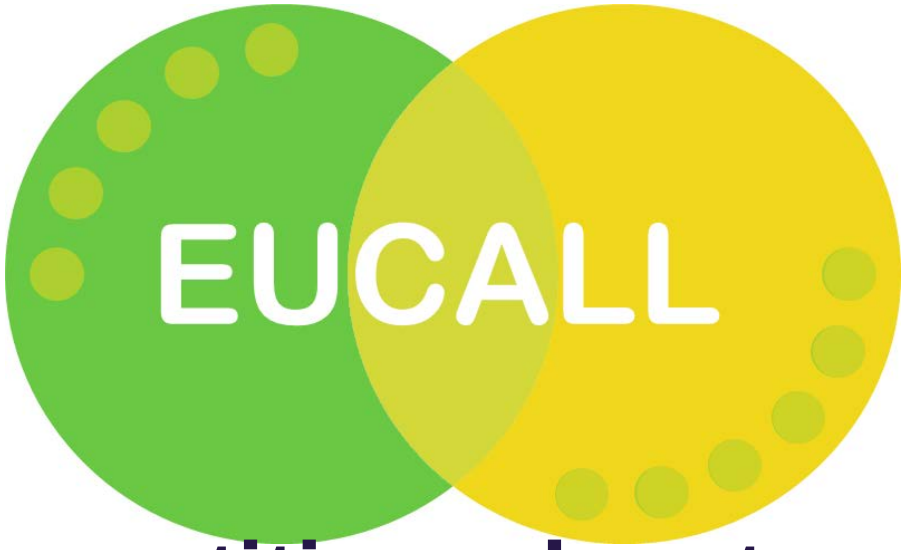


# ELI's competitive advantages in the landscape of European light sources

Industrial applications of high-power laser technologies of the Extreme Light Infrastructure (ELI)

24 – 25 May 2018, Za Radnicí 835, Dolní Břežany, Czech Republic

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

# ELI's competitive advantages in the landscape of ELS

This first session (11h-12h30) is composed by two parts:

1. the analysis of the present offer of the European light sources
2. the presentation by ELI representatives of the competitive advantages of these new infrastructures.

The state of the art of the ELS offer in Europe is based on the EUCALL "Innovation Potential of Advanced Light Sources" report (11h-11h30)

The ELI's competitive advantages are presented during the panel discussion (11h30-12h30)

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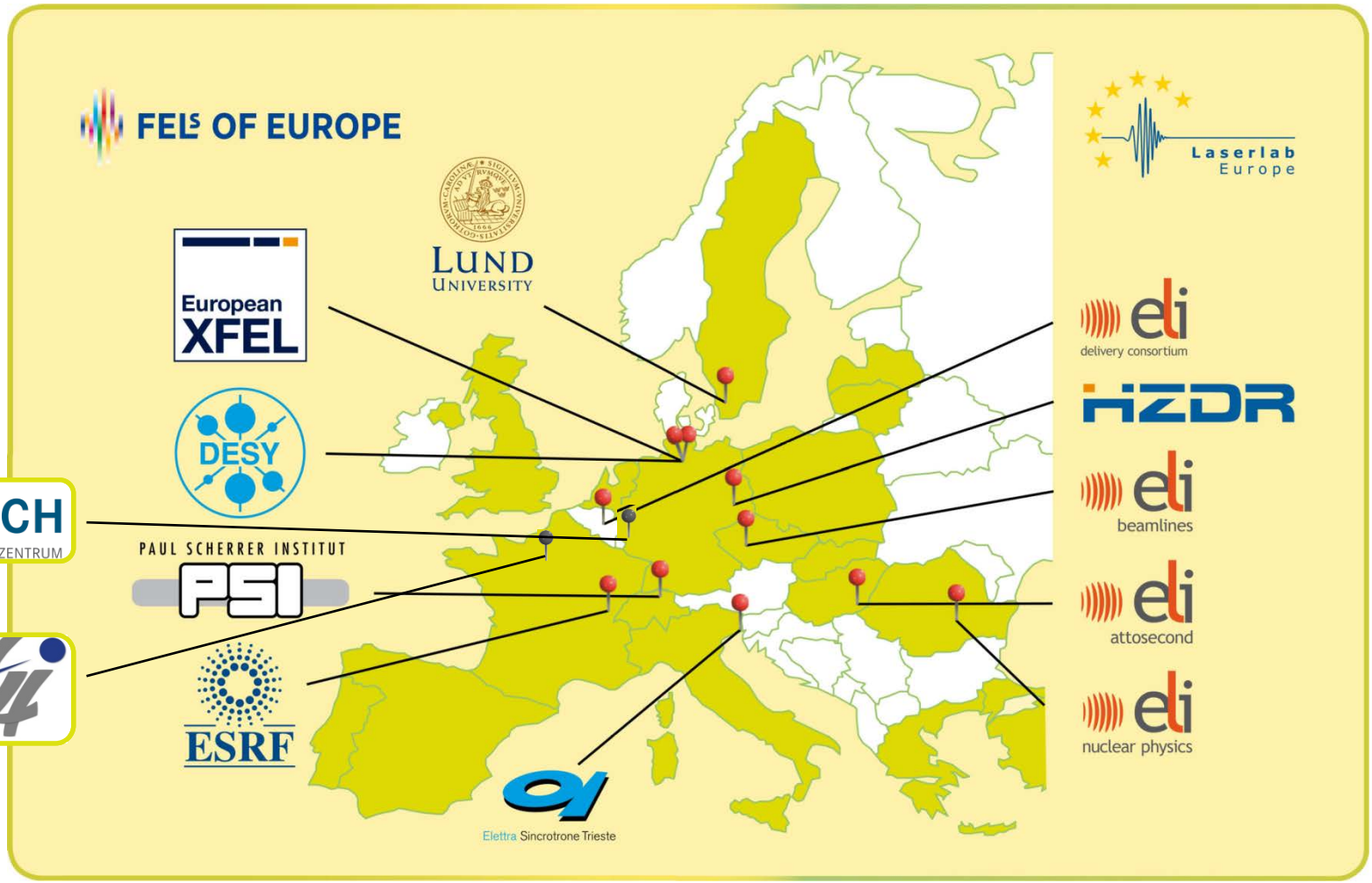
# European Cluster of Advanced Laser Light Sources




