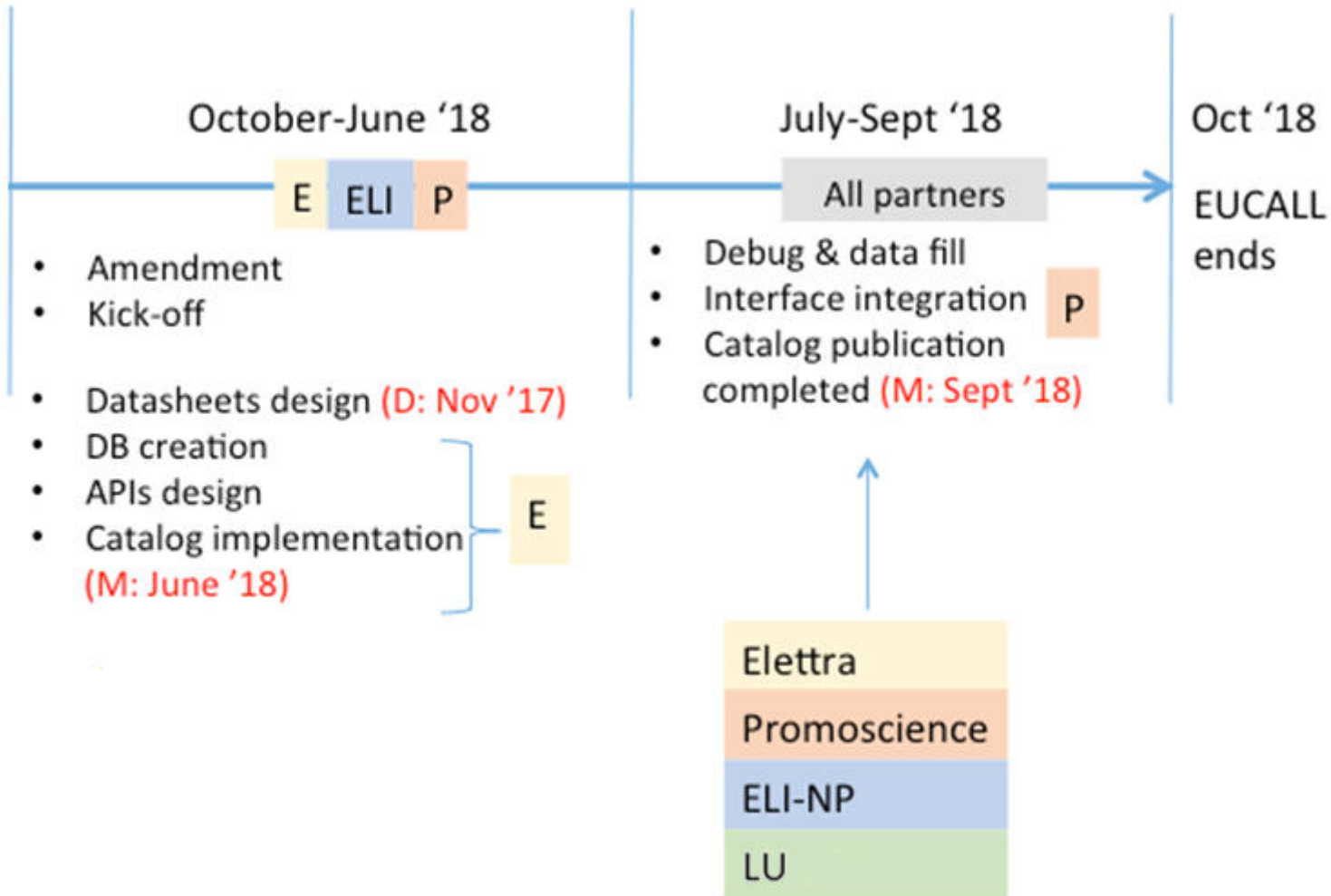
*Automatic display of the datasheet:  
1) the display into the wayforlight website will be automatically implemented from June 2018 onwards*

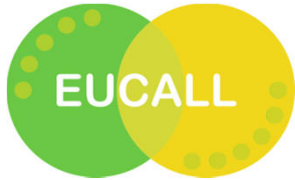
*2) automatic display to RI's website needs some in-kind work at the facility which is not included the EUCALL task.*

*Even at Elettra the beamline datasheets are presently displayed as text tables, and the EUCALL developments will not cover the necessary implementation to automatically display Elettra's beamline datasheets in wayforlight on Elettra's website.*