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

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# "Innovation Potential of Advanced Light Sources"

EUCALL report "Innovation Potential of Advanced Light Sources" was prepared to **analyze the combined innovation potential** of the advanced laser light source research infrastructures (RIs).

- An extensive survey has been performed among the TTOs of light source RIs
- A further survey was performed at the Hannover Messe 2018

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# What's Innovation?

- Innovation, by Clayton Christensen*

*...a process by which a product or service takes root initially in simple applications at the bottom of a market and then **relentlessly moves up** market, eventually displacing established competitors...*

**Innovation is in ELI DNA:** this technology challenging project required innovative solution at every step (starting from the funding plan!).

**This DNA was influenced ELI mission for a boarder impact to society, beyond science to reach real-life application through innovation**

*Christensen, Clayton M. (1997), The innovator's dilemma: when new technologies cause great firms to fail

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# Innovation for large RI

During our interview to the TTOs and ILOs of the EUCALL large RI we identified 3 axes of innovation within the large RI*:

- **Industry as a supplier:** RIs can collaborate with the industry for a **joint development of technology.**
- **Industry as a user:** Industry can buy **commercial access** to the RIs for proprietary research and can access to the IP generated by the facility (**protection and commercialization of intellectual property**)

*See also the report "ESFRI Scripta Volume III, Innovation-oriented cooperation of Research Infrastructures, European Strategy Forum on Research Infrastructures Innovation Working Group

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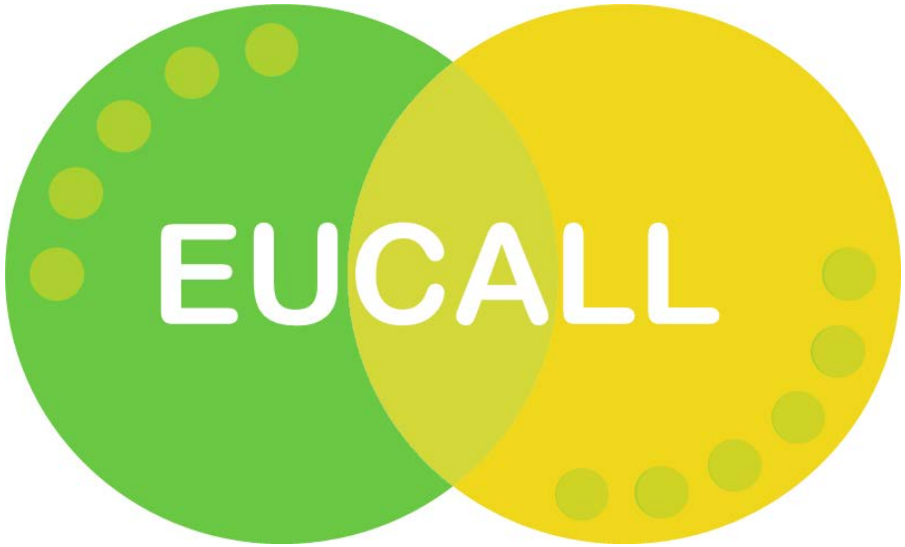


# Industry's awareness of potential for collaboration with RIs

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# Survey performed at the Hannover Messe 2018

25 companies, small to large, EU-based, bio and mat. science

- **General lack of awareness** among the industry about the possibilities of collaboration with large RIs.
- The companies expressed the opinion that the experimental capabilities of large RIs are **“too advanced”** for their needs.
- The company that had the highest awareness of large RIs had itself **employed a former synchrotron scientist** into its research and development group.

**Outreach challenge for the industrial services?**

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# Contract research companies (also Hannover Messe 2018)

- Perform advanced materials science analysis for external clients
- Appear to be widespread

Can large RIs can benefit from direct engagement of these companies?

**Mediator companies were identified as an efficient solution also during the EUCALL interviews (e.g. at PSI the company EXCELSUS)**

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# Joint development of technology

In the report are collected the conclusions of the best practices for an efficient joint development of technology between the RIs and the industry.

Also 5 models of joint development are identified and described in detail

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# Joint development of technology

- **Visibility.** Increasing the visibility of companies whose products have been developed via collaboration with an RI might increase the economic impact of RIs.
- **Exchange.** Knowledge about expertise is common knowledge within one community. Exchanging between communities of such expertise could stimulate innovation and cross-pollination of idea.
- **Dissemination.** The RIs must reserve the right to exchange general information with other facilities about with whom they are working and in what field.
- **Protection.** NDAs are critical to reduce “hidden technology transfer” between RI staff and industry

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# Models of Joint Development

Five different models describing ALL-RIs' joint development of technology with industry.

The differentiating factor is the role of each partner in the joint development.

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# Models of Joint Development

**The RI provides the IP, the company provides the engineering**

- In this model the RI has developed a new technique and has protected the intellectual property. A private company is necessary for the prototyping, implementation and debugging of the technology
- The RI then licenses the technique for royalty fees.

**An example is PSI, which jointly developed a component of their on-site proton therapy center with an industrial supplier.**

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# Models of Joint Development

**The RI proposes an evolution of a commercial product implemented at the facility**

- In this model, while using a commercial product, RI staff identify a way to enhance the performances for a specific (scientific) application. The company then proposes the evolution of the product as an option or as a standard and rewards the RI with royalty fees.

**An example is at HZDR, which co-developed a few technologies with a laser supplier.**

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# Models of Joint Development

**The RI owns the IP and performs the engineering, the company manufactures the product**

- In this model the RI could reach the market with the new technology independently from any form of partnership.
- This approach usually implies the deep involvement of the RI staff to transfer the technology to the company (joint venture?).

**This model could be of use to ESRF and ELI-Beamlines in the future to bring their own technologies to the market.**

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# Models of Joint Development

**The RI proposes an idea, the company develops the technique and the technology.**

- In this model, the RI typically expresses an advanced requirement. If the potential market justifies it, a company can decide to develop the technique and the technology to realize the product.

**The RI usually acts as a beta-tester before the final version of the product reaches the market.**

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# Models of Joint Development

**The RI and a company create a so-called "Joint Lab"**

- Their efforts are joined, with shared resources in terms of work forces, financial support and equipment.
- This scheme is likely the most appropriate to ensure developing a successful long-term strategy, producing state-of-the-art outcomes that will fit the market.

**An example of a Joint Lab, formed with an optical laser RI, is the IMPULSE Joint Lab between Amplitude Technology and the Laserlab-Europe LIDYL laboratory of CEA.**

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# Protection and commercialization of intellectual property

The report collects the TTOs observation about the relation between the researchers and the IP protections, and the recommendations on the development of spin-offs of the RIS

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# IP and researchers

## Motivation of RIs' researchers to engage the technology transfer office

- **Training of the researchers** about processes involved in protection and commercialization of intellectual property is imperative in developing the innovation potential of RIs.

## Visibility out of the facility of the generated IP

- **A database of patents held by ALL-RIs** could be established, so that patent-holders could more easily find researchers with similar interests at partner RIs for possible collaboration.

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# RIs and spin-offs

- **“key performance indicator”** definition for the economic impact of an RI is needed.

- The success of RI spin-off companies could be improved if **knowledge about the companies is disseminated** within the network of RIs.

- A **common procedure** within the European Union **to let the companies and the RIs collaborate on the prototyping of projects** would be very useful. The actual procedures must currently be negotiated case by case and this can be exhausting for a SME.