# WP3 – [www.wayforlight.eu](http://www.wayforlight.eu)





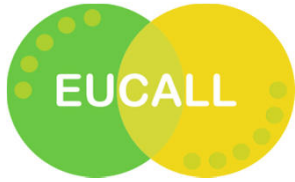
## WP3 – Synergy / Workshops

EUCALL WP3 workshops for 2017/2018:

- User Access at ALLs (for staff of new facilities such as ELI) [21-22.09.17]
- Technology Transfer and Innovation at RIs (for staff of new facilities such as ELI, European XFEL) [14-16.11.17]
- Biology at Advanced Laser Light Sources [30.11-01.12.17]
  
- Theory, Simulation and Computing at RIs [tba 2018]
- Societal Challenges at Advanced Laser Light Sources [26.04.18]
- Building a Target Delivery Network for European Laser RIs [27.05.18]
- Future strategies for RI operators and policy makers [06.09.18]



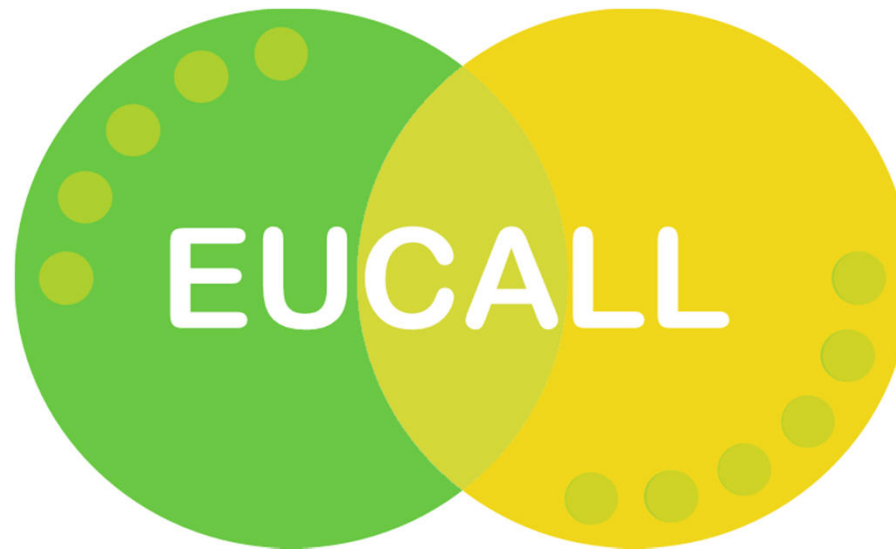




## Summary

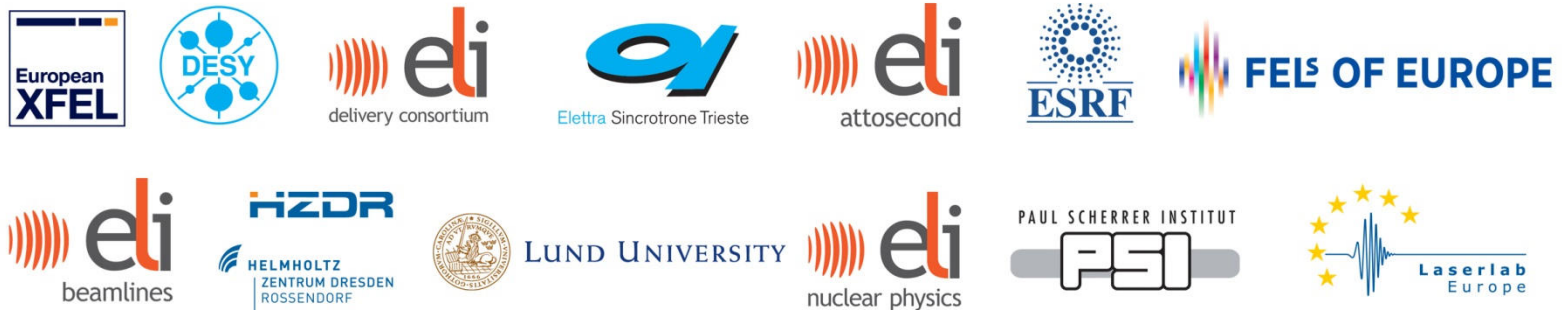
- EUCALL brings together synchrotron, FEL and optical laser RIs
- EUCALL aims to promote efficient use of facilities
- Modified [www.wayforlight.eu](http://www.wayforlight.eu) database will include optical laser RIs (ELI, Laserlab-Europe)
- Delivered prototype will have enhanced capability to keep info up-to-date with RI's own website data





Thank you for your attention

[www.eucall.eu](http://www.eucall.eu) / [contact@eucall.eu](mailto:contact@eucall.eu)



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