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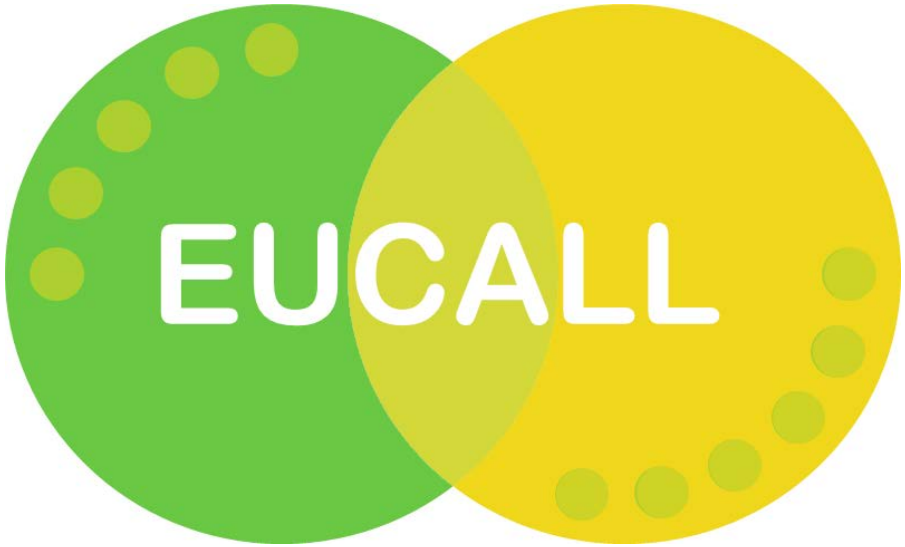


# Commercial access policies

In the reports the structure and activities of industrial liaison offices are described, as well as the role of the clusters of RIs within the project (Laserlab-Europe, CALIPSOplus, SINE2020, NFFA, ACCELERATE…)

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# The structure and activities of industrial liaison offices

- The structure and activities of industrial liaison offices at different light sources **varies greatly** over the range of facilities interviewed in the current report.
- Commercial access to ALL-RIs via the **use of mediator companies** such as *Excelsus Structural Solutions* and *Colloidal Resource Limited* is considered very important.
- A **cluster of RIs could offer a special access scheme** to these companies, which allows access to a diverse range of various synchrotrons, FEL, optical laser and also perhaps neutron sources.

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# Encountered problems and recommendations

**Motivation of RI staff scientists to perform industrial measurements.**

- Existing solutions are either a large number of experienced industrial liaison scientists or an additional budget to improve the beamline or to fund short-term positions

**Help the industry to find the best partner.**

- Establishment of an Industrial Advisory Panel consisting of experts in synchrotron, FEL, optical laser and neutron techniques who can provide advice on which techniques (from all sources) could be best for a given industrial problem..

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# Conclusions (philosophy)

**Research infrastructures and Industry – what are the ingredients for a successful relationship?**

- **Know yourself**: A clear message about the goals of a RIs (research, development, innovation) is necessary to communicate with industry necessary

- **Know your communities:** Industry and RIs must exchange as much as possible on their interaction, to get rid of the cultural differences and the misunderstanding.

- **Be creative.** Innovation is in the content but also in the methods.

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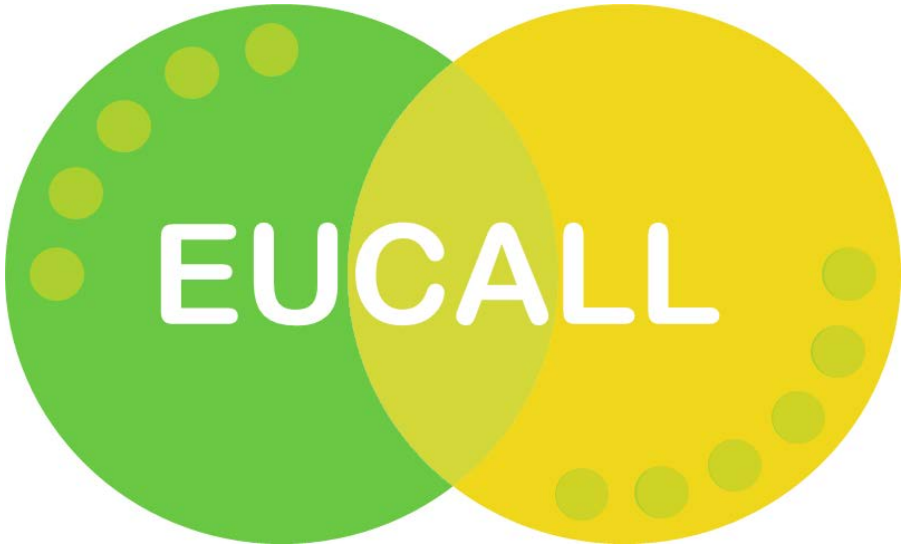


Thank you for your attention

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# ELI panel discussion

**What does a competitive advantage means for the scientific offer for a research infrastructure?**

If we try to make a non-exhaustive list:

- How to reach the customer differently?
- How to make customer life easier?
- How to define the offer to the users?
- How to motivate the researchers?
- How to work with the competition (the others European Light Sources)?

